

ANNUAL ELECTRIC TRANSMISSION AVAILABILITY REPORT: 2024

ANNUAL ELECTRIC TRANSMISSION AVAILABILITY PERFORMANCE REPORT

Prepared by PG&E for California Independent System Operator (CAISO) - April 1, 2025

Performance Year 2024



Morro Bay - California Flats Solar Switching Station 230kV Transmission Line



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TABLE OF CONTENTS

2	<u>Section</u>	Subject	Page
3	1.	CAISO Maintenance Standards and Availability Performance	3
4	2.	How Control Charts Are Created	4
5	3.	How Control Charts Are Used to Monitor Performance	6
6	4.	Control Charts	7
7	5.	Performance Year 2024	13
8	6.	Discussion on Why Performance May Be Outside Control Chart Limits	24
9	7.	Discussion on Improving Performance	37
10	8.	Summary Outage Data	44

PACIFIC GAS AND ELECTRIC COMPANY



1 1. CAISO Maintenance Standards and Availability Performance

2 This annual report to the California Independent System Operator (CAISO or ISO) is prepared in accordance with Appendix C of the Transmission Control

- 3 Agreement (TCA) between each Participating Transmission Owner (PTO) such as Pacific Gas and Electric Company (PG&E) and CAISO. Section 4.3 of Appendix C
- 4 (Updated as of January 13, 2013) entitled CAISO TRANSMISSION MAINTENANCE STANDARDS states:
- 5 "Each PTO shall submit an annual report to the CAISO . . . describing its Availability Measures performance. This annual report shall be based
- 6 on Forced Outage records. All Forced Outage records shall be submitted by each PTO to the CAISO and shall include the date, start time, end
- 7 time affected Transmission Facility, and the probable cause(s) if known."

8 The Availability Measure Targets are defined in Appendix C as "The Availability performance goals established by the ISO," which are based on the control chart

- 9 limits described and shown later in this report.
- 10 The purpose of the ISO Maintenance Standards is to promote safe, cost effective and reliable electric transmission service consistent with the requirements of
- 11 California Assembly Bill 1890. A fundamental precept behind these standards is that the adequacy and effectiveness of a PTO's maintenance of its electric
- 12 transmission system can be gauged by monitoring transmission availability performance. This performance is characterized by calculating three measures
- 13 (indices) related to "forced" outages (see Section 3 of this report for what constitutes a forced outage) on all CAISO-controlled circuits within a voltage class. A
- 14 majority, but not all, of PG&E transmission circuits have been assigned as being under CAISO control. Two indices measure the relative frequency of outages –

15 Annual Average Forced Outage Frequency (FREQUENCY) and Annual Proportion (PROPORTION) of Circuits with No Forced Outages. A third index measures the

16 duration of those outages – Annual Average Accumulated Forced Outage Duration (DURATION) for those Circuits with Forced Outages. As with all processes or

- 17 systems, variations in annual performances as defined by these three indices are inherent and expected. Control charts can be helpful in indicating whether
- 18 variation is due to common (i.e., random) causes, or to special (i.e., assignable) causes, and whether the electric transmission system is in a state of statistical
- 19 control. If the system is in a state of control, then maintenance practices are presumed to be adequate and effective. However, if a control chart indicates a
- 20 system is not in statistical control, then special cause(s) is likely and maintenance practices by the PTO may need review.
- This report presents the control charts as calculated by CAISO using outage data submitted by PG&E and then jointly reconciled for any discrepancies through performance year 2024. The report also shows results of applying 48 tests to the 12 charts (4 tests per chart) to help determine whether annual performance
- 22 performance year 2024. The report also shows results of applying 46 tests to the 12 charts (4 tests per chart) to help determine whether annual performance
- 23 for each of four voltage classes is improving, degrading, or in a state of statistical control.



1 2. HOW CONTROL CHARTS ARE CREATED

- 2 Control charts are used to measure and assess the performance of a process. Such charts not only account for random variations in processes, especially those
- 3 with relatively wide tolerances, but can also illustrate an expected range of performance based on historical data. They can also assist with discrete
- 4 observations of recent performance improvement, decline or stability. Quality control and improvement are based on assessment of processes. Without
- 5 methods to quantitatively show how a process is performing, reasonable decisions cannot be made about whether a process is improving, deteriorating, or
- 6 performing as expected (stable).
- 7 The process being measured is the availability of PG&E's electric transmission (ET) lines specifically, lines or circuits operating at 60,000 & 70,000 volts
- 8 (combined for this report and reported as "69kV"), 115kV, 230kV and 500kV where operational control was transferred to the CAISO. Availability is a measure
- 9 of the time a transmission line circuit can provide service, and is the key indicator in the adequacy and effectiveness of maintenance by PG&E. The availability
- 10 performance monitoring system is measured through three indices:
- 11 o Index 1: FREQUENCY = Annual average forced outage frequency for all circuits.
- 12 o Index 2: DURATION = Annual average accumulated forced outage duration for those circuits with forced outages.
- 13 Index 3: PROPORTION = Annual proportion of lines with no forced outages.
- 14 The CAISO defines an outage as an interruption of the flow of electricity in a transmission line between terminals. However, to enhance the use of availability
- 15 measures as a gauge of maintenance effectiveness, it is necessary to exclude certain types of outages. Excluded outages include scheduled outages, outages
- 16 not classified as a forced outage as per the ISO's Maintenance Procedures, outages originating outside PG&E's system, and outages caused be earthquakes.
- 17 Section 4.1.3 of Appendix C of the Transmission Control Agreement provides guidance for identifying outages that should be excluded from the availability
- 18 measures and availability measure targets. In 2024 there were a total of 1,124 outages, 90 which were excluded bringing us to total of 1,034 outages to be
- 19 considered for the calculation of the annual availability measures.
- 20 In addition, any forced outage with a duration exceeding 72 hours is capped at 4,320 minutes so as not to skew the control chart results and compromise
- 21 meaningful interpretation of Index 2 results. In 2024 there were 70 outages that were capped. After capping the outages at 72 hours, the total outage duration
- 22 to be considered for the calculation of annual availability measures was 711,411 minutes.



- 1 The control charts included in this report are time ordered plots of each index mentioned above for each of four transmission voltage classes within PG&E. The
- 2 four classes at PG&E are 69kV, 115kV, 230kV and 500kV. A total of 12 charts—3 indices per voltage class and 4 voltage classes—are created by CAISO using
- 3 outage data provided by PG&E and verified by CAISO to characterize how circuits within a voltage class perform on a yearly basis. Adequacy of PG&E's
- 4 availability performance is gauged against its own historical performance and not against other participating utilities.



3. HOW CONTROL CHARTS ARE USED TO MONITOR PERFORMANCE

- 2 After control charts are updated to include 2024 outage data, four tests are visually applied to each chart to detect performance changes:
 - Test 1: Control Limit Test—does the data point for the current year fall outside the upper control limit or lower control limit of the chart?
 - Test 2: Center Line Test—do "v1" consecutive annual data points fall above or "v2" consecutive points fall below the centerline of the chart?
 - Test 3: Warning Limit Test—do at least 2 out of 3 consecutive annual data points including the most recent performance year fall outside the upper or lower warning limits on the same side of the centerline?
 - Test 4: Trend Test—do 6 or more values consecutively increase or consecutively decrease?
- 8 The first test detects any short-term change in the average performance; tests 2 and 4 are looking for longer-term changes. Test 2 will detect a shift up in
- 9 averages or a shift to a lower level. Values of v1 and v2 for test 2 are determined from TABLE 3-1 below and the Percentile Value "V" output calculated by
- 10 statistical software MINITAB. Test 4 shows any trend of continuous increase or decrease in the average values. Test 3 assesses changes in performance during
- 11 an intermediate (i.e., 3-year) period. The four tests allow PG&E to monitor availability performance by kV class.

		0
Percentile	v1	v2
35-39	10	5
40	10	6
41-43	9	6
44-46	8	6
47-48	8	7
49-51	7	7
52-53	7	8
54-56	6	8
57-59	6	9
60	6	10
61-65	5	10

TABLE 3-1: Values of v1 and v2 for Percentiles of the CL in Specified Ranges

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- 1 4. CONTROL CHARTS
- 2 The calculation of the availability measures is performed using forced outage data for the calendar year being assessed. The average forced outage frequency
- 3 and average accumulated forced outage duration is calculated for each transmission line within each voltage class. The annual proportion of transmission lines
- 4 that did not experience a forced outage comprises the third measure.
- 5 **TABLE 4-1** shows the data points for annual actuals in the control charts that follow.
- 6

TABLE 4-1: Historical Actuals (Annual Data Points) for Control Charts

		69kV			115kV			230kV			500kV	
Year	Proportion No Outages	Mean Outage Duration	Mean Outage Frequency	Proportion No Outages	Mean Outage Duration	Mean Outage Frequency	Proportion No Outages	Mean Outage Duration	Mean Outage Frequency	Proportion No Outages	Mean Outage Duration	Mean Outage Frequency
2003	0.289809	992.82	2.340764	0.520833	1073.57	1.214286	0.472727	826.00	0.975758	0.157895	1684.69	2.000000
2004	0.287066	1187.57	2.201893	0.510386	1143.13	1.213650	0.512195	1386.48	0.823171	0.500000	1401.50	0.700000
2005	0.273585	1311.61	2.402516	0.473684	1309.36	1.166667	0.632530	1152.67	0.574074	0.500000	512.50	0.900000
2006	0.242138	1718.60	2.842767	0.424419	1384.14	1.488372	0.464706	927.79	0.898810	0.500000	1186.00	0.800000
2007	0.244514	1494.63	2.385580	0.332378	1727.38	1.722063	0.305389	1603.93	1.479042	0.500000	1587.70	0.750000
2008	0.201258	2697.32	3.776730	0.231214	2562.83	2.482659	0.376471	2443.15	1.553571	0.400000	3451.25	1.500000
2009	0.248447	1819.38	2.683230	0.312500	1778.24	1.664773	0.360947	1873.90	1.359281	0.400000	2858.50	1.200000
2010	0.285714	1619.20	2.618012	0.332394	1208.97	1.523944	0.519553	1132.54	0.853107	0.500000	2221.70	0.700000
2011	0.297214	1897.04	2.340557	0.453782	1571.10	1.193277	0.520231	1446.40	0.912281	0.650000	1977.71	0.500000
2012	0.374613	1423.20	1.566563	0.491620	1630.94	1.094972	0.571429	1380.05	0.716763	0.500000	1767.10	1.400000
2013	0.510903	1042.74	0.950156	0.516304	1253.37	0.807065	0.569948	1952.02	0.756477	0.565217	1895.60	0.782609
2014	0.367925	531.38	1.474843	0.542466	497.63	0.827397	0.668712	428.48	0.490798	0.500000	1318.00	1.000000
2015	0.266871	1122.32	2.168712	0.449864	1182.17	1.252033	0.497268	1852.90	0.939891	0.571429	908.33	0.571429
2016	0.326220	973.98	1.649390	0.539894	1140.95	0.864362	0.620321	893.72	0.631016	0.555556	244.50	0.611111
2017	0.291667	1446.25	2.482143	0.514667	1104.56	1.008000	0.648649	1231.63	0.637838	0.578947	1338.63	1.210526
2018	0.372727	1255.87	1.587879	0.552561	866.60	0.943396	0.673684	980.06	0.555556	0.444444	1319.30	0.888889
2019	0.340491	1447.29	2.168712	0.566038	1097.49	0.929919	0.640212	708.45	0.595745	0.470588	2222.00	0.882353
2020	0.292683	1008.99	1.701220	0.523936	1115.40	0.949468	0.614973	1410.24	0.641710	0.368421	2056.92	1.315790
2021	0.318182	1492.04	2.018180	0.526739	1287.79	1.050800	0.642105	1361.12	0.636840	0.157895	1800.40	1.666670
2022	0.324074	1167.53	1.703703	0.613941	861.87	0.640750	0.684211	1115.37	0.436842	0.421053	3766.82	1.105260
2023	0.304348	1958.62	2.360250	0.546917	1127.06	0.897570	0.690722	3564.77	0.670100	0.473684	7417.40	1.315790
2024	0.361111	1362.65	1.69753	0.560332	857.54	0.815010	0.716418	4349.79	0.76617	0.444444	4173.10	1.777778



1 FIGURE 4-1, FIGURE 4-2, FIGURE 4-3 and FIGURE 4-4 that follow are reproductions of the control charts for 2024 as calculated by CAISO using outage data 2 provided by PG&E and checked by CAISO with its records. As described earlier in this report, if a test is triggered (i.e., if one can answer in the affirmative to the 3 test question and conclude the test "failed"), it may indicate presence of a "special" cause(s) of variability (rather than a chance or common cause(s) that is inherent to a system or process), and the failure may be indicative of statistically significant performance improvement (TRIGGERED) or degradation 4 5 (TRIGGERED). Conversely, if a test is not triggered (NOT TRIGGERED), that generally means there is stable performance and that the electric transmission system is performing as expected relative to its historical performances, and further, that maintenance practices are likely adequate and effective. 6 7 Each figure that follows is divided into guadrants. The two upper guadrants and the lower left guadrant show the 3 control charts per class, one for each 8 performance index. The lower right quadrant provides a summary of the four tests applied to each control chart, and whether a specific test passed or failed. 9 Any test failure suggesting degrading performance is shown in red font, there were three such failures in 2024. A test failure indicating improved performance 10 is shown in green font, and there were nineteen such "failures" in 2024 suggesting statistically significant improvement in availability performance across some

11 voltage classes.





FIGURE 4-1: 2024 Control Charts – 69kV Class

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FIGURE 4-2: 2024 Control Charts – 115kV Class

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FIGURE 4-3: 2024 Control Charts-230kV Class

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FIGURE 4-4: 2024 Control Charts-500kV Class



1 **5. PERFORMANCE YEAR 2024**

- 2 Control charts for performance year 2024 indicate an increase in transmission system availability. 915 circuits were reported as CAISO-controlled for this
- 3 report. There were 1,034 unplanned forced outages recorded in 2024 with accumulated capped facility outage duration equal to 711,441 minutes. These 2024
- 4 results were less than those reported for 2023, with 1,248 unplanned outages and 924,268 accumulated minutes. The transmission system availability in the
- 5 69kV and 115kV voltage classes rebounded from the extreme weather events in Quarter 1 of 2023 and continued the trend of increased performance, while
- 6 the 230kV and 500kV voltage classes saw a decrease in availability. The 230kV and 500kV voltages classes are being impacted by an increase in outage
- 7 frequency and duration due to voltage issues stemming from light loading and behind-the-meter PV. These high voltage conditions are mitigated by de-
- 8 energizing lines to ensure the overall stability of the larger transmission network. In addition, the 500kV voltage class was also impacted by an increase in
- 9 wildfire activity in 2024. Details around these events, as well as PG&E's strategy will be discussed in detail in this report.



- 1 **FIGURE 5-1** is a Pareto chart showing the spread of accumulated outage frequency over the 915 circuits in 2024. The chart shows that 230 (25%) of the
- 2 transmission lines accounted for 80% of the unplanned forced outages. Additionally, 476 (52%) of the 915 circuits had zero unplanned forced outages in 2024.
- 3

FIGURE 5-1: Accumulated Outage Frequency 2024





- 1 FIGURE 5-2 is a Pareto chart showing the spread of accumulated outage durations over the 915 circuits in 2024. It shows that 92 (10%) of the 915 circuits
- 2 accounted for 80% of the facility outage minutes.
- 3







- 1 HISTORICAL AVERAGE CIRCUIT OUTAGE FREQUENCY / DURATION (ACOF / ACOD):
- 2 The ACOF and the ACOD reinforce PG&E's historical performance improvement in transmission availability.
- 3 FIGURE 5-3 shows ACOF and ACOD for all PG&E transmission circuits, not just those that are CAISO controlled. The plots show that these metrics were
- generally trending downward from 2010 through 2022. However, in 2023, due to extreme weather events, tree failures, and increased voltage mitigations, 4
- 5 performance suffered. Due to fewer weather impact days in 2024, ACOF and ACOD for PG&E's transmission system trended towards historical performance.
- The two graphs reinforce the conclusions derived from the control charts in this report for accumulated outage frequency and duration. 6



FIGURE 5-3: PG&E Historical Performances ACOF and ACOD – All Voltages

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10 The shape of the outage frequency and duration can indicate how much of an impact some of the worse performing lines had on overall availability. FIGURE 5-

11 4 and FIGURE 5-5 indicate an improvement in 2024 compared to that in 2023. The shape of the outage frequency in 2024 indicates that a few poor performing

12 lines had a significant impact on outage frequency.



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ANNUAL ELECTRIC TRANSMISSION AVAILABILITY REPORT: 2024





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ANNUAL ELECTRIC TRANSMISSION AVAILABILITY REPORT: 2024

FIGURE 5-5: Shape of Outage Frequency 2023





1 WEATHER SUMMARY

Weather is a contributing factor to transmission availability. PG&E's meteorology department tracks storms and their potential impact on PG&E assets so
emergency preparedness resources can be allocated accordingly. All days are given a classification of Blue Sky (BS), Gray Sky (GS), or Storm Day (SD). A Blue Sky
Day is defined as a non-weather impact day. A Gray Sky Day is defined as a weather impact day that does not meet the criteria of a Storm Day. And a Storm
Day is defined as a weather impact day with a System Average Interruption Duration Index (SAIDI) greater than 0.620 and the number of system wide outages
greater than 90. When a day is classified as a weather impact day (GS/SD), a subcategory is assigned to further define what type of weather was involved.
Figure 5-6 shows the breakdown of subcategories for the last 10 years. The meteorology data shows that 2024 had the third highest count of weather impact
days over the last 10 years.

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FIGURE 5-6: Annual Weather Impact Day Details



1 **Table 5-1** provides definitions for the different types of weather impact days.

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	TABLE 5-1: Weather Impact Day Type Definitions
Weather - Type	Description
	Weather type selected for classic winter storms where strong southerly winds are usually observed and
Winter Storm	are the primary damage pathway. Note that winter storms may also be accompanied by heavy rain /
	low snow / and lightning.
	Heavy rain resulting in elevated outage activity, not accompanied by wind. Heavy rain can cause a
Rain	number of issues from underground vault flooding to vegetation sagging to pole/tree failure due to soil
	instability. This category is also used for insulator-flash events driven by rain or drizzle.
Lightning	Any outage event caused by thunderstorms and lightning.
	Weather type used when strong offshore (northerly or northeast winds) result in elevated outage
North East	activity. This includes Diablo and Santa Ana wind events. An example are the classic offshore winds
	events where surface high pressure develops in the Upper Great Basin.
North Woot	Strong northwest or westerly winds resulting in elevated outage activity. An example are the strong
North West	winds that develop after a cold frontal passage or a stronger than normal sea breeze.
Heat	Heat-related outage activity due to hot ambient temperatures.
	The outage type used when outage activity is due primarily to abundant snow-loading. These events
Low Snow	are most common across the lower elevations (< 4000') such as the Sierra foothills where there is
	generally more distribution and vegetation is more susceptible to snow-load.
	Public Safety Power Shutoff Outages, almost always due to Northeast wind events. PSPS was created
PSPS	instead of keeping these as Northeast Flagged due to the substantially increase outage numbers during
	a typical PSPS.
Other	Weather type used for storm residual, rare, or unknown weather events.



1 OUTAGE FREQUENCY DISTRIBUTION

2 **FIGURE 5-7** shows the number of outages by month in 2024. February was the outlier for outage frequency in 2024.



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FIGURE 5-8 further details the months of February by day. February 4th had the largest single-day outage count in 2024 with 110 outages and also represented the largest single-day outage count experienced over the last 15 years.



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FIGURE 5-9 shows nine days with double-digit counts of forced outages in 2024.



1 2 3

4 5 6

Note: Per IEEE 1366 a Major Event Day (MED) is a day when events exceed reasonable design or operational limits of the electric power system. Statistically,

days having daily system SAIDI greater than the annually calculated threshold (T_{MED}) are days on which the energy delivery system experienced stresses beyond
 those that are normally expected (such as during severe weather).



ANNUAL ELECTRIC TRANSMISSION AVAILABILITY REPORT: 2024

1 6. DISCUSSION WHY PERFORMANCE MAY BE OUTSIDE CONTROL CHART LIMITS

2	All systems and processes and their outputs exhibit variability. Control charts help monitor variability and can be used to differentiate common causes of
3	variability from special causes. Common – or chance – causes are numerous small causes of variability that are inherent to a system and operate randomly.
4	Special – or assignable – causes can have relatively large effects on the process and may lead to a state that is out of statistical control—i.e., outside control
5	chart limits. The probability that a point falls above the upper control limit (for most control chart designs, usually an indicator of significant process
6	degradation) or below the lower control limit (an indicator, usually, of significant process improvement) if only common causes are operating is approximately
7	0.00135. It is therefore unlikely to have measures fall beyond the control limits when no special cause is operating. False alarms are possible, but the
8	placement of the control limits at 3 standard deviations (+/-) from the process average is thought to control the number of false alarms adequately in most
9	situations. The simplest rule for detecting presence of a special cause is one or more points that fall beyond upper or lower limits of the chart. The chart can be
10	more sensitive and effective in detecting out of control states if other signals and patterns that are unlikely to occur by chance alone are considered. ^[1] Tests 2,
11	3 and 4 described in the previous section of this report are examples of such signals or patterns.
12	Examples of special causes of variability in a manufacturing environment include changes in raw materials, differences in relationships among production
13	equipment, materials, and workers, and changes in manufacturing conditions, which for this discussion could be changes in how planned outages are recorded.
14	For electric overhead transmission—especially facilities in the PG&E service territory designed and operated at 60kV and 70kV—severe storms and other
15	natural disasters such as wildfires can be a special cause. A high number of simultaneous outages during such disasters increases restoration times due to
16	limited or restricted access, resource limitations (e.g., priority to restore customers vs. restoring transmission facilities), and personnel safety concerns (e.g.,
17	limited winter daylight hours, limited visibility, insufficient rest periods, and slippery or icy roads).
18	As shown in Section 4 of this report, there were three results that reflected negatively on availability performances however the causes cannot typically be
19	addressed by PG&E maintenance practices.
20	
21	

23 ^[1] Levine, Ramsey, Smidt; Applied Statistics for Engineers and Scientists; copyright 2001 by Prentice Hall, Inc., Chapter 6



1 OUTAGE CAUSE BREAKDOWN

2 **TABLE 6-1** is a summary of the frequency and accumulated duration of unplanned transmission outages by cause category for 2024.

	TABLE 6-1: Number and Accumulate	d Duration ((Capped)	of Unplann	ed Transmission Outages by Cause Category	2024	
CAISO				CAISO		Accumulated	
Primary	CAISO Outage	Accumulated	%	Primary	CAISO Outage	Duration	
Cause	Primary Cause Code Description	Frequency	Frequency	Cause	Primary Cause Code Description	(capped)	% Duration
UNKN	Unknown	245	23.7%	DIST	System Disturbance	213,604	30.0%
LEQP	Line Equipment Problem	186	18.0%	LEQP	Line Equipment Problem	148,157	20.8%
DIST	System Disturbance	88	8.5%	VEGA	Vegetation	81,515	11.5%
VEGA	Vegetation	67	6.5%	SEQP	Substation Equipment Problem	42,384	6.0%
OTHR	Other	66	6.4%	FIRE	Fire	36,397	5.1%
ANIM	Animal Contact	64	6.2%	VEH	Vehicle Contact	34,642	4.9%
LIGT	Lightning	53	5.1%	UNKN	Unknown	30,942	4.3%
VEH	Vehicle Contact	49	4.7%	СВ	Circuit Breaker Trouble	19,964	2.8%
FIRE	Fire	40	3.9%	LATE	Late Notification	16,693	2.3%
SEQP	Substation Equipment Problem	37	3.6%	OTHR	Other	16,328	2.3%
OPER	Operating error	28	2.7%	WEAT	Weather	16,235	2.3%
PROT	Protection	26	2.5%	ANIM	Animal Contact	13,074	1.8%
CNTM	Contamination	21	2.0%	OPER	Operating error	13,018	1.8%
СВ	Circuit Breaker Trouble	18	1.7%	PROT	Protection	12,938	1.8%
WEAT	Weather	18	1.7%	LIGT	Lightning	6,252	0.9%
LATE	Late Notification	16	1.5%	CNTM	Contamination	5,948	0.8%
UC	Utility Contact	6	0.6%	AIR	Aircraft	1,774	0.2%
MB	Mylar Balloon	3	0.3%	ND	Natural Disaster	1,087	0.2%
ND	Natural Disaster	2	0.2%	UC	Utility Contact	427	0.1%
AIR	Aircraft	1	0.1%	MB	Mylar Balloon	62	0.0%
	TOTALS	1,034	100%		TOTALS	711,441	100%

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6 Note: Per CAISO Procedure 2: DIST (System Disturbance) Primary Cause lists the following as examples: outages are caused by frequency instability, system low 7 frequency automatic load shedding, line tripped due to RAS, loss of load diversity, open for voltage control, or overload. For 2024, the DIST outages identified

8 above were all caused by opening transmission lines for voltage control.



1 **TABLE 6-2** summarizes the frequency and accumulated duration of unplanned transmission outages by cause category and by voltage class in 2024.

	CAISO Outage	69kV				1	15kV		230kV				500kV				
CAISO Cause	Primary Cause Code Description	F*	%F	D**	%D	F*	%F	D**	%D	F*	%F	D**	%D	F*	%F	D**	%D
AIR	Aircraft	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	3.1%	1,774	4.3%
ANIM	Animal Contact	36	6.6%	5,324	1.9%	24	7.9%	3,325	2.4%	4	2.6%	4,425	1.8%	0	0.0%	0	0.0%
СВ	Circuit Breaker Trouble	4	0.7%	927	0.3%	9	3.0%	17,761	12.7%	5	3.3%	1,276	0.5%	0	0.0%	0	0.0%
CNTM	Contamination	6	1.1%	665	0.2%	13	4.3%	3,655	2.6%	2	1.3%	1,628	0.7%	0	0.0%	0	0.0%
DIST	System Disturbance	0	0.0%	0	0.0%	3	1.0%	731	0.5%	70	46.1%	191,555	78.1%	15	46.9%	21,318	51.1%
FIRE	Fire	15	2.7%	10,537	3.7%	8	2.6%	5,853	4.2%	6	3.9%	6,051	2.5%	11	34.4%	13,956	33.4%
LATE	Late Notification	11	2.0%	12,257	4.3%	4	1.3%	4,354	3.1%	0	0.0%	0	0.0%	1	3.1%	82	0.2%
LEQP	Line Equipment Problem	117	21.4%	94,555	33.3%	55	18.2%	40,336	28.8%	12	7.9%	9,219	3.8%	2	6.3%	4,047	9.7%
LIGT	Lightning	16	2.9%	706	0.2%	27	8.9%	4,030	2.9%	10	6.6%	1,516	0.6%	0	0.0%	0	0.0%
MB	Mylar Balloon	1	0.2%	60	0.0%	2	0.7%	2	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
ND	Natural Disaster	2	0.4%	1,087	0.4%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
OPER	Operatingerror	16	2.9%	2,404	0.8%	8	2.6%	10,147	7.2%	4	2.6%	467	0.2%	0	0.0%	0	0.0%
OTHR	Other	41	7.5%	9,186	3.2%	21	7.0%	6,603	4.7%	4	2.6%	539	0.2%	0	0.0%	0	0.0%
PROT	Protection	14	2.6%	3,973	1.4%	8	2.6%	3,374	2.4%	4	2.6%	5,591	2.3%	0	0.0%	0	0.0%
SEQP	Substation Equipment Problem	8	1.5%	8,636	3.0%	17	5.6%	15,220	10.9%	12	7.9%	18,528	7.6%	0	0.0%	0	0.0%
UC	Utility Contact	2	0.4%	339	0.1%	4	1.3%	88	0.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
UNKN	Unknown	139	25.4%	17,197	6.0%	85	28.1%	8,782	6.3%	19	12.5%	4,409	1.8%	2	6.3%	554	1.3%
VEGA	Vegetation	59	10.8%	73,841	26.0%	8	2.6%	7,674	5.5%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
VEH	Vehicle Contact	43	7.8%	26,421	9.3%	6	2.0%	8,221	5.9%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
WEAT	Weather	18	3%	16,235	6%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
F	* Accumulated Frequency																
D*	* Accumulated Duration (Capped)																

TABLE 6-2: Frequency and Accumulated Duration (Capped) of Unplanned Transmission Outages by Cause Category and Voltage Class 2024

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FIGURE 6-1 shows the number of outages by cause category and voltage class as a percentage of the total number of outages in 2024 (1,034). FIGURE 6-1: Frequency of Outages by Cause



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	2024 Duration of Outages Expressed as Pe	rcent of Total D	uration (71	1,441 min	utes)		-	٦		-		
CAISO	CAISO Outage	CAISO						28% -				
Cause	Primary Cause Code Description	Cause	69kV	115kV	230kV	500kV						
AIR	Aircraft	AIR	0.0%	0.0%	0.0%	0.2%		-				
ANIM	Animal Contact	ANIM	0.7%	0.5%	0.6%	0.0%		24% -				
CB	Circuit Breaker Trouble	CB	0.1%	2.5%	0.2%	0.0%		_				
CNTM	Contamination	CNTM	0.1%	0.5%	0.2%	0.0%	es	200%				
DIST	System Disturbance	DIST	0.0%	0.1%	26.9%	3.0%	tag	20%				
FIRE	Fire	FIRE	1.5%	0.8%	0.9%	2.0%	no	-				
LATE	Late Notification	LATE	1.7%	0.6%	0.0%	0.0%	tal	16% -				
LEQP	Line Equipment Problem	LEQP	13.3%	5.7%	1.3%	0.6%	To					
LIGT	Lightning	LIGT	0.1%	0.6%	0.2%	0.0%	tof]				
MB	Mylar Balloon	MB	0.0%	0.0%	0.0%	0.0%	en	12% -				
ND	Natural Disaster	ND	0.2%	0.0%	0.0%	0.0%	erc	-				
OPER	Operating error	OPER	0.3%	1.4%	0.1%	0.0%	Δ.	8% -				
OTHR	Other	OTHR	1.3%	0.9%	0.1%	0.0%						
PROT	Protection	PROT	0.6%	0.5%	0.8%	0.0%		1				
SEQP	Substation Equipment Problem	SEQP	1.2%	2.1%	2.6%	0.0%		4% -				
UC	Utility Contact	UC	0.0%	0.0%	0.0%	0.0%		-		-		
UNKN	Unknown	UNKN	2.4%	1.2%	0.6%	0.1%		0%				
VEGA	Vegetation	VEGA	10.4%	1.1%	0.0%	0.0%		0 /0 -	LL I	×	8	×
VEH	Vehicle Contact	VEH	3.7%	1.2%	0.0%	0.0%			\triangleleft	AN	0	CN1
WEAT	Weather	WEAT	2.3%	0.0%	0.0%	0.0%						-
	· · · · · · · · · · · · · · · · · · ·	Totals	40.0%	19.7%	34.5%	5.9%						





1 VOLTAGE MITIGATION OUTAGES

- 2 Similar to 2023, PG&E's transmission system experienced an increase in voltage mitigation related outages in 2024 compared to the previous year. When 3 PG&E's system experiences light loading and a significant portion of the load is being served by behind-the-meter PV and other solar generation, high voltages 4 develop across the system. In order to maintain the stability of the larger transmission network, PG&E must make unplanned forced outages of targeted lines 5 throughout the system to mitigate the high voltages being experienced. **TABLE 6-3** shows the accumulated capped duration and outage frequency for all transmission lines that had voltage mitigation outages. These outages do not have a have customer impact, but they do have an impact on the availability of 6 7 the transmission system. The impacts of these outages were significant in 2024 with DIST (Voltage Mitigation) outages accounting for the highest capped 8 accumulated duration and the most frequent cause of outages on the 230kV system by a large margin. Discounting these outages would have resulted in the 9 230kV average accumulated forced outage duration to fall just above the Lower Warning Limit of the control chart (Figure 4-3). These voltage mitigation 10 outages continue to rise. Compared to 2023, voltage mitigation outage frequency increased 31% and duration increased 6%. The moderate increase in 11 duration is due to many of these outages being capped at 4320 minutes. Section 7 of this report will discuss how PG&E and the California ISO have been 12 working towards dealing with the voltage issues proactively through the transmission planning cycle.
- 13

TABLE 6-3: 2024 Transmission Voltage Mitigation Outages

	Voltage	Accumulated Duration		Voltage	Accumulated
Transmission Line ID	Class	Capped	Transmission Line ID	Class	Frequency
MORRO BAY-CALIFORNIA FLATS SW STA	230	76,276	MORRO BAY-CALIFORNIA FLATS SW STA	230	30
MORRO BAY-SOLAR SW STA #2	230	70,018	MORRO BAY-SOLAR SW STA #2	230	27
ROCK CREEK-POE	230	18,118	LOS BANOS-MIDWAY #2	500	7
POE-RIO OSO	230	13,820	DIABLO-MIDWAY #3	500	5
DIABLO-MIDWAY #3	500	12,222	ROCK CREEK-POE	230	5
ARCO-MIDWAY	230	4,320	POE-RIO OSO	230	4
FINK SW STA-WESTLEY	230	4,320	ARCO-MIDWAY	230	1
RIO OSO-LOCKEFORD	230	4,320	DIABLO-GATES #1	500	1
ROUND MTN-TABLE MTN #1	500	4,320	FINK SW STA-WESTLEY	230	1
LOS BANOS-MIDWAY #2	500	2,417	RIO OSO-ATLANTIC	230	1
ROUND MTN-TABLE MTN #2	500	2,059	RIO OSO-LOCKEFORD	230	1
RIO OSO-ATLANTIC	230	363	RIO OSO-WEST SACRAMENTO	115	1
DIABLO-GATES #1	500	300	ROUND MTN-TABLE MTN #1	500	1
RIO OSO-WEST SACRAMENTO	115	258	ROUND MTN-TABLE MTN #2	500	1
WOODLAND-DAVIS	115	241	WEST SACRAMENTO-DAVIS	115	1
WEST SACRAMENTO-DAVIS	115	232	WOODLAND-DAVIS	115	1
TOTALS		213,604	TOTALS		88



FIGURE 6-3 shows the number of voltage mitigation outage by month.





1 <u>UNKNOWN OUTAGES</u>

- 2 UNKN (Unknown) was the most frequent outage cause in 2024 and accounted for the seventh highest capped accumulated duration. PG&E patrols every
- 3 circuit after a line relay, regardless of whether it tests OK, tests no good, or was set up not to test, to facilitate cause identification. Momentary conditions are
- 4 not easily identified via these patrols. UNKN (Unknown) accounted for the seventh highest capped accumulated duration largely due to PG&E's practice of
- 5 disabling automatic reclosing during wildfire season and patrol time during weather impact days. When automatic reclosing is disabled, PG&E patrols each line
- 6 relay and confirms that it is safe to re-energize before doing so. The time required to patrol the line relays drives the UNKN (Unknown) outage durations.
- 7 **FIGURE 6-4** shows the correlation between the weather impact and outages where the cause cannot be determined.
- 8 9



FIGURE 6-4: 2024 Unknown Outages by Weather Impact



1 LINE EQUIPMENT OUTAGES

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- 2 LEQP (Line Equipment Problem) was the second most frequent outage cause in 2024 and accounted for the second highest capped accumulated duration.
- 3 Outages classified as LEQP (Line Equipment Problem) include outages resulting from failure of equipment causing a line relay event and from emergency forced
- 4 outages for emergency equipment repair or replacements. Through PG&E's enhanced inspection program, transmission line components identified to be in
- 5 need of urgent replacement are mitigated during a forced outage to prevent an in-service failure. **FIGURE 6-5** illustrates the comparison of forced vs. relayed
- 6 Line Equipment Problem outages in 2024.





- 1 VEGETATION OUTAGES
- 2 VEGA (Tree) was the fourth most frequent outage cause in 2024 and accounted for the third highest capped accumulated duration. **FIGURE 6-6** shows the
- 3 connection between weather impact days and vegetation caused outages; 94% of vegetation caused outages occurred on a weather impact day.
- 4



FIGURE 6-6: 2024 Vegetation Outages by Weather Impact



1 OUTAGES CLASSIFIED AS OTHER

2 OTHR (Other) was the fifth most frequent cause in 2024 but only accounted for the tenth highest capped accumulated duration. Per CAISO Procedure 2, the 3 OTHR (Other) Primary Cause lists the following as examples: foreign utility faulted, opened for foreign utility work, customer fault, tripped by foreign utility 4 personnel, opened at request of public authorities, and vandalism. By their very nature, many of these outages end up being excluded from the calculation of 5 the availability measures as per Section 4.1.3 of Appendix C or ISO Maintenance Procedure No. 5. However, PG&E has historically classified outages caused by 6 the distribution system or at the request of Distribution Operations as OTHR (Other). These outages are included in the calculation of the annual availability 7 measures. In 2024, just over 60% of the outages classified as OTHR (Other) can be attributed impacts from the distribution system. These outages almost 8 exclusively occurred on the 69 kV and 115 kV voltage classes where PG&E's transmission system is closely tied with its distribution system. 9 10 SUBSTATION EQUIPMENT OUTAGES 11 SEQP (Substation Equipment Problem) – was only the tenth most frequent cause in 2024 but accounted for the fourth highest capped accumulated duration.

The Primary Cause, SEQP (Substation Equipment Problem), list the following examples: terminal work, maintenance or test caused, opened for switching to

repair station equipment, replaced insulators, power transformer failed. While CB (Circuit Breaker Trouble) and PROT (Protection) are typically considered

substation components, ISO Maintenance Procedure No. 2 defines unique primary cause codes for these components. While SEQP (Substation Equipment

Problem), CB (Circuit Breaker Trouble) and PROT (Protection) outages are infrequent, their duration impact can be significant on transmission availability.

When considered together, SEQP, CB, and PROT outages accounted for over 10% of the outages and 8% of the outage duration in 2024.

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1 WILDFIRE SEASON

2 **TABLE 6-4** and quote below are taken from CAL FIRE web pages (<u>https://www.fire.ca.gov/incidents/2024</u> and <u>https://www.fire.ca.gov/our-impact/statistics/</u>):

"The 2024 fire year in California was marked by significant wildfire activity, exacerbated by a hotter-than-normal June and an abundance of fine fuels resulting
 from unusually wet winter and spring seasons. This combination rendered vegetation more susceptible to ignition and rapid fire spread, particularly in areas
 below 3,000 feet where dense growth was observed."

- 7 **TABLE 6-4** shows that there were no 2024 wildfires among the top 20 largest wildfires.
- 8

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FIRE NAME (CAUSE)	DATE	COUNTY	ACRES	STRUCTURES	DEATHS
1 AUGUST COMPLEX (Lightning)	August 2020	Mendocino, Humboldt, Trinity, Tehama, Glenn, Lake, & Colusa	1,032,648	935	1
2 DIXIE (Powerlines)	July 2021	Butte, Plumas, Lassen, Shasta & Tehama	963,309	1,311	1
3 MENDOCINO COMPLEX (Human Related)	July 2018	Colusa, Lake, Mendocino & Glenn	459,123	280	1
4 PARK FIRE (Arson)	July 2024	Butte, Plumas, Shasta & Tehama	429,603	709	0
5 SCU LIGHTNING COMPLEX (Lightning)	August 2020	Stanislaus, Santa Clara, Alameda, Contra Costa, & San Joaquin	396,625	225	0
6 CREEK (Undetermined)	September 2020	Fresno & Madera	379,895	858	0
7 LNU LIGHTNING COMPLEX (Lightning/Arson)	August 2020	Napa, Solano, Sonoma, Yolo, Lake, & Colusa	363,220	1,491	6
8 NORTH COMPLEX (Lightning)	August 2020	Butte, Plumas & Yuba	318,935	2,352	15
9 THOMAS (Powerlines)	December 2017	Ventura & Santa Barbara	281,893	1,060	2
10 CEDAR (Human Related)	October 2003	San Diego	273,246	2,820	15
11 RUSH (Lightning)	August 2012	Lassen	271,911 CA / 43,666 NV	0	0
12 RIM (Human Related)	August 2013	Tuolumne	257,314	112	0
13 ZACA (Human Related)	July 2007	Santa Barbara	240,207	1	0
14 CARR (Human Related)	July 2018	Shasta County & Trinity	229,651	1,614	8
15 MONUMENT (Lightning)	August 2021	Trinity	223,124	28	0
16 CALDOR (Under Investigation)	August 2021	Alpine, Amador, & El Dorado	221,835	1,005	1
17 MATILIJA (Undetermined)	September 1932	Ventura	220,000	0	0
18 RIVER COMPLEX (Lightning)	July 2021	Siskiyou & Trinity	199,359	122	0
19 WITCH (Powerlines)	October 2007	San Diego	197,990	1,650	2
20 KLAMATH THEATER COMPLEX (Lightning)	June 2008	Siskiyou	192,038	0	2
There is no doubt that there were fires with significant acreage by fires in more recent times. This list does not include fire jurisdiction. These are the Top 20 r	urned in years prior to regardless of whether th	1932, but those records are less reliable, and this lis	st is meant to give an	overview of the large	CALINE

TABLE 6-4: 20 Largest California Wildfires Top 20 Largest California Wildfires

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10/2/2024



1 **TABLE 6-5** shows that 36 of the 1,034 total unplanned outages (3.9%) in 2024 were assigned "FIRE" as a Primary Cause and the majority were CAL FIRE

2 incidents. In comparison, last year 23 of the 1,248 total outages (1.8%) were due to FIRE with less than 10% CAL FIRE incidents.

3

TABLE 6-5: 2024 Transmission Unplanned or "Forced" Outages due to FIRE

Count of		Nominal	Start	Start	Actual Outage	Actual Outage	Capped		End	Primary	Secondary	
Outages	Transmission Line Name	Voltage	Date	Time	Duration (hr:min)	Duration (min)	Duration (min)	End Date	Time	Cause	Cause	Name of Fire
1	CORTINA #2	60	02/01/24	11:46	0:01	1	1	02/01/24	11:47	FIRE	COND	N/A
2	CORTINA #2	60	02/01/24	12:06	8:50	530	530	02/01/24	20:56	FIRE	COND	N/A
3	LERDO-KERN OIL-7TH STANDARD	115	04/05/24	19:33	13:31	811	811	04/06/24	9:04	FIRE	STRU	N/A
4	COLUSA JCT #1	60	05/02/24	14:00	28:38	1,718	1,718	05/03/24	18:38	FIRE	STRU	N/A
5	COLEMAN-RED BLUFF	60	05/03/24	22:21	1:09	69	69	05/03/24	23:30	FIRE	STRU	N/A
6	TESLA-LOS BANOS #1	500	06/01/24	19:00	0:01	1	1	06/01/24	19:01	FIRE	NONE	Corral
7	TRACY-LOS BANOS	500	06/01/24	19:49	16:10	970	970	06/02/24	11:59	FIRE	NONE	Corral
8	GATES-MIDWAY 500kV	500	06/06/24	16:41	3:34	214	214	06/06/24	20:15	FIRE	NONE	Lost
9	STANISLAUS-MANTECA #2	115	06/17/24	17:04	24:10	1,450	1,450	06/18/24	17:14	FIRE	NONE	Aero
10	STANISLAUS-MELONES SW STA-MANTECA #1	115	06/17/24	17:04	22:56	1,376	1,376	06/18/24	16:00	FIRE	NONE	Aero
11	STANISLAUS-MELONES SW STA-RIVERBANK JCT SW STA	115	06/17/24	17:04	24:13	1,453	1,453	06/18/24	17:17	FIRE	NONE	Aero
12	POE-RIO OSO	230	07/02/24	13:06	28:12	1,692	1,692	07/03/24	17:18	FIRE	NONE	Thompson
13	ROCK CREEK-POE	230	07/02/24	13:10	1:16	76	76	07/02/24	14:26	FIRE	NONE	Thompson
14	TABLE MTN-RIO OSO	230	07/02/24	14:26	26:59	1,619	1,619	07/03/24	17:25	FIRE	NONE	Thompson
15	CARIBOU #2	60	07/02/24	14:38	4:02	242	242	07/02/24	18:40	FIRE	NONE	Thompson
16	CARIBOU-PLUMAS JCT	60	07/02/24	14:38	8:59	539	539	07/02/24	23:37	FIRE	NONE	Thompson
17	CARIBOU-TABLE MOUNTAIN	230	07/02/24	14:38	21:04	1,264	1,264	07/03/24	11:42	FIRE	NONE	Thompson
18	CARIBOU-WESTWOOD	60	07/02/24	14:38	4:16	256	256	07/02/24	18:54	FIRE	NONE	Thompson
19	HAMILTON BRANCH-CHESTER	60	07/02/24	14:38	8:34	514	514	07/02/24	23:12	FIRE	NONE	Thompson
20	COBURN-OIL FIELDS #1	60	07/13/24	17:28	21:52	1,312	1,312	07/14/24	15:20	FIRE	STRU	N/A
21	GATES-MIDWAY 500kV	500	07/14/24	21:22	11:40	700	700	07/15/24	9:02	FIRE	NONE	Lost Hills
22	LOS BANOS-MIDWAY #2	500	07/14/24	21:22	11:12	672	672	07/15/24	8:34	FIRE	NONE	Lost Hills
23	GATES-MIDWAY	230	07/14/24	21:24	11:32	692	692	07/15/24	8:56	FIRE	NONE	Lost Hills
24	ARCO-MIDWAY	230	07/14/24	21:29	11:48	708	708	07/15/24	9:17	FIRE	NONE	Lost Hills
25	ROUND MTN-TABLE MTN #2	500	07/24/24	19:29	0:25	25	25	07/24/24	19:54	FIRE	NONE	Park
26	MALIN-ROUND MOUNTAIN #2	500	07/24/24	20:02	40:23	2,423	2,423	07/26/24	12:25	FIRE	NONE	Park
27	ROUND MTN-TABLE MTN #2	500	07/24/24	20:02	40:23	2,423	2,423	07/26/24	12:25	FIRE	NONE	Park
28	MALIN-ROUND MOUNTAIN #2	500	07/26/24	14:16	18:24	1,104	1,104	07/27/24	8:40	FIRE	NONE	Park
29	ROUND MTN-TABLE MTN #2	500	07/26/24	14:16	18:24	1,104	1,104	07/27/24	8:40	FIRE	NONE	Park
30	COLEMAN-SOUTH	60	07/26/24	21:05	22:59	1,379	1,379	07/27/24	20:04	FIRE	NONE	Park
31	VALLEY SPRINGS-CLAY	60	07/27/24	14:44	27:43	1,663	1,663	07/28/24	18:27	FIRE	INSL	Cosgrove
32	ROUND MTN-TABLE MTN #1	500	07/29/24	15:15	89:53	5,393	4,320	08/02/24	9:08	FIRE	NONE	Park
33	CENTERVILLE-TABLE MTN	60	08/01/24	12:56	10:12	612	612	08/01/24	23:08	FIRE	STRU	N/A
34	PALERMO-OROVILLE #1	60	08/29/24	8:05	6:45	405	405	08/29/24	14:50	FIRE	STRU	N/A
35	PALERMO-OROVILLE #2	60	08/29/24	8:05	0:32	32	32	08/29/24	8:37	FIRE	STRU	N/A
36	EAGLE ROCK-CORTINA	115	09/08/24	15:12	4:05	245	245	09/08/24	19:17	FIRE	NONE	Boyles
37	EAGLE ROCK-REDBUD	115	09/08/24	15:17	3:55	235	235	09/08/24	19:12	FIRE	NONE	Boyles
38	SANTA ROSA-CORONA	115	10/12/24	20:24	1:08	68	68	10/12/24	21:32	FIRE	NONE	N/A
39	DAIRYLAND-MENDOTA	115	10/21/24	13:50	3:35	215	215	10/21/24	17:25	FIRE	STRU	N/A
40	CARNERAS-TAFT	70	12/25/24	13:50	21:05	1,265	1,265	12/26/24	10:55	FIRE	STRU	N/A
	TOTALS	•				37,470	36,397				•	



1 PSPS OUTAGES

- 2 Due to the devastating statewide wildfire season in 2017, PG&E developed Public Safety Power Shutoff (PSPS) protocols as an additional precautionary
- 3 measure to reduce the risk of wildfire ignition by utility equipment failures. Beginning with the 2019 wildfire season, PG&E expanded its PSPS program to
- 4 include all electric lines that pass through a High Fire-Threat District (HFTD, see Note below) both distribution and transmission. Because PG&E's electric grid
- 5 relies on power lines working together to provide service, any of its more than 5.750 million customers could have power shut off, and power will remain off
- 6 until weather conditions that triggered the call for PSPS execution subside and de-energized facilities are patrolled to ensure they can be safely restored.
- 7 Because of the public safety aspect of PSPS and per sections 5.3 and 5.4 in Maintenance Procedure No. 5, 11 PSPS events in 2024 were excluded for the
- 8 purpose of calculating the control charts for transmission line availability.
- 9 **Table 6-6** provides details on the 11 PSPS caused transmission outages in 2024.
- 10

TABLE 6-6: 2024 PSPS Events and Lines Affected

Voltage	Nominal		Outage	Outage	DURN	Durn	Outage	Outage	Outage	Primary	Secondary	
Class	Voltage	Line Name	Start Date	Start Time	(hr:min)	(min)	End Date	End Time	Class	Cause	Cause	Comments
69	60	VASCO-HERDLYN	07/20/24	15:40	16:42	1,002	07/21/24	8:22	Х	OTHR	PSPS	De-energized for Public Safety Power Shut-off (PSPS). Sustained interruption to Dyer.
115	115	TESLA-STOCKTON COGEN JCT	07/20/24	16:09	16:17	977	07/21/24	8:26	Х	OTHR	PSPS	De-energized for Public Safety Power Shut-off (PSPS). No customer interruption.
69	60	KILARC-CEDAR CREEK	09/30/24	6:14	9:26	566	09/30/24	15:40	Х	OTHR	PSPS	De-energized for Public Safety Power Shut-off (PSPS). No customer interruption.
69	60	ELK CREEK TAP	09/30/24	8:30	9:18	558	09/30/24	17:48	х	OTHR	PSPS	De-energized for Public Safety Power Shut-off (PSPS). Sustained interruption to Stony Gorge (offline).
69	60	CASCADE-BENTON-DESCHUTES	09/30/24	9:08	8:30	510	09/30/24	17:38	Х	OTHR	PSPS	De-energized for Public Safety Power Shut-off (PSPS). No customer interruption
69	60	ELK CREEK TAP	10/17/24	13:22	50:42	3,042	10/19/24	16:04	Х	OTHR	PSPS	De-energized for Public Safety Power Shut-off (PSPS). Sustained interruption to Elk Creek and Stony Gorge (offline).
115	115	LOWER LAKE-HOMESTAKE	10/17/24	18:09	46:17	2,777	10/19/24	16:26	х	OTHR	PSPS	De-energized for Public Safety Power Shut-off (PSPS). Sustained interruption to Homestake.
115	115	GEYSERS #5-GEYSERS #3	11/05/24	18:50	40:57	2,457	11/07/24	11:47	х	OTHR	PSPS	De-energized for Public Safety Power Shut-off (PSPS). Sustained interruption to Geysers #5 & #6.
115	115	LOWER LAKE-HOMESTAKE	11/05/24	22:03	48:39	2,919	11/07/24	22:42	х	OTHR	PSPS	De-energized for Public Safety Power Shut-off (PSPS). Sustained interruption to Homestake.
69	60	CLEAR LAKE-KONOCTI	11/05/24	22:08	48:40	2,920	11/07/24	22:48	х	OTHR	PSPS	De-energized for Public Safety Power Shut-off (PSPS). No customer interruption
69	60	TULUCAY-NAPA #1	11/06/24	7:14	28:59	1,739	11/07/24	12:13	х	OTHR	PSPS	De-energized for Public Safety Power Shut-off (PSPS). No customer interruption
TOTALS 19,467												

11 12

Note: The High Fire-Threat District (HFTD) Map for application of enhanced fire safety regulations was developed under California Public Utilities Commission (CPUC) Rulemaking 15-05-006, following procedures and requirements in CPUC Decision (D.) 17-01-009, revised by D.17-06-024. The <u>HFTD Map</u> is now a composite of two maps: (1) Tier 1 High Hazard Zones (HHZs) on the U.S. Forest Service-CAL FIRE Joint Tree Mortality Task Force map of HHZs (i.e. HHZ Map) and (2) Tier 2 (elevated) and Tier 3 (extreme) fire-threat areas on the CPUC Fire-Threat Map. The final CPUC Fire-Threat Map was adopted by CPUC's Safety and Enforcement Division (SED) in January 2018. A revised HHZ Map was iscurd by the U.S. Forest Service CAL FIRE Joint Tree Service in March 2019.

17 issued by the U.S. Forest Service-CAL FIRE Joint Tree Mortality Task Force in March 2018.



1 7. DISCUSSION ON IMPROVING PERFORMANCE

2 2023-2025 WILDFIRE MITIGATION PLAN (WMP)

3 As mentioned earlier in this report, fire – and notably wildfires – is another significant contributor to transmission line unavailability, especially when durations 4 are considered using uncapped minutes. As described in the WMP, PG&E continues to build on the work we have done to reduce wildfire risk by incorporating 5 more mitigation work that targets the highest risk-informed areas of our system using existing mitigations measures and innovative technologies. Our 2023-6 2025 WMP reflects feedback from stakeholders including our customers, public safety partners, the Office of Energy Infrastructure Safety (Energy Safety), the 7 CPUC, the Independent Safety Monitor, the Governor's Operational Observer, Community-Based Organizations, and the communities they serve, tribal 8 governments, municipalities, and other engaged stakeholders. The WMP outlines a broad program to reduce wildfires, with many complementary parts that 9 work together to boldly address this risk. PG&E's Vegetation Management program is critical to mitigating wildfire risk. PG&E operates our lines in ET ROWs that are home to vegetation ranging from 10 11 sparse to extremely dense. Our transmission lines also pass through urban, agricultural, and forested settings. The corridor environment is dynamic and 12 requires ongoing management to ensure vegetation stays clear of energized conductors and other equipment. Vegetation inspection is a required operational 13 step in an overall VM Program. Accordingly, PG&E has developed an annual inspection cycle program as part of our overall Transmission VM Program to 14 respond to the diverse and dynamic environment of our service territory. The Routine NERC and Routine Non-NERC Programs are annually recurring. The 15 Integrated Vegetation Management (IVM) Program is designed to maintain cleared ROWs in a sustainable and compatible condition by eliminating tall-growing 16 vegetation and promoting low-growing, compatible vegetation. 17 PG&E's detailed inspections are sources of maintenance notifications, and completions of such notifications provide a benefit of system hardening. 18 Transmission overhead assets in the HFTD and HFRA are inspected in accordance with PG&E's Electric Transmission Preventive Maintenance (ETPM) series and 19 informed by the Failure Modes and Effects Analysis (FMEA). Methods of inspection include detailed ground, detailed aerial (drone, helicopter, or aerial lift), 20 climbing, IR/corona, patrols, intrusive pole test, switch function test, and other pilot methods such as below grade assessment and climbing for corrosion. Pilot 21 methods aim to ensure coverage across asset failure modes currently undetectable through current programs. For example, the pilot of climbing for corrosion 22 goes beyond detailed visual examination of steel structures, and involves scraping/cleaning of existing corrosion to see the base metal, assess any crevice 23 corrosion, and assess stub interfaces – removing thick mastic and blisters in paint to fully assess steel, etc. Through our inspection programs, we seek to



- 1 proactively identify and mitigate asset conditions which could fail and lead to an ignition. Ignition-related maintenance notifications, many of which are a result
- 2 of the inspections, are targeted for repair in HFTD and HFRA areas by their required deadlines, barring external factors. There will continue to be a backlog of
- 3 notifications in non-HFTD areas that are assessed through the Field Safety Reassessment (FSR) Program to monitor conditions for escalation if required. TABLE

TABLE 7-1: Current Year WMP Activities (2025)

- 4 **7-1** Shows 2025 WMP planned activities for aerial, climbing, ground and infrared (IR) inspections for transmission line.
- 5

Target Name	Initiative Activity Tracking ID	2025 Target & HFTD/HFRA Unit
Detailed Inspection Transmission – Ground	AI-02	Complete detailed ground inspections on approximately 22,000 transmission structures in PG&E's asset registry as of January 1, 2025.
		Please note that this projected target may require modification based on changes in the risk output.
Detailed Inspection Transmission – Aerial	AI-04	Complete detailed aerial inspections on approximately 19,000 transmission structures in PG&E's asset registry as of January 1, 2025.
		Please note that this projected target may require modification based on changes in the risk output.
Detailed Inspection Transmission – Climbing	AI-05	Complete detailed climbing inspections on approximately 1,200 transmission structures in PG&E's asset registry as of January 1, 2025.
		Please note that this projected target may require modification based on changes in the risk output.
Perform transmission IR	AI-06	Infrared patrols will be performed on 3,500 circuit miles of energized transmission line.
Inspections		Please note that this projected target may require modification based on changes in the risk output.

- 7 PG&E's grid design and system hardening initiatives are a key strategy to mitigate wildfire risk caused by overhead assets. Specific to transmission line, our
- 8 2025 WMP activities include installation of shunt splice(s) on 25 transmission lines (Initiative Tracking ID GH-06), transmission conductor segment replacement
- 9 on 2 lines (Initiative Tracking ID GH-11), and 5 miles of transmission line hardening (rebuild) (Initiative Tracking ID GH-05).



- 1 In summary, we assess our wildfire risk, develop a comprehensive strategy to reduce ignitions, and implement mitigations designed to minimize the likelihood
- 2 of catastrophic wildfires to keep our customers and communities safe, ensure the reliability of the electric system, and limit disruption to customers from our
- 3 wildfire mitigation efforts.
- 4



1 2024 ASSET MANAGEMENT PLAN (AMP)

2	Supplementing the PG&E 2023 WMP, the Transmission Line Overhead (OH) Asset Management Plan (AMP) provides an overview of the transmission line
3	overhead asset inventory, assessment of asset conditions, performance and performance measures, risks, risk drivers, and threats. The AMP discusses efforts
4	to mitigate those risks, as well as the overall strategic approach for management of electric transmission OH assets. This AMP further serves as a roadmap for
5	achieving the asset management strategy and delivering the long-term objectives for this asset family.
6	This AMP is consistent with the Electric Strategic Asset Management Plan (SAMP), which is the guidance document for developing other AMPS such as
7	underground transmission and substation AMPs. The SAMP supports eight total AMPs representing the electric asset families. Strategy and planning in this
8	document also aim for consistency with external guidance documents such as the California Public Utility Commission (CPUC) General Order (G.O.) 95,
9	"Overhead Electric Line Construction" and CPUC G.O. 165: Inspection Requirements for Electric Distribution and Transmission Facilities. Other guiding
10	documents are discussed in relevant sections.
11	AMPs provide specific action for a multi-step approach that involves: (1) a system assessment of the asset base; (2) an assessment of asset condition and
12	performance; (3) an asset prioritization based on current criteria that ties to department objectives (also aligned with Company objectives); (4) potential
13	initiatives to improve business optimization and (5) the development of specific controls and mitigations for the risk associated with managing a transmission
14	system.
15	Current investment levels are not adequate to address the growing gap in both proactive asset replacement and corrective maintenance/repair work. To
16	address the multitude of system needs, an integrated grid planning (IGP) effort was stood up. The Integrated Grid Planning (IGP) effort looks at all needs across
17	a given transmission line, in order to identify, bundle and forecast the most efficient timeframe to perform capital work. This is done by first identifying the
18	system needs, be they capacity, interconnection, asset health, etc. and determining potential solutions to meet all needs. These solutions, complete with clear
19	costs and benefits, are assigned to resolve the need and prioritize the investments into multi-year capital workplans.
20	Execution of the 2024 AMPs for electric overhead transmission line, electric underground cable, and substation should, over the years and in conjunction with
21	the programs and initiatives of the 2025 WMP, enable the availability of the electric transmission and substation grid to further improve.



1 VEGATATION MANAGEMENT RIGHT OF WAY PROGRAMS

- 2 PG&E's Vegetation Management Program consists of an annual maintenance patrol of electric overhead transmission facilities and two Right of Way
- 3 management programs.
- 4 The annual maintenance patrol program maintains vegetation clearance in accordance with the California Public Utilities Commission (CPUC, General Order 95,
- 5 Rule 18, and Rule 35; California Public Resource Code (PRC) Sections 4293 and 4295.5; and the North American Electric Reliability Corporation (NERC)
- 6 Reliability
- 7 Standard for Transmission Vegetation Management, FAC-003-5. The intent of this program is to prevent encroachment into the NERC minimum vegetation
- 8 clearance distances (MVCD) and PG&E-defined minimum clearance distances, to reduce the risk of reasonably foreseeable outages and fire ignitions, to comply
- 9 with Federal and State mandates, and to ensure the safe and reliable operation of bulk transmission facilities.
- 10 The two additional Right of Way (ROW) programs consist of Right of Way Expansion (ROWX) and Right of Way Maintenance (TIVM). These two Vegetation
- 11 Management programs establish and maintain vegetation control in wire and border zone areas underneath and adjacent to overhead electric transmission
- 12 facilities (managed areas), ensuring that PG&E complies with commitment-based obligations.
- 13 ROWX is a one-time effort to manage vegetation within ROWs, widen managed areas to the easement widths or, where possible, beyond easement widths,
- 14 and mitigate danger trees outside ROWs.
- 15 Transmission Integrated Vegetation Management (TIVM) is an ongoing effort to maintain electric transmission-managed areas. TIVM also includes the
- 16 management of assigned PG&E fee-owned properties to comply with local city and county weed and hazardous vegetation abatement ordinances.
- 17 Right of Way Expansion Program:
- Widens existing managed areas where land rights or easements allow, or where property owners are willing, to the targeted widths.
 - Inspects trees outside managed areas and mitigates trees that, in the professional judgment of the inspector, are danger trees.
- Removes incompatible vegetation within the resulting managed areas.
- 21 TIVM Program:

19

Promotes desirable, low-growing plant communities that resist invasion by tall-growing tree species by using appropriate, environmentally sound, and
 cost-effective control methods.



- Applies control methods to manage incompatible vegetation, which may include a combination of chemical, biological, cultural, mechanical, and
 manual treatments.
- Applies EPA-approved herbicides by following the applicable regulations to maintain sustainable, low-growing, diverse plant communities compatible
 with electrical facilities, per Pest Control Adviser (PCA) recommendations.
- 5 Maintains managed areas to the targeted widths as long as supported by PG&E land rights (easements) and customer and agency agreement.

6

7 The success of the Right of Way programs is seen, in part, by the lack of Vegetation Caused outages on the 230kV and 500kV systems.



1 HIGH VOLTAGE MITIGATION

- 2 PG&E has understood that the introduction of behind-the-meter PV, although critical for California's green energy goals, would introduce challenges in the
- 3 day-to-day operation of the transmission grid. The decrease in net demand experienced because of the behind-the-meter PV in conjunction with low flows on
- 4 COI and Path 26 are primary causes for PG&E experiencing high voltages.
- 5 PG&E works with the CAISO, through the Transmission Planning Process, to continuously evaluate the reliability of the grid including identifying and addressing
- 6 voltage concerns. Recent Transmission Planning cycles have resulted in many voltage support devices placed into service with additional ones currently under
- 7 development. The most impactful in improving availability are:
- 8 Gates STATCOM (LS Power) Placed in Service 2025
- 9 Fern Road STATCOM (LS Power) Expected In Service Date Late 2025
- DCPP Voltage Support Project (Diablo Canyon Area 230 kV High Voltage Mitigation) Expected In Service Date Late 2028
- 11 Caballero Storage (connecting at Mesa) Placed in Service 2025
 - Rio Oso Area 230 kV Voltage Support Expected In Service Date mid 2026
- 13 The DCPP Voltage Support Project is expected to provide the most benefit as it directly addresses the two most frequently de-energized transmission lines; the
- 14 Morro Bay-California Flats Switching Station 230kV line and the Morro Bay-Solar Switching Station #2 230kV line.
- 15 In addition, PG&E is working with the CAISO and stakeholders to investigate a process, either through CAISO markets or direct contracts with generators, to
- 16 have Inverter-Based Resources (IBR) provide MVAR support to support area voltage.
- 17 These projects along with transformer tap adjustments, distribution power factor correction, and generator/battery storage schedules should also have a
- 18 positive impact on the high voltage issues PG&E has been experiencing across the transmission system and should limit the frequency and duration that
- 19 transmission lines are de-energized for voltage control.



1 8. SUMMARY OUTAGE DATA

- 2 PG&E's overall availability performance in 2024 was consistent with previous years. As demonstrated by the control charts, PG&E is experiencing both short-
- 3 term and long-term shifts in its mean outage frequency for most voltage classes indicating performance improvement. The strategic implementation of PG&E's
- 4 Asset Management Plan (AMP), Wildfire Mitigation Plan (WMP), and Vegetation Management Right of Way Programs support this increased availability.
- 5 Although PG&E saw decreases in transmission system availability for the 230kV and 500kV voltage classes, the underlying causes cannot be addressed by
- 6 increasing maintenance, suggesting that PG&E's maintenance practices are considered adequate. Through the CAISO Transmission Planning Process, and as
- 7 voltage support projects are placed into service, a decrease in the frequency and duration of voltage mitigation outages is expected.
- 8
- 9 **TABLE 8-1** shows summary data for each ISO-controlled circuit in 2024.
- 10 **TABLE 8-2** shows the PG&E transmission lines that experienced zero outages in 2024.



ANNUAL ELECTRIC TRANSMISSION AVAILABILITY REPORT: 2024

TABLE 8-1: Summary Outage Data 2024												
	Volt		Accumulated Outage	Accumulated Outage		Volt	Accumulated Outage	Accumulated Outage				
Count	Class	Transmission Line ID	Frequency	Duration	Count	Class Transmission Line ID	Frequency	Duration				
1	230	MORRO BAY-CALIFORNIA FLATS SW ST	30	76276	41	69 MONTE RIO-FORT ROSS	5	1472				
2	230	MORRO BAY-SOLAR SW STA #2	28	70025	42	69 COTTONWOOD #1	5	1385				
3	69	ESSEX JCT-ORICK	25	7258	43	69 CORTINA #2	5	1376				
4	69	SNEATH LANE - HALF MOON BAY	10	16988	44	115 TEMBLOR-SAN LUIS OBISPO	5	1133				
5	115	STANISLAUS-MANTECA #2	10	7705	45	69 CASCADE-BENTON-DESCHUTES	5	799				
6	69	FORT BRAGG-ELK	9	6848	46	69 MONTA VISTA-LOS GATOS	5	446				
7	500	LOS BANOS-MIDWAY #2	9	3092	47	69 JAYNE SW STA-COALINGA #1	5	380				
8	69	BRIDGEVILLE-GARBERVILLE	8	4315	48	115 RIO OSO-WEST SACRAMENTO	5	262				
9	69	CARNERAS-TAFT	8	3397	49	69 SALINAS-LAURELES	5	38				
10	115	STANISLAUS-MELONES SW STA-RIVER	8	2652	50	69 IGNACIO-BOLINAS #1	5	5				
11	69	NICOLAUS-PLAINFIELD	8	705	51	69 NICOLAUS-WILKINS SLOUGH	5	5				
12	69	EXCHEQUER-INDIAN FLAT	7	10294	52	69 GARBERVILLE-LAYTONVILLE	4	6086				
13	69	MENDOCINO-HARTLEY	7	2754	53	69 KERN-MAGUNDEN	4	5525				
14	69	STOCKTON A-WEBER #3	7	1175	54	500 MALIN-ROUND MOUNTAIN #2	4	4879				
15	115	PANOCHE-ORO LOMA	7	159	55	69 FAIRHAVEN-HUMBOLDT	4	3633				
16	115	SILVERADO-FULTON JCT.	7	33	56	115 BELLOTA-RIVERBANK-MELONES SW S	4	3162				
17	230	ROCK CREEK-POE	6	18194	57	69 LOS BANOS-PACHECO	4	3037				
18	230	POE-RIO OSO	6	15882	58	69 GLENN #2	4	2651				
19	69	FULTON-MOLINO-COTATI	6	6264	59	69 ORO LOMA-CANAL #1	4	2160				
20	230	ARCO-MIDWAY	6	5503	60	69 COLUSA JCT #1	4	1858				
21	69	ESSEX JCT-ARCATA-FAIRHAVEN	6	5123	61	69 COBURN-OIL FIELDS #1	4	1667				
22	115	STANISLAUS-MELONES SW STA-MANTE	6	3733	62	115 EAGLE ROCK-CORTINA	4	1601				
23	69	DIXON-VACA #1	6	2092	63	69 WATSONVILLE-SALINAS	4	1467				
24	69	KERN CANYON-MAGUNDEN-WEEDPAT	6	1925	64	69 MAPLE CREEK-HOOPA	4	1367				
25	115	WESTPARK-COLUMBUS	6	1655	65	69 COBURN-OIL FIELDS #2	4	1177				
26	115	BRIDGEVILLE-COTTONWOOD	6	138	66	115 HUMBOLDT-TRINITY	4	1053				
27	69	LAURELES-OTTER	6	45	67	230 CRESTA-RIO OSO	4	993				
28	500	DIABLO-MIDWAY #3	5	12222	68	69 MERCED FALLS-EXCHEQUER	4	9 <mark>1</mark> 8				
29	500	ROUND MTN-TABLE MTN #2	5	8857	69	69 BIOLA-GLASS-MADERA	4	749				
30	69	IGNACIO-BOLINAS #2	5	8077	70	115 STOCKTON A-LOCKEFORD-BELLOTA #	4	724				
31	69	FORT ROSS-GUALALA	5	7823	71	69 TULUCAY-NAPA #1	4	718				
32	230	LAS AGUILAS SW STA-PANOCHE #1	5	5733	72	69 ARCO-TULARE LAKE	4	474				
33	69	BURNS-LONE STAR #2	5	5612	73	69 STOCKTON A #1	4	400				
34	69	RIO DELL JCT-BRIDGEVILLE	5	5304	74	69 KILARC-CEDAR CREEK	4	388				
35	69	TRINITY-MAPLE CREEK	5	3573	75	115 VIERRA-TRACY-KASSON	4	368				
36	69	MENDOCINO-WILLITS-FORT BRAGG	5	3446	76	69 SALINAS-FORT ORD #1	4	359				
37	69	BUTTE-ESQUON	5	2932	77	69 CONTRA COSTA-PITTSBURG	4	350				
38	69	SALADO-NEWMAN #2	5	2836	78	69 ARCO-CARNERAS	4	8				
39	69	MENDOTA-SAN JOAQUIN-HELM	5	2030	79	115 KINGSBURG-WAUKENA SW STA	4	4				
40	69	MANTECA #1	5	1758	80	230 LAS AGUILAS SW STA-PANOCHE #2	3	5253				

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ANNUAL ELECTRIC TRANSMISSION AVAILABILITY REPORT: 2024

TABLE 8-1: Summary Outage Data 2024												
	Volt		Accumulated Outage	Accumulated Outage		Volt		Accumulated Outage	Accumulated Outage			
Count	Class	Transmission Line ID	Frequency	Duration	Count	Class	Transmission Line ID	Frequency	Duration			
81	230	QUINTO SW STA-FINK SW STA	3	4640	121	115	KERN-STOCKDALE-LAMONT #1	3	34			
82	115	RIVERBANK JCT SW STA-RIPON	3	4324	122	115	KINGSBURG-CORCORAN #1	3	15			
83	69	BURNS-LONE STAR #1	3	4322	123	115	GEYSERS #3-EAGLE ROCK	3	3			
84	115	LIVE OAK-KERN OIL	3	4173	124	69	HERDLYN-BALFOUR	3	3			
85	69	ALMADEN-LOS GATOS	3	3429	125	115	NEWARK-MILPITAS #1	2	8640			
86	69	MIDDLE FORK #1	3	3362	126	500	ROUND MTN-TABLE MTN #1	2	8640			
87	69	WEIMAR #1	3	3362	127	115	OLEUM-NORTH TOWER-CHRISTIE	2	6087			
88	230	JEFFERSON-MARTIN	3	3103	128	230	VACA-BAHIA	2	4812			
89	69	SNEATH LANE-PACIFICA	3	3081	129	69	PEASE-MARYSVILLE-HARTER	2	4690			
90	115	IGNACIO-MARE ISLAND #2	3	2327	130	69	DEL MAR-ATLANTIC #2	2	4530			
91	230	BUCKS CREEK-ROCK CREEK-CRESTA	3	2075	131	115	MISSOURI FLAT-GOLD HILL #1	2	4483			
92	115	KINGS RIVER-SANGER-REEDLEY	3	2070	132	115	FULTON-SANTA ROSA #2	2	4338			
93	115	MIDSUN-MIDWAY	3	2049	133	115	BRIGHTON-GRAND ISLAND #2	2	4321			
94	69	PLACER-DEL MAR	3	1976	134	69	MONTA VISTA-BURNS	2	4321			
95	69	CENTERVILLE-TABLE MTN	3	1822	135	230	RIO OSO-LOCKEFORD	2	4321			
96	115	SAN LUIS OBISPO-SANTA MARIA	3	1633	136	69	CROW CREEK SW STA-NEWMAN	2	3901			
97	230	CARIBOU-TABLE MOUNTAIN	3	1549	137	69	SPAULDING-SUMMIT	2	3090			
98	69	CENTERVILLE-TABLE MTN-OROVILLE	3	1540	138	69	SMARTVILLE-MARYSVILLE	2	2996			
99	115	CORTINA-MENDOCINO #1	3	1521	139	69	FULTON-CALISTOGA	2	2781			
100	115	PARADISE-TABLE MOUNTAIN	3	1500	140	69	COLGATE-ALLEGHANY	2	2752			
101	69	PHILO JCT-ELK	3	1303	141	69	ELK-GUALALA	2	2219			
102	69	SALINAS-FIRESTONE #1	3	1238	142	69	SOLEDAD #1	2	2145			
103	115	TESLA-STOCKTON COGEN JCT	3	1090	143	115	SAN LUIS OBISPO-OCEANO	2	1953			
104	500	GATES-MIDWAY 500KV	3	996	144	230	HAAS-MCCALL	2	1798			
105	69	MERCY SPRINGS SW STA-CANAL-ORO	3	853	145	230	TABLE MTN-RIO OSO	2	1620			
106	69	GLENN #1	3	666	146	115	CORCORAN-OLIVE SW STA	2	1519			
107	115	VACA-SUISUN-JAMESON	3	535	147	69	POTTER VALLEY-WILLITS	2	1405			
108	69	MONTE RIO-FULTON	3	529	148	115	SYCAMORE CREEK-NOTRE DAME-TAB	2	1390			
109	115	SANTA ROSA-CORONA	3	500	149	69	GUERNSEY-HENRIETTA	2	1320			
110	69	BORDEN-MADERA #1	3	493	150	115	DRUM-HIGGINS	2	1064			
111	115	WOODLAND-DAVIS	3	457	151	69	ALMENDRA JCT-NICOLAUS	2	1043			
112	69	STOCKTON A-WEBER #2	3	396	152	69	COALINGA #1-SAN MIGUEL	2	991			
113	69	LOCKEFORD #1	3	346	153	69	CORTINA #1	2	979			
114	69	MERCED #1	3	344	154	69	WHEELER RIDGE-WEEDPATCH	2	936			
115	115	STOCKTON A-LOCKEFORD-BELLOTA #	3	330	155	69	MERCED-MERCED FALLS	2	926			
116	69	CARIBOU #2	3	299	156	115	TESLA-SALADO-MANTECA	2	926			
117	69	NEWARK-VALLECITOS	3	214	157	115	WEST SACRAMENTO-DAVIS	2	921			
118	69	SMARTVILLE-NICOLAUS #1	3	142	158	69	RIO DELL TAP	2	861			
119	69	HUMBOLDT-MAPLE CREEK	3	58	159	115	SOBRANTE-R #2	2	814			
120	115	RIO OSO-WOODLAND #2	3	45	160	69	FULTON-HOPLAND	2	803			

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ANNUAL ELECTRIC TRANSMISSION AVAILABILITY REPORT: 2024

TABLE 8-1: Summary Outage Data 2024												
	Volt	Accumulated Outage	Accumulated Outage		Volt		Accumulated Outage	Accumulated Outage				
Count	Class Transmission Line ID	Frequency	Duration	Count	Class	Transmission Line ID	Frequency	Duration				
161	69 BUTTE-CHICO #1	2	779	201	69	COOLEY LANDING-STANFORD	2	72				
162	69 DEL MONTE-VIEJO	2	721	202	69	TAFT-CUYAMA #2	2	52				
163	69 HAMILTON BRANCH-CHESTER	2	716	203	69	HALSEY-PLACER	2	48				
164	69 CONTRA COSTA-BALFOUR	2	674	204	69	ARCO-POLONIO PASS PP	2	20				
165	69 PEACHTON-PEASE	2	661	205	69	WISHON-COPPERMINE	2	18				
166	230 GLENN-DELEVAN	2	638	206	69	ARCO-CHOLAME	2	13				
167	69 CARIBOU-PLUMAS JCT	2	601	207	115	MOSS LANDING-SALINAS #2	2	11				
168	69 DIXON-VACA #2	2	516	208	69	TAFT-CUYAMA #1	2	7				
169	69 LAS POSITAS-VASCO	2	515	209	69	ARCO-TWISSELMAN	2	6				
170	69 STOCKTON A-WEBER #1	2	513	210	69	HUMBOLDT BAY-RIO DELL JCT	2	6				
171	69 WEEDPATCH-WELLFIELD	2	510	211	115	BRIGHTON-GRAND ISLAND #1	2	2				
172	115 CRAZY HORSE CANYON SW STA-HOLLIS	2	491	212	115	COLUMBUS-MAGUNDEN	2	2				
173	115 MCCALL-WEST FRESNO #2	2	473	213	69	COPPERMINE-TIVY VALLEY	2	2				
174	69 CARIBOU-WESTWOOD	2	452	214	69	CRESCENT SW STA-SCHINDLER	2	2				
175	230 GOLD HILL-EIGHT MILE ROAD	2	406	215	69	DEL MONTE-FORT ORD #2	2	2				
176	69 CARUTHERS-LEMOORE NAS-CAMDEN	2	377	216	69	FAIRHAVEN #1	2	2				
177	69 POTTER VALLEY-MENDOCINO	2	365	217	115	GOLD HILL-BELLOTA-LOCKEFORD	2	2				
178	230 TULUCAY-VACA	2	336	218	115	MCCALL-SANGER #1	2	2				
179	115 IGNACIO-MARE ISLAND #1	2	330	219	115	MCCALL-SANGER #2	2	2				
180	115 SAN BENITO-HOLLISTER	2	304	220	115	MILPITAS-SWIFT	2	2				
181	115 DRUM-RIO OSO #1	2	301	221	115	NEWARK-TRIMBLE	2	2				
182	115 CASCADE-COTTONWOOD	2	283	222	69	TAFT-MARICOPA	2	2				
183	69 SALINAS-SPENCE	2	281	223	69	DRUM-SPAULDING	1	4320				
184	69 COTTONWOOD-BENTON #2	2	258	224	230	FINK SW STA-WESTLEY	1	4320				
185	69 ELK CREEK 60KV TAP	2	244	225	69	JEFFERSON #1	1	4320				
186	115 RAVENSWOOD-COOLEY LANDING #2	2	240	226	115	KERN OIL-WITCO	1	4320				
187	115 EAGLE ROCK-REDBUD	2	236	227	230	KERN-STOCKDALE #1	1	4320				
188	115 BRIGHTON-DAVIS	2	226	228	115	LERDO-FAMOSO	1	4320				
189	69 WEST POINT-VALLEY SPRINGS	2	223	229	115	MELONES-RACETRACK	1	4320				
190	115 DIVIDE-CABRILLO #2	2	218	230	115	MISSOURI FLAT-GOLD HILL #2	1	4320				
191	69 DRUM-GRASS VALLEY-WEIMAR	2	216	231	115	MONTA VISTA-WOLFE	1	4320				
192	115 KERN-MAGUNDEN-WITCO	2	209	232	115	SONOMA-PUEBLO	1	4320				
193	69 SCHINDLER-COALINGA #2	2	203	233	230	TABLE MTN-PALERMO	1	4320				
194	115 C-X #2	2	168	234	69	WHEELER RIDGE-SAN BERNARD	1	4320				
195	115 C-X #3	2	168	235	115	HERNDON-WOODWARD	1	4234				
196	115 PLACER-GOLD HILL #1	2	134	236	69	LAKEVILLE #1	1	2403				
197	69 KESWICK-TRINITY	2	108	237	69	DEL MONTE-MONTEREY	1	2362				
198	69 HELM-CRESCENT SW STA	2	95	238	69	VIEJO-MONTEREY	1	2362				
199	115 MENDOCINO-REDBUD	2	76	239	115	WHISMAN-MONTA VISTA	1	2289				
200	69 WISHON-SAN JOAQUIN #3	2	73	240	115	SISQUOC-SANTA YNEZ SW STA	1	2101				

3 (continued next page)

2



	TABLE 8-1: Summary Outage Data 2024												
	Volt		Accumulated Outage	Accumulated Outage		Volt		Accumulated Outage	Accumulated Outage				
Count	Class	Transmission Line ID	Frequency	Duration	Count	Clas	s Transmission Line ID	Frequency	Duration				
241	69	IGNACIO-ALTO-SAUSALITO #2	1	1884	281	6	69 KING CITY-COBURN #2	1	578				
242	500	TABLE MTN-VACA	1	1774	282	2 6	69 WEEDPATCH-SAN BERNARD	1	508				
243	69	WEBER-MORMON JCT	1	1755	283	3 11	15 RIO OSO-WOODLAND #1	1	500				
244	69	VALLEY SPRINGS-CLAY	1	1663	284	1 23	30 MONTA VISTA-COYOTE SW STA	1	497				
245	115	KERCKHOFF-CLOVIS-SANGER #2	1	1572	285	5 6	69 WASCO-FAMOSO	1	484				
246	69	SUTTER HOME SW STA-LOCKEFORD-L	1	1532	286	6 6	69 LAYTONVILLE-WILLITS	1	467				
247	115	OLIVE SW STA-SMYRNA	1	1518	287	/ 11	15 HUMBOLDT-BRIDGEVILLE	1	452				
248	115	MIDWAY-SHAFTER	1	1508	288	8 6	69 SAN MATEO-BAIR	1	430				
249	115	WHEELER RIDGE-ADOBE SW STA	1	1488	289	23	30 BELLOTA-TESLA #2	1	428				
250	115	PARADISE-BUTTE	1	1486	290) 6	69 PALERMO-OROVILLE #1	1	405				
251	69	CLAY-MARTELL	1	1472	291	23	30 METCALF-MONTA VISTA #3	1	391				
252	69	COLEMAN-SOUTH	1	1379	292	2 23	30 BELLOTA-COTTLE	1	364				
253	69	WHEELER RIDGE-TEJON	1	1308	293	3 11	15 UKIAH-HOPLAND-CLOVERDALE	1	364				
254	69	COLGATE-CHALLENGE	1	1303	294	23	30 RIO OSO-ATLANTIC	1	363				
255	230	DIABLO-MESA	1	1181	295	5 23	30 MOSS LANDING-COBURN	1	350				
256	69	DESABLA-CENTERVILLE	1	1136	296	5 11	15 GREEN VALLEY-PAUL SWEET	1	333				
257	230	ROUND MOUNTAIN-COTTONWOOD #2	1	1025	297	23	30 FINK SW STA-PROXIMA SOLAR	1	319				
258	115	BUTTE-SYCAMORE CREEK	1	1002	298	3 23	30 LOS BANOS-QUINTO SW STA	1	319				
259	500	TRACY-LOS BANOS	1	970	299	23	30 MONTA VISTA-JEFFERSON #2	1	313				
260	69	COLGATE-PALERMO	1	959	300) 11	15 METCALF-SANTA TERESA	1	311				
261	69	LIVERMORE-LAS POSITAS	1	954	301	50	00 DIABLO-GATES #1	1	300				
262	230	ELECTRA-BELLOTA	1	920	302	2 11	15 MARTIN-DALY CITY #2	1	299				
263	69	MENDOCINO-PHILO JCT-HOPLAND	1	909	303	8 6	69 MARICOPA-COPUS	1	297				
264	69	KINGSBURG-LEMOORE	1	894	304	23	30 PIT #3-PIT #1	1	294				
265	115	CLAYTON-MEADOW LANE	1	892	305	5 11	15 PALERMO-PEASE	1	291				
266	69	SOLEDAD #2	1	878	306	6 23	30 COTTONWOOD-GLENN	1	289				
267	115	ATWATER-CRESSEY	1	865	307	/ 11	15 CRAZY HORSE CANYON SW STA-SALI	l 1	280				
268	69	TEJON-LEBEC	1	832	308	3 11	15 PITTSBURG-MARTINEZ #2	1	269				
269	115	LERDO-KERN OIL-7TH STANDARD	1	811	309) 6	69 IGNACIO-ALTO	1	262				
270	69	LIVINGSTON-LIVINGSTON JCT	1	775	310) 6	69 COTTONWOOD-BENTON #1	1	259				
271	69	LOS BANOS-LIVINGSTON JCT-CANAL	1	775	311	23	30 MONTA VISTA-JEFFERSON #1	1	259				
272	115	SAN MATEO-MARTIN #6	1	775	312	2 11	15 ATWATER-EL CAPITAN	1	254				
273	115	TABLE MTN-BUTTE #1	1	736	313	3 11	15 EL CAPITAN-WILSON	1	254				
274	69	COPUS-OLD RIVER	1	720	314	1 6	69 PEASE-HARTER	1	251				
275	230	LAS POSITAS-NEWARK	1	720	315	5 11	15 SOBRANTE-STANDARD OIL SW STA #*	1	244				
276	230	GATES-MIDWAY	1	692	316	6 11	15 LE GRAND-DAIRYLAND	1	225				
277	69	BORDEN-MADERA #2	1	643	317	/ 11	15 BALCH-SANGER	1	223				
278	69	KEARNEY-KERMAN	1	643	318	3 11	15 DAIRYLAND-MENDOTA	1	215				
279	69	FULTON-WINDSOR	1	586	319) 6	69 HARTLEY-CLEAR LAKE	1	210				
280	69	CORCORAN-ANGIOLA	1	585	320) 6	69 HUMBOLDT #1	1	209				

2

1

3 (continued next page)



ANNUAL ELECTRIC TRANSMISSION AVAILABILITY REPORT: 2024

TABLE 8-1: Summary Outage Data 2024												
	Volt		Accumulated Outage	Accumulated Outage		Volt		Accumulated Outage	Accumulated Outage			
Count	Class	Transmission Line ID	Frequency	Duration	Count	Class	Transmission Line ID	Frequency	Duration			
321	115	LINCOLN-PLEASANT GROVE	1	201	361	69	CRESCENT SW STA-STROUD	1	1			
322	115	MORAGA-CLAREMONT #2	1	180	362	2 69	DEL MONTE-FORT ORD #1	1	1			
323	230	RANCHO SECO-BELLOTA #2	1	172	363	3 69	DELTA-MTN GATE JCT	1	1			
324	115	VACA-VACAVILLE-JAMESON-NORTH TO	1	164	364	115	DIXON LANDING-MCKEE	1	1			
325	69	DEL MAR-ATLANTIC #1	1	161	365	5 115	DRUM-RIO OSO #2	1	1			
326	69	VALLEY SPRINGS #2	1	147	366	5 115	DRUM-SUMMIT #1	1	1			
327	115	GREEN VALLEY-CAMP EVERS	1	141	367	/ 115	DRUM-SUMMIT #2	1	1			
328	69	VALLEY SPRINGS #1	1	129	368	3 115	EAGLE ROCK-FULTON-SILVERADO	1	1			
329	69	BUTTE-CHICO #2	1	124	369) 115	EASTSHORE-MT EDEN #1	1	1			
330	69	LAKEVILLE #2	1	117	370) 115	EASTSHORE-MT EDEN #2	1	1			
331	115	FULTON-PUEBLO	1	101	371	115	EXCHEQUER-LE GRAND	1	1			
332	115	METCALF-EL PATIO #2	1	88	372	2 115	FULTON-SANTA ROSA #1	1	1			
333	69	COTTONWOOD-RED BLUFF	1	85	373	3 230	GATES-ARCO	1	1			
334	115	OCEANO-CALLENDER SW STA	1	73	374	4 69	GATES-COALINGA #2	1	1			
335	69	COLEMAN-RED BLUFF	1	69	375	5 230	GATES-PANOCHE #1	1	1			
336	69	BAIR-COOLEY LANDING #2	1	60	376	5 230	GATES-PANOCHE #2	1	1			
337	230	PEABODY-BIRDS LANDING SW. STA.	1	55	377	69	GLENN #4	1	1			
338	230	VACA-PEABODY	1	55	378	3 115	GWF-KINGSBURG	1	1			
339	230	DELEVAN-VACA #1	1	52	379	69 69	HAT CREEK #1-WESTWOOD	1	1			
340	115	TESLA-TRACY	1	48	380) 69	HELM-KERMAN	1	1			
341	69	PALERMO-OROVILLE #2	1	32	381	230	HELM-MCCALL	1	1			
342	115	BELL-PLACER	1	28	382	2 69	HELM-STROUD	1	1			
343	69	NEWARK-LIVERMORE	1	28	383	69	HENRIETTA-KENT SW STA	1	1			
344	115	PLACER-GOLD HILL #2	1	28	384	115	HENRIETTA-LEPRINO SW STA	1	1			
345	69	CHRISTIE-WILLOW PASS	1	17	385	5 69	HUMBOLDT BAY-HUMBOLDT #1	1	1			
346	69	VASCO-HERDLYN	1	13	386	5 115	KERN-STOCKDALE-LAMONT #2	1	1			
347	69	JEFFERSON-STANFORD	1	12	387	/ 115	KERN-WESTPARK #1	1	1			
348	115	7TH STANDARD-KERN	1	10	388	3 115	KERN-WESTPARK #2	1	1			
349	115	MELONES-CURTIS	1	7	389	9 69	KESWICK-CASCADE	1	1			
350	230	PIT #1-COTTONWOOD	1	7	390) 69	KING CITY-COBURN #1	1	1			
351	230	PIT #5-ROUND MTN #2	1	7	391	115	LAKEWOOD-CLAYTON	1	1			
352	69	WEIMAR-HALSEY	1	7	392	2 115	LAWRENCE-MONTA VISTA	1	1			
353	230	TESLA-NEWARK #1	1	4	393	3 230	LOCKEFORD-BELLOTA	1	1			
354	69	COLGATE-GRASS VALLEY	1	2	394	115	LOS ESTEROS-MONTAGUE	1	1			
355	115	ATLANTIC-PLEASANT GROVE #2	1	1	395	5 115	MARTIN-SF AIRPORT	1	1			
356	115	BELLOTA-RIVERBANK	1	1	396	5 115	MARTINEZ-SOBRANTE	1	1			
357	115	CALIFORNIA AVE-MCCALL	1	1	397	115	MCCALL-KINGSBURG #1	1	1			
358	115	CAMP EVERS-PAUL SWEET	1	1	398	3 115	MCCALL-KINGSBURG #2	1	1			
359	69	COLEMAN-COTTONWOOD	1	1	399	115	MCKEE-PIERCY	1	1			
360	230	COLGATE-RIO OSO	1	1	400	230	MIDDLE FORK-GOLD HILL	1	1			

3 (continued next page)

2



ANNUAL ELECTRIC TRANSMISSION AVAILABILITY REPORT: 2024

TABLE 8-1: Summary Outage Data 2024												
	Volt		Accumulated Outage	Accumulated Outage		Volt		Accumulated Outage	Accumulated Outage			
Count	Class	Transmission Line ID	Frequency	Duration	Count	Clas	Transmission Line ID	Frequency	Duration			
401	230	MIDWAY-BITTERWATER SW STA #2	1	1	441	11	5 A-H-W #2	0	0			
402	115	MIDWAY-TUPMAN-RIO BRAVO-RENFRO	1	1	442	2 11	5 A-P #1	0	0			
403	230	MIDWAY-WHEELER RIDGE #2	1	1	443	3 11	5 A-X #1	0	0			
404	115	MOSS LANDING-DEL MONTE #2	1	1	444	11	5 A-Y #1	0	0			
405	69	MOUNTAIN GATE JCT-CASCADE	1	1	445	5 11	5 A-Y #2	0	0			
406	115	NEWARK-AMES #2	1	1	446	5 11	5 AMES DISTRIBUTION-AMES	0	0			
407	115	NEWARK-LAWRENCE	1	1	447	11	5 AMES-MTN VIEW	0	0			
408	69	NICOLAUS-MARYSVILLE	1	1	448	3 11	5 AMES-WHISMAN	0	0			
409	115	PALERMO-BOGUE	1	1	449) 11	5 APPLIED MATERIALS-BRITTON	0	0			
410	115	PALERMO-NICOLAUS	1	1	450) 6	9 ARCATA-HUMBOLDT	0	0			
411	115	PANOCHE-EXCELSIOR SW STA #2	1	1	451	6	9 ATASCADERO-CAYUCOS	0	0			
412	115	PITTSBURG-CLAYTON #4	1	1	452	2 6	9 ATASCADERO-SAN LUIS OBISPO	0	0			
413	115	RAVENSWOOD-AMES #2	1	1	453	3 23	0 ATLANTIC-GOLD HILL	0	0			
414	115	RAVENSWOOD-BAIR #1	1	1	454	11	5 ATLANTIC-PLEASANT GROVE #1	0	0			
415	115	RAVENSWOOD-PALO ALTO #2	1	1	455	5 11	5 ATWATER-LIVINGSTON-MERCED	0	0			
416	115	RAVENSWOOD-SAN MATEO	1	1	456	5 23	0 BAHIA-MORAGA	0	0			
417	115	RIO OSO-LINCOLN	1	1	457	11	5 BAIR-BELMONT	0	0			
418	230	ROUND MOUNTAIN-COTTONWOOD #3	1	1	458	8 6	9 BAIR-COOLEY LANDING #1	0	0			
419	69	SALINAS-LAGUNITAS	1	1	459	23	0 BALCH-MCCALL	0	0			
420	115	SANGER-CALIFORNIA AVE	1	1	460) 11	5 BARTON-AIRWAYS-SANGER	0	0			
421	115	SANGER-REEDLEY	1	1	461	23	0 BELLOTA-WARNERVILLE	0	0			
422	115	SEMITROPIC-MIDWAY #2	1	1	462	2 23	0 BELLOTA-WEBER	0	0			
423	69	SMARTVILLE-CAMP FAR WEST	1	1	463	3 23	0 BIRDS LANDING SW STA-CONTRA COS	S ⁻ 0	0			
424	115	SOBRANTE-STANDARD OIL SW STA #2	1	1	464	23	0 BIRDS LANDING SW STA-CONTRA COS	S ⁻ 0	0			
425	69	SPENCE-FIRESTONE	1	1	465	5 23	0 BITTERWATER SW STA-WHEELER RID	G 0	0			
426	115	STELLING-WOLFE	1	1	466	5 11	5 BOGUE-RIO OSO	0	0			
427	115	SWIFT-METCALF	1	1	467	6	9 BORDEN-COPPERMINE	0	0			
428	115	TABLE MOUNTAIN-BUTTE #2	1	1	468	8 6	9 BORDEN-GLASS	0	0			
429	69	TAFT-ELK HILLS	1	1	469) 6	9 BORDEN-GLASS-BIOLA	0	0			
430	500	TESLA-LOS BANOS #1	1	1	470) 23	0 BORDEN-GREGG #1	0	0			
431	115	TESLA-SCHULTE SW STA #1	1	1	471	23	0 BORDEN-GREGG #2	0	0			
432	115	TESLA-SCHULTE SW STA #2	1	1	472	23	0 BRENTWOOD-KELSO	0	0			
433	230	TRANQUILLITY SW STA-HELM	1	1	473	3 23	0 BRIGHTON-BELLOTA	0	0			
434	69	TULARE LAKE-KENT SW STA	1	1	474	11	5 BRITTON-MONTA VISTA	0	0			
435	69	WEBER-FRENCH CAMP #2	1	1	475	5 11	5 C-L #1	0	0			
436	115	WEST FRESNO-CALIFORNIA AVE	1	1	476	5 1 1	5 CABRILLO-SANTA YNEZ SW STA	0	0			
437	69	WHEELER RIDGE-LAKEVIEW	1	1	477	23	0 CALIENTE SW STA-MIDWAY #1	0	0			
438	69	WILLOW PASS-CONTRA COSTA	1	1	478	3 23	0 CALIENTE SW STA-MIDWAY #2	0	0			
439	115	WILSON-LE GRAND	1	1	479	23	0 CALIFORNIA FLATS SW STA-GATES	0	0			
440	115	A-H-W #1	0	0	480) 11	5 CALLENDAR SW STA-MESA	0	0			

3 (continued next page)

2



ANNUAL ELECTRIC TRANSMISSION AVAILABILITY REPORT: 2024

TABLE 8-1: Summary Outage Data 2024												
	Volt		Accumulated Outage	Accumulated Outage			Volt		Accumulated Outage	Accumulated Outage		
Count	Class	Transmission Line ID	Frequency	Duration	Cou	unt	Class	Transmission Line ID	Frequency	Duration		
481	69	CAMDEN-KINGSBURG	0	0		521	115	CRAG VIEW-CASCADE	0	0		
482	230	CARBERRY SW STA-ROUND MTN	0	0	1	522	115	CRAZY HORSE CANYON SW STA-SALIN	0	0		
483	230	CASTRO VALLEY-NEWARK	0	0	1	523	115	CRAZY HORSE CANYON SW STA-SAN B	0	0		
484	115	CHARCA-FAMOSO	0	0	1	524	115	CRESSEY-GALLO	0	0		
485	115	CHOWCHILLA-KERCKHOFF	0	0		525	115	D-L #1	0	0		
486	69	CHRISTIE-FRANKLIN #1	0	0		526	230	DELEVAN-CORTINA	0	0		
487	69	CHRISTIE-FRANKLIN #2	0	0		527	230	DELEVAN-VACA #2	0	0		
488	115	CHRISTIE-SOBRANTE	0	0		528	230	DELEVAN-VACA #3	0	0		
489	69	CLEAR LAKE - KONOCTI	0	0		529	230	DELTA SWITCHING YARD-TESLA	0	0		
490	69	CLEAR LAKE-HOPLAND	0	0		530	525	DIABLO-MIDWAY #2	0	0		
491	69	COALINGA #1-COALINGA #2	0	0		531	69	DINUBA-OROSI	0	0		
492	69	COBURN-BASIC ENERGY	0	0		532	115	DIVIDE-CABRILLO #1	0	0		
493	230	COBURN-LAS AGUILAS SW STA	0	0	ļ	533	230	DOS AMIGOS PUMPING PLANT-PANOCH	0	0		
494	69	COLGATE PH-COLGATE SW STA	0	0		534	115	DUMBARTON-NEWARK	0	0		
495	69	COLGATE-SMARTVILLE #1	0	0		535	115	EAST GRAND-SAN MATEO	0	0		
496	69	COLGATE-SMARTVILLE #2	0	0		536	115	EASTSHORE-DUMBARTON	0	0		
497	115	CONTRA COSTA #1	0	0		537	230	EASTSHORE-SAN MATEO	0	0		
498	115	CONTRA COSTA #2	0	0		538	230	EIGHT MILE ROAD-STAGG	0	0		
499	230	CONTRA COSTA PP-CONTRA COSTA S	0	0		539	230	EIGHT MILE ROAD-TESLA	0	0		
500	230	CONTRA COSTA-BRENTWOOD	0	0	ļ	540	115	EL DORADO-MISSOURI FLAT #1	0	0		
501	230	CONTRA COSTA-DELTA SWITCHING YA	0	0		541	115	EL DORADO-MISSOURI FLAT #2	0	0		
502	69	CONTRA COSTA-DU PONT	0	0	ļ	542	115	EL PATIO-SAN JOSE A	0	0		
503	230	CONTRA COSTA-LAS POSITAS	0	0		543	69	EUREKA-STA "A"	0	0		
504	230	CONTRA COSTA-LONE TREE	0	0		544	69	EVERGREEN-ALMADEN	0	0		
505	230	CONTRA COSTA-MORAGA #1	0	0	1	545	69	EVERGREEN-MABURY	0	0		
506	230	CONTRA COSTA-MORAGA #2	0	0		546	115	EXCELSIOR SW STA-SCHINDLER #1	0	0		
507	69	COOLEY LANDING-LOS ALTOS	0	0	!	547	115	EXCELSIOR SW STA-SCHINDLER #2	0	0		
508	115	COOLEY LANDING-PALO ALTO	0	0		548	69	EXCHEQUER-MARIPOSA	0	0		
509	69	CORCORAN-GUERNSEY	0	0	ļ	549	115	FELLOWS-MIDSUN	0	0		
510	115	CORONA-LAKEVILLE	0	0		550	115	FELLOWS-TAFT	0	0		
511	69	CORTINA #3	0	0	!	551	69	FIVE POINTS SW STA-HURON-GATES	0	0		
512	69	CORTINA #4	0	0	1	55 2	115	FMC-SAN JOSE B	0	0		
513	230	CORTINA-VACA	0	0	!	553	115	FULTON JCT-VACA	0	0		
514	230	COTTLE-MELONES	0	0	!	554	230	FULTON-IGNACIO #1	0	0		
515	69	COTTONWOOD #2	0	0	!	555	230	FULTON-LAKEVILLE	0	0		
516	230	COTTONWOOD-DELEVAN #1	0	0	1	556	69	GATES-HURON	0	0		
517	230	COTTONWOOD-DELEVAN #2	0	0	!	557	69	GATES-JAYNE SW STA	0	0		
518	230	COTTONWOOD-LOGAN CREEK	0	0	!	558	230	GATES-MUSTANG SW STA #1	0	0		
519	115	COTTONWOOD-PANORAMA	0	0		559	230	GATES-MUSTANG SW STA #2	0	0		
520	230	COYOTE SW STA-METCALF	0	0	!	560	69	GATES-TULARE LAKE	0	0		

3 (continued next page)

2



ANNUAL ELECTRIC TRANSMISSION AVAILABILITY REPORT: 2024

TABLE 8-1: Summary Outage Data 2024												
	Volt	Accumulated Outage	Accumulated Outage		Volt		Accumulated Outage	Accumulated Outage				
Count	Class Transmission Line ID	Frequency	Duration	Count	Class	Transmission Line ID	Frequency	Duration				
561	1 115 GEYSERS #3-CLOVERDALE	0	0	601	115	IGNACIO-SAN RAFAEL #1	0	0				
562	2 69 GLENN #3	0	0	602	230	IGNACIO-SOBRANTE	0	0				
563	3 69 GLENN #5	0	0	603	69	JEFFERSON-HILLSDALE JCT	0	0				
564	69 GOLD HILL #1	0	0	604	69	JEFFERSON-LAS PULGAS	0	0				
565	5 115 GOLD HILL-CLARKSVILLE	0	0	605	115	K-D #1	0	0				
566	230 GOLD HILL-LODI STIG	0	0	606	115	K-D #2	0	0				
567	7 115 GRANT-EASTSHORE #1	0	0	607	69	KASSON #1	0	0				
568	3 115 GRANT-EASTSHORE #2	0	0	608	69	KASSON-BANTA #1	0	0				
569	115 GREEN VALLEY-LLAGAS	0	0	609	69	KASSON-CARBONA	0	0				
570	69 GREEN VALLEY-WATSONVILLE	0	0	610	69	KASSON-LOUISE	0	0				
571	1 230 GREGG-ASHLAN	0	0	611	69	KEARNEY ALTERNATE TIE	0	0				
572	2 230 GREGG-HERNDON #1	0	0	612	69	KEARNEY TIE	0	0				
573	3 230 GREGG-HERNDON #2	0	0	613	69	KEARNEY-BIOLA	0	0				
574	115 H-P #1	0	0	614	69	KEARNEY-BOWLES	0	0				
575	5 115 H-P #3	0	0	615	69	KEARNEY-CARUTHERS	0	0				
576	3 115 H-P #4	0	0	616	230	KELSO-TESLA	0	0				
577	7 115 H-Y #1	0	0	617	115	KERCKHOFF #1-KERCKHOFF #2	0	0				
578	69 HAMMER-COUNTRY CLUB	0	0	618	115	KERCKHOFF-CLOVIS-SANGER #1	0	0				
579	69 HAT CREEK #1-PIT #1	0	0	619	230	KERN -BAKERSFIELD	0	0				
580	69 HENRIETTA-LEMOORE	0	0	620	69	KERN-FRUITVALE	0	0				
581	69 HENRIETTA-LEMOORE NAS	0	0	621	69	KERN-KERN OIL-FAMOSO	0	0				
582	2 69 HERDLYN-TRACY	0	0	622	115	KERN-LIVE OAK	0	0				
583	3 230 HERNDON-ASHLAN	0	0	623	69	KERN-OLD RIVER #1	0	0				
584	115 HERNDON-BARTON	0	0	624	69	KERN-OLD RIVER #2	0	0				
585	115 HERNDON-BULLARD #1	0	0	625	115	KERN-ROSEDALE	0	0				
586	115 HERNDON-BULLARD #2	0	0	626	230	KERN-STOCKDALE #2	0	0				
587	230 HERNDON-KEARNEY	0	0	627	115	KIFER-FMC	0	0				
588	3 115 HERNDON-MANCHESTER	0	0	628	69	KILARC-DESCHUTES	0	0				
589	230 HICKS-METCALF	0	0	629	69	KILARC-VOLTA TIE	0	0				
590	115 HIGGINS-BELL	0	0	630	69	KONOCTI - EAGLE ROCK	0	0				
591	69 HILLSDALE JCT-HALF MOON BAY	0	0	631	69	KONOCTI - MIDDLETOWN	0	0				
592	2 69 HUMBOLDT BAY-EUREKA	0	0	632	230	LAKEVILLE-IGNACIO #1	0	0				
593	69 HUMBOLDT BAY-HUMBOLDT #2	0	0	633	230	LAKEVILLE-IGNACIO #2	0	0				
594	69 HUMBOLDT-EUREKA	0	0	634	69	LAKEVILLE-PETALUMA "C"	0	0				
595	5 230 HZ-1	0	0	635	230	LAKEVILLE-SOBRANTE #2	0	0				
596	6 230 HZ-2	0	0	636	115	LAKEVILLE-SONOMA #1	0	0				
597	115 IBM HARRY RD #1	0	0	637	115	LAKEVILLE-SONOMA #2	0	0				
598	3 115 IBM HARRY RD #2	0	0	638	230	LAKEVILLE-TULUCAY	0	0				
599	69 IGNACIO-ALTO-SAUSALITO #1	0	0	639	115	LAKEWOOD-MEADOW LANE-CLAYTON	0	0				
600	115 IGNACIO-LAS GALLINAS	0	0	640	230	LAMBIE SW STA-BIRDS LANDING SW ST	0	0				

3 (continued next page)

2

PACIFIC GAS AND ELECTRIC COMPANY



ANNUAL ELECTRIC TRANSMISSION AVAILABILITY REPORT: 2024

TABLE 8-1: Summary Outage Data 2024											
	Volt	Accumulated Outage	Accumulated Outage			Volt		Accumulated Outage	Accumulated Outage		
Count	Class Transmission Line ID	Frequency	Duration	C	Count	Class	Transmission Line ID	Frequency	Duration		
641	115 LAMMERS-KASSON	0	0		681	115	MESA-SISQUOC	0	0		
642	115 LE GRAND-CHOWCHILLA	0	0		682	115	METCALF-EDENVALE #2	0	0		
643	115 LEPRINO FOODS-LEPRINO SW STA	0	0		683	115	METCALF-EL PATIO #1	0	0		
644	115 LEPRINO SW STA- GWF HANFORD SW	0	0		684	115	METCALF-EVERGREEN #1	0	0		
645	115 LLAGAS-GILROY FOODS	0	0		685	115	METCALF-EVERGREEN #2	0	0		
646	69 LOCKEFORD-INDUSTRIAL	0	0		686	115	METCALF-GREEN VALLEY	0	0		
647	69 LOCKEFORD-LODI #2	0	0		687	115	METCALF-MORGAN HILL	0	0		
648	69 LOCKEFORD-LODI #3	0	0		688	230	METCALF-MOSS LANDING #1	0	0		
649	230 LODI STIG-EIGHT MILE ROAD	0	0		689	230	METCALF-MOSS LANDING #2	0	0		
650	69 LODI-INDUSTRIAL	0	0		690	115	MI-WUK-CURTIS	0	0		
651	230 LOGAN CREEK-DELEVAN	0	0		691	230	MIDWAY-KERN #1	0	0		
652	230 LONE TREE-CAYETANO	0	0		692	230	MIDWAY-KERN #3	0	0		
653	230 LOS BANOS-DOS AMIGOS	0	0		693	230	MIDWAY-KERN #4	0	0		
654	525 LOS BANOS-GATES #1	0	0		694	115	MIDWAY-RENFRO-TUPMAN	0	0		
655	69 LOS BANOS-MERCY SPRINGS SW STA	0	0		695	115	MIDWAY-TAFT	0	0		
656	69 LOS BANOS-O'NEILL PGP	0	0		696	115	MIDWAY-TEMBLOR	0	0		
657	230 LOS BANOS-PADRE FLAT SW STA	0	0		697	230	MIDWAY-WHEELER RIDGE #1	0	0		
658	230 LOS BANOS-PANOCHE #2	0	0		698	115	MILLBRAE-SAN MATEO #1	0	0		
659	230 LOS BANOS-SAN LUIS PUMPS #1	0	0		699	69	MILLBRAE-SNEATH LANE	0	0		
660	230 LOS BANOS-SAN LUIS PUMPS #2	0	0		700	230	MONTA VISTA-HICKS	0	0		
661	230 LOS ESTEROS-METCALF	0	0		701	69	MONTA VISTA-LOS ALTOS	0	0		
662	115 LOS ESTEROS-NORTECH	0	0		702	230	MONTA VISTA-SARATOGA	0	0		
663	115 LOS ESTEROS-TRIMBLE	0	0		703	115	MONTAGUE-TRIMBLE	0	0		
664	115 MADISON-VACA	0	0		704	230	MORAGA-CASTRO VALLEY	0	0		
665	115 MANCHESTER-AIRWAYS-SANGER	0	0		705	115	MORAGA-CLAREMONT #1	0	0		
666	69 MANTECA-LOUISE	0	0		706	115	MORAGA-LAKEWOOD	0	0		
667	115 MANTECA-VIERRA	0	0		707	115	MORAGA-OAKLAND #1	0	0		
668	69 MARTIN - SNEATH LANE	0	0		708	115	MORAGA-OAKLAND #2	0	0		
669	115 MARTIN-DALY CITY #1	0	0		709	115	MORAGA-OAKLAND #3	0	0		
670	115 MARTIN-EAST GRAND	0	0		710	115	MORAGA-OAKLAND #4	0	0		
671	115 MARTIN-MILLBRAE #1	0	0		711	115	MORAGA-OAKLAND J	0	0		
672	115 MCCALL-MALAGA	0	0		712	115	MORAGA-SAN LEANDRO #1	0	0		
673	115 MCCALL-REEDLEY	0	0		713	115	MORAGA-SAN LEANDRO #2	0	0		
674	115 MCCALL-SANGER #3	0	0		714	115	MORAGA-SAN LEANDRO #3	0	0		
675	230 MELONES-WILSON	0	0		715	115	MORGAN HILL-LLAGAS	0	0		
676	115 MENDOCINO-UKIAH	0	0	L	716	230	MORRO BAY-DIABLO	0	0		
677	69 MENDOCINO-WILLITS	0	0		717	230	MORRO BAY-MESA	0	0		
678	115 MESA-DIVIDE #1	0	0		718	115	MORRO BAY-SAN LUIS OBISPO #1	0	0		
679	115 MESA-DIVIDE #2	0	0		719	115	MORRO BAY-SAN LUIS OBISPO #2	0	0		
680	115 MESA-SANTA MARIA	0	0		720	230	MORRO BAY-SOLAR SW STA #1	0	0		

3 (continued next page)

2



ANNUAL ELECTRIC TRANSMISSION AVAILABILITY REPORT: 2024

	TABLE 8-1: Summary Outage Data 2024										
	Volt		Accumulated Outage	Accumulated Outage		Volt		Accumulated Outage	Accumulated Outage		
Count	Class	Transmission Line ID	Frequency	Duration	Count	Class	Transmission Line ID	Frequency	Duration		
721	230	MORRO BAY-TEMPLETON	0	0	761	115	OLEUM-G #1	0	0		
722	115	MOSS LANDING-CRAZY HORSE CANYO	0	0	762	115	OLEUM-G #2	0	0		
723	115	MOSS LANDING-CRAZY HORSE CANYO	0	0	763	115	OLEUM-MARTINEZ	0	0		
724	115	MOSS LANDING-DEL MONTE #1	0	0	764	69	ORO LOMA-MENDOTA	0	0		
725	115	MOSS LANDING-GREEN VALLEY #1	0	0	765	115	P-X #1	0	0		
726	115	MOSS LANDING-GREEN VALLEY #2	0	0	766	115	P-X #2	0	0		
727	230	MOSS LANDING-LAS AGUILAS SW STA	0	0	767	230	PADRE FLAT SW STA-PANOCHE	0	0		
728	525	MOSS LANDING-LOS BANOS	0	0	768	230	PALERMO-COLGATE	0	0		
729	525	MOSS LANDING-METCALF	0	0	769	115	PALERMO-WYANDOTTE	0	0		
730	115	MOSS LANDING-SALINAS #1	0	0	770	115	PANOCHE-EXCELSIOR SW STA #1	0	0		
731	115	MOUNTAIN VIEW-MONTA VISTA	0	0	771	115	PANOCHE-MENDOTA	0	0		
732	230	MUSTANG SW STA-GREGG	0	0	772	230	PANOCHE-TRANQUILLITY SW STA #1	0	0		
733	230	MUSTANG SW STA-MCCALL	0	0	773	230	PANOCHE-TRANQUILLITY SW STA #2	0	0		
734	230	NEWARK E-F BUS TIE	0	0	774	230	PARKWAY-MORAGA	0	0		
735	115	NEWARK-AMES #1	0	0	775	69	PASO ROBLES-TEMPLETON	0	0		
736	115	NEWARK-AMES #3	0	0	776	115	PEASE-RIO OSO	0	0		
737	115	NEWARK-AMES DISTRIBUTION	0	0	777	115	PIERCY-METCALF	0	0		
738	115	NEWARK-APPLIED MATERIALS	0	0	778	69	PIT #1-HAT CREEK #2-BURNEY	0	0		
739	115	NEWARK-DIXON LANDING	0	0	779	69	PIT #1-MCARTHUR	0	0		
740	115	NEWARK-FREMONT #1	0	0	780	230	PIT #3-CARBERRY SW STA	0	0		
741	115	NEWARK-FREMONT #2	0	0	781	115	PITTSBURG-CLAYTON #1	0	0		
742	115	NEWARK-JARVIS #1	0	0	782	115	PITTSBURG-CLAYTON #3	0	0		
743	115	NEWARK-JARVIS #2	0	0	783	115	PITTSBURG-COLUMBIA STEEL	0	0		
744	115	NEWARK-KIFER	0	0	784	230	PITTSBURG-EASTSHORE	0	0		
745	230	NEWARK-LOS ESTEROS	0	0	785	115	PITTSBURG-KIRKER-COLUMBIA STEEL	0	0		
746	115	NEWARK-MILPITAS #2	0	0	786	115	PITTSBURG-MARTINEZ #1	0	0		
747	115	NEWARK-NORTHERN RECEIVING STATI	0	0	787	230	PITTSBURG-SAN MATEO	0	0		
748	115	NEWARK-NORTHERN RECEIVING STATI	0	0	788	230	PITTSBURG-SAN RAMON	0	0		
749	115	NEWARK-NUMMI	0	0	789	230	PITTSBURG-TASSAJARA	0	0		
750	230	NEWARK-RAVENSWOOD	0	0	790	230	PITTSBURG-TESLA #1	0	0		
751	69	NICOLAUS-CATLETT JCT	0	0	791	230	PITTSBURG-TESLA #2	0	0		
752	115	NORTECH-NORTHERN RECEIVING STAT	0	0	792	230	PITTSBURG-TESORO	0	0		
753	230	NORTH DUBLIN-CAYETANO	0	0	793	230	PITTSBURG-TIDEWATER	0	0		
754	230	NORTH DUBLIN-VINEYARD	0	0	794	230	QUINTO SW STA-WESTLEY	0	0		
755	230	NORTHERN ORCHARD PV-BITTERWATE	0	0	795	69	RADUM-LIVERMORE	0	0		
756	115	NORTHERN RECEIVING STATION-SCOT	0	0	796	69	RADUM-VALLECITOS	0	0		
757	115	NORTHERN RECEIVING STATION-SCOT	0	0	797	230	RANCHO SECO-BELLOTA #1	0	0		
758	115	NOTRE DAME-BUTTE	0	0	798	115	RAVENSWOOD-AMES #1	0	0		
759	115	OAKLAND C-MARITIME	0	0	799	115	RAVENSWOOD-BAIR #2	0	0		
760	115	OAKLAND J-GRANT	0	0	800	115	RAVENSWOOD-COOLEY LANDING #1	0	0		

3 (continued next page)

2



ANNUAL ELECTRIC TRANSMISSION AVAILABILITY REPORT: 2024

	TABLE 8-1: Summary Outage Data 2024											
	Volt	Accumulated Outage	Accumulated Outage		V	/olt		Accumulated Outage	Accumulated Outage			
Count	Class Transmission Line ID	Frequency	Duration	Cou	nt C	lass	Transmission Line ID	Frequency	Duration			
801	115 RAVENSWOOD-PALO ALTO #1	0	0	8	41	69	SMARTVILLE-NICOLAUS #2	0	0			
802	230 RAVENSWOOD-SAN MATEO #1	0	0	8	42	115	SMYRNA-SEMITROPIC-MIDWAY	0	0			
803	230 RAVENSWOOD-SAN MATEO #2	0	0	8	43	115	SOBRANTE-G #1	0	0			
804	69 REEDLEY-DINUBA #1	0	0	8	44	115	SOBRANTE-G #2	0	0			
805	69 REEDLEY-OROSI	0	0	8	45	115	SOBRANTE-GRIZZLY-CLAREMONT #1	0	0			
806	69 RIO BRAVO HYDRO	0	0	8	46	115	SOBRANTE-GRIZZLY-CLAREMONT #2	0	0			
807	230 RIO OSO-BRIGHTON	0	0	8	47	115	SOBRANTE-MORAGA	0	0			
808	230 RIO OSO-GOLD HILL	0	0	8	48	115	SOBRANTE-R #1	0	0			
809	115 RIO OSO-NICOLAUS	0	0	8	49	230	SOLAR SW STA-CALIENTE SW STA #1	0	0			
810	69 SALADO-CROW CREEK SW STA	0	0	8	50	230	SOLAR SW STA-CALIENTE SW STA #2	0	0			
811	69 SALINAS-FIRESTONE #2	0	0	8	51	69	SOLEDAD #3	0	0			
812	69 SALINAS-FORT ORD #2	0	0	8	52	69	SOLEDAD #4	0	0			
813	69 SAN BERNARD-TEJON	0	0	8	53	69	STAGG-COUNTRY CLUB #1	0	0			
814	115 SAN JOSE A-SAN JOSE B	0	0	8	54	69	STAGG-COUNTRY CLUB #2	0	0			
815	115 SAN JOSE B-STONE-EVERGREEN	0	0	8	55	69	STAGG-HAMMER	0	0			
816	115 SAN LEANDRO-OAKLAND J #1	0	0	8	56	230	STAGG-TESLA	0	0			
817	69 SAN LUIS OBISPO-CAYUCOS	0	0	8	57	115	STELLING-MONTA VISTA	0	0			
818	115 SAN MATEO-BAY MEADOWS #1	0	0	8	58	115	STONE-EVERGREEN	0	0			
819	115 SAN MATEO-BAY MEADOWS #2	0	0	8	59	115	STONE-EVERGREEN-METCALF	0	0			
820	115 SAN MATEO-BELMONT	0	0	8	60	69	SUTTER HOME SW STA-STAGG	0	0			
821	69 SAN MATEO-HILLSDALE JCT	0	0	8	61	525	TABLE MOUNTAIN-TESLA	0	0			
822	230 SAN MATEO-MARTIN	0	0	8	62	69	TABLE MTN- PEACHTON	0	0			
823	115 SAN MATEO-MARTIN #3	0	0	8	63	230	TASSAJARA-NEWARK	0	0			
824	115 SAN MATEO-MARTIN #4	0	0	8	64	115	TEMBLOR-KERNRIDGE	0	0			
825	69 SAN MIGUEL-PASO ROBLES	0	0	8	65	69	TEMPLETON-ATASCADERO	0	0			
826	230 SAN RAMON-MORAGA	0	0	8	66	230	TEMPLETON-GATES	0	0			
827	69 SAN RAMON-RADUM	0	0	8	67	115	TESLA-LAWRENCE LAB	0	0			
828	115 SANGER-MALAGA	0	0	8	68	525	TESLA-METCALF	0	0			
829	115 SANTA MARIA-SISQUOC	0	0	8	69	230	TESLA-NEWARK #2	0	0			
830	115 SANTA TERESA-EDENVALE	0	0	8	370	230	TESLA-RAVENSWOOD	0	0			
831	230 SARATOGA-VASONA	0	0	8	71	115	TESLA-SALADO #1	0	0			
832	69 SCHINDLER-FIVE POINTS SW STA	0	0	8	72	525	TESLA-TRACY	0	0			
833	115 SCHULTE SW STA-KASSON-MANTECA	0	0	8	73	230	TESLA-TRACY #1	0	0			
834	115 SCHULTE SW STA-LAMMERS	0	0	8	74	230	TESLA-TRACY #2	0	0			
835	115 SEMITROPIC-CHARCA	0	0	8	75	230	TESLA-WESTLEY	0	0			
836	115 SEMITROPIC-MIDWAY #1	0	0	8	76	230	TESORO-SOBRANTE	0	0			
837	69 SEMITROPIC-WASCO	0	0	8	377	230	TIDEWATER-SOBRANTE	0	0			
838	115 SF AIRPORT-SAN MATEO	0	0	8	78	230	TIGER CREEK-ELECTRA	0	0			
839	115 SHAFTER-RIO BRAVO	0	0	8	79	230	TIGER CREEK-VALLEY SPRINGS	0	0			
840	69 SIERRA PINES LIMITED	0	0	8	80	69	TIVY VALLEY-REEDLEY	0	0			

3 (continued next page)

2



				TABI	LE 8-1: Summary	Outage Data 2024
		Volt		Accumulated Outage	Accumulated Outage	
C	Count	Class	Transmission Line ID	Frequency	Duration	
	881	230	TRANQUILLITY SW STA-KEARNEY	0	0	
	882	230	TRANQUILLITY SW STA-SCARLET PV	0	0	
	883	115	TRIMBLE-SAN JOSE B	0	0	
	884	115	TRINITY-COTTONWOOD	0	0	
	885	69	TULUCAY-NAPA #2	0	0	
	886	230	VACA-LAKEVILLE #1	0	0	
	887	230	VACA-LAMBIE SWITCHING STATION	0	0	
	888	230	VACA-PARKWAY	0	0	
L	889	69	VACA-PLAINFIELD	0	0	
	890	115	VACA-SUISUN	0	0	
	891	525	VACA-TESLA	0	0	
L	892	115	VACA-VACAVILLE-CORDELIA	0	0	
	893	230	VALLEY SPRINGS-BELLOTA	0	0	
	894	69	VALLEY SPRINGS-CALAVERAS CEMEN	0	0	
L	895	69	VALLEY SPRINGS-MARTELL #1	0	0	
L	896	230	VASONA-METCALF	0	0	
	897	230	VINEYARD-NEWARK	0	0	
	898	69	VOLTA-DESCHUTES	0	0	
L	899	69	VOLTA-SOUTH	0	0	
	900	230	WARNERVILLE-WILSON	0	0	
	901	115	WAUKENA SW STA-CORCORAN	0	0	
	902	69	WEBER-FRENCH CAMP #1	0	0	
	903	115	WEST SACRAMENTO-BRIGHTON	0	0	
	904	230	WHEELER RIDGE-SANDRINI PV	0	0	
	905	115	WILSON-ATWATER #2	0	0	
_	906	230	WILSON-BORDEN #1	0	0	
-	907	230	WILSON-BORDEN #2	0	0	
-	908	115	WILSON-MERCED #1	0	0	
_	909	115	WILSON-MERCED #2	0	0	
-	910	115	WILSON-ORO LOMA	0	0	
-	911	69	WINDSOR -FITCH MOUNTAIN	0	0	
-	912	115	WOODLEAF-PALERMO	0	0	
_	913	115	WOODWARD-SHEPHERD	0	0	
-	914	115	X-Y #1	0	0	
	915	230	ZA-1	0	0	

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3 (End of **Table 8-1**).



ANNUAL ELECTRIC TRANSMISSION AVAILABILITY REPORT: 2024

TABLE 8-2: List of Transmission Circuits with "Zero" Outages in 2024

Line Name	kV Class	Outage Class Code	Line Name	kV Class	Outage Class Code	Line Name	kV Class	Outage Class Code
A-H-W #1	115	N	CALLENDAR SW STA-MESA	115	N	COYOTE SW STA-METCALF	230	N
A-H-W #2	115	N	CAMDEN-KINGSBURG	69	N	CRAG VIEW-CASCADE	115	N
A-P #1	115	N	CARBERRY SW STA-ROUND MTN	230	N	CRAZY HORSE CANYON SW STA-SALINAS-SO	115	N
A-X #1	115	N	CASTRO VALLEY-NEWARK	230	N	CRAZY HORSE CANYON SW STA-SAN BENITO	115	N
A-Y #1	115	Ν	CHARCA-FAMOSO	115	Ν	CRESSEY-GALLO	115	N
A-Y #2	115	Ν	CHOWCHILLA-KERCKHOFF	115	Ν	D-L #1	115	N
AMES DISTRIBUTION-AMES	115	N	CHRISTIE-FRANKLIN #1	69	N	DELEVAN-CORTINA	230	N
AMES-MTN VIEW	115	N	CHRISTIE-FRANKLIN #2	69	N	DELEVAN-VACA #2	230	N
AMES-WHISMAN	115	Ν	CHRISTIE-SOBRANTE	115	N	DELEVAN-VACA #3	230	N
APPLIED MATERIALS-BRITTON	115	Ν	CLEAR LAKE - KONOCTI	69	Ν	DELTA SWITCHING YARD-TESLA	230	Ν
ARCATA-HUMBOLDT	69	Ν	CLEAR LAKE-HOPLAND	69	Ν	DIABLO-MIDWAY #2	525	Ν
ATASCADERO-CAYUCOS	69	Ν	COALINGA #1-COALINGA #2	69	N	DINUBA-OROSI	69	N
ATASCADERO-SAN LUIS OBISPO	69	N	COBURN-BASIC ENERGY	69	N	DIVIDE-CABRILLO #1	115	N
ATLANTIC-GOLD HILL	230	N	COBURN-LAS AGUILAS SW STA	230	N	DOS AMIGOS PUMPING PLANT-PANOCHE	230	N
ATLANTIC-PLEASANT GROVE #1	115	N	COLGATE PH-COLGATE SW STA	69	Ν	DUMBARTON-NEWARK	115	N
ATWATER-LIVINGSTON-MERCED	115	Ν	COLGATE-SMARTVILLE #1	69	Ν	EAST GRAND-SAN MATEO	115	N
BAHIA-MORAGA	230	N	COLGATE-SMARTVILLE #2	69	N	EASTSHORE-DUMBARTON	115	N
BAIR-BELMONT	115	N	CONTRA COSTA #1	115	N	EASTSHORE-SAN MATEO	230	N
BAIR-COOLEY LANDING #1	69	N	CONTRA COSTA #2	115	Ν	EIGHT MILE ROAD-STAGG	230	N
BALCH-MCCALL	230	N	CONTRA COSTA PP-CONTRA COSTA SUB	230	Ν	EIGHT MILE ROAD-TESLA	230	Ν
BARTON-AIRWAYS-SANGER	115	N	CONTRA COSTA-BRENTWOOD	230	Ν	EL DORADO-MISSOURI FLAT #1	115	N
BELLOTA-WARNERVILLE	230	N	CONTRA COSTA-DELTA SWITCHING YARD	230	Ν	EL DORADO-MISSOURI FLAT #2	115	N
BELLOTA-WEBER	230	N	CONTRA COSTA-DU PONT	69	N	EL PATIO-SAN JOSE A	115	N
BIRDS LANDING SW STA-CONTRA COSTA PP	230	N	CONTRA COSTA-LAS POSITAS	230	Ν	EUREKA-STA "A"	69	N
BIRDS LANDING SW STA-CONTRA COSTA SUB	230	N	CONTRA COSTA-LONE TREE	230	Ν	EVERGREEN-ALMADEN	69	N
BITTERWATER SW STA-WHEELER RIDGE #2	230	N	CONTRA COSTA-MORAGA #1	230	Ν	EVERGREEN-MABURY	69	N
BOGUE-RIO OSO	115	N	CONTRA COSTA-MORAGA #2	230	Ν	EXCELSIOR SW STA-SCHINDLER #1	115	N
BORDEN-COPPERMINE	69	N	COOLEY LANDING-LOS ALTOS	69	Ν	EXCELSIOR SW STA-SCHINDLER #2	115	N
BORDEN-GLASS	69	N	COOLEY LANDING-PALO ALTO	115	Ν	EXCHEQUER-MARIPOSA	69	Ν
BORDEN-GLASS-BIOLA	69	N	CORCORAN-GUERNSEY	69	Ν	FELLOWS-MIDSUN	115	N
BORDEN-GREGG #1	230	N	CORONA-LAKEVILLE	115	Ν	FELLOWS-TAFT	115	N
BORDEN-GREGG #2	230	N	CORTINA #3	69	Ν	FIVE POINTS SW STA-HURON-GATES	69	N
BRENTWOOD-KELSO	230	N	CORTINA #4	69	N	FMC-SAN JOSE B	115	N
BRIGHTON-BELLOTA	230	N	CORTINA-VACA	230	N	FULTON JCT-VACA	115	N
BRITTON-MONTA VISTA	115	N	COTTLE-MELONES	230	Ν	FULTON-IGNACIO #1	230	N
C-L #1	115	N	COTTONWOOD #2	69	N	FULTON-LAKEVILLE	230	Ν
CABRILLO-SANTA YNEZ SW STA	115	N	COTTONWOOD-DELEVAN #1	230	N	GATES-HURON	69	N
CALIENTE SW STA-MIDWAY #1	230	N	COTTONWOOD-DELEVAN #2	230	N	GATES-JAYNE SW STA	69	N
CALIENTE SW STA-MIDWAY #2	230	N	COTTONWOOD-LOGAN CREEK	230	N	GATES-MUSTANG SW STA #1	230	N
CALIFORNIA FLATS SW STA-GATES	230	N	COTTONWOOD-PANORAMA	115	N	GATES-MUSTANG SW STA #2	230	N

3 (continued next page)

2



ANNUAL ELECTRIC TRANSMISSION AVAILABILITY REPORT: 2024

TABLE 8-2: List of Transmission Circuits with "Zero" Outages in 2024

2	kV Class	Outage Class Code	Line Name	kV Class	Outage Class Code	Line Name	kV Class	Outage Class Code
GATES-TULARE LAKE	69	Ν	IGNACIO-LAS GALLINAS	115	Ν	LAMBIE SW STA-BIRDS LANDING SW STA	230	Ν
GEYSERS #3-CLOVERDALE	115	Ν	IGNACIO-SAN RAFAEL #1	115	Ν	LAMMERS-KASSON	115	Ν
GLENN #3	69	Ν	IGNACIO-SOBRANTE	230	N	LE GRAND-CHOWCHILLA	115	N
GLENN #5	69	N	JEFFERSON-HILLSDALE JCT	69	N	LEPRINO FOODS-LEPRINO SW STA	115	N
GOLD HILL #1	69	N	JEFFERSON-LAS PULGAS	69	N	LEPRINO SW STA- GWF HANFORD SW STA	115	N
GOLD HILL-CLARKSVILLE	115	Ν	K-D #1	115	Ν	LLAGAS-GILROY FOODS	115	N
GOLD HILL-LODI STIG	230	Ν	K-D #2	115	Ν	LOCKEFORD-INDUSTRIAL	69	Ν
GRANT-EASTSHORE #1	115	Ν	KASSON #1	69	Ν	LOCKEFORD-LODI#2	69	N
GRANT-EASTSHORE #2	115	Ν	KASSON-BANTA #1	69	Ν	LOCKEFORD-LODI#3	69	N
GREEN VALLEY-LLAGAS	115	Ν	KASSON-CARBONA	69	Ν	LODI STIG-EIGHT MILE ROAD	230	N
GREEN VALLEY-WATSONVILLE	69	N	KASSON-LOUISE	69	Ν	LODI-INDUSTRIAL	69	N
GREGG-ASHLAN	230	N	KEARNEY ALTERNATE TIE	69	Ν	LOGAN CREEK-DELEVAN	230	N
GREGG-HERNDON #1	230	N	KEARNEY TIE	69	N	LONE TREE-CAYETANO	230	N
GREGG-HERNDON #2	230	N	KEARNEY-BIOLA	69	Ν	LOS BANOS-DOS AMIGOS	230	N
H-P #1	115	Ν	KEARNEY-BOWLES	69	Ν	LOS BANOS-GATES #1	525	N
H-P #3	115	Ν	KEARNEY-CARUTHERS	69	Ν	LOS BANOS-MERCY SPRINGS SW STA	69	N
H-P #4	115	Ν	KELSO-TESLA	230	Ν	LOS BANOS-O'NEILL PGP	69	N
H-Y #1	115	Ν	KERCKHOFF #1-KERCKHOFF #2	115	Ν	LOS BANOS-PADRE FLAT SW STA	230	N
HAMMER-COUNTRY CLUB	69	N	KERCKHOFF-CLOVIS-SANGER #1	115	N	LOS BANOS-PANOCHE #2	230	N
HAT CREEK #1-PIT #1	69	N	KERN -BAKERSFIELD	230	N	LOS BANOS-SAN LUIS PUMPS #1	230	N
HENRIETTA-LEMOORE	69	N	KERN-FRUITVALE	69	Ν	LOS BANOS-SAN LUIS PUMPS #2	230	N
HENRIETTA-LEMOORE NAS	69	N	KERN-KERN OIL-FAMOSO	69	N	LOS ESTEROS-METCALF	230	N
HERDLYN-TRACY	69	Ν	KERN-LIVE OAK	115	Ν	LOS ESTEROS-NORTECH	115	N
HERNDON-ASHLAN	230	Ν	KERN-OLD RIVER #1	69	Ν	LOS ESTEROS-TRIMBLE	115	N
HERNDON-BARTON	115	Ν	KERN-OLD RIVER #2	69	Ν	MADISON-VACA	115	N
HERNDON-BULLARD #1	115	Ν	KERN-ROSEDALE	115	Ν	MANCHESTER-AIRWAYS-SANGER	115	N
HERNDON-BULLARD #2	115	N	KERN-STOCKDALE #2	230	Ν	MANTECA-LOUISE	69	N
HERNDON-KEARNEY	230	N	KIFER-FMC	115	N	MANTECA-VIERRA	115	N
HERNDON-MANCHESTER	115	N	KILARC-DESCHUTES	69	N	MARTIN - SNEATH LANE	69	N
HICKS-METCALF	230	N	KILARC-VOLTA TIE	69	Ν	MARTIN-DALY CITY #1	115	N
HIGGINS-BELL	115	Ν	KONOCTI - EAGLE ROCK	69	Ν	MARTIN-EAST GRAND	115	N
HILLSDALE JCT-HALF MOON BAY	69	Ν	KONOCTI - MIDDLETOWN	69	Ν	MARTIN-MILLBRAE #1	115	Ν
HUMBOLDT BAY-EUREKA	69	Ν	LAKEVILLE-IGNACIO #1	230	Ν	MCCALL-MALAGA	115	N
HUMBOLDT BAY-HUMBOLDT #2	69	Ν	LAKEVILLE-IGNACIO #2	230	Ν	MCCALL-REEDLEY	115	N
HUMBOLDT-EUREKA	69	Ν	LAKEVILLE-PETALUMA "C"	69	Ν	MCCALL-SANGER #3	115	Ν
HZ-1	230	N	LAKEVILLE-SOBRANTE #2	230	N	MELONES-WILSON	230	N
HZ-2	230	Ν	LAKEVILLE-SONOMA #1	115	Ν	MENDOCINO-UKIAH	115	N
IBM HARRY RD #1	115	Ν	LAKEVILLE-SONOMA #2	115	Ν	MENDOCINO-WILLITS	69	N
IBM HARRY RD #2	115	Ν	LAKEVILLE-TULUCAY	230	Ν	MESA-DIVIDE #1	115	Ν
IGNACIO-ALTO-SAUSALITO #1	69	Ν	LAKEWOOD-MEADOW LANE-CLAYTON	115	Ν	MESA-DIVIDE #2	115	N

3 (continued next page)

2



TABLE 8-2: List o	f Transmission Circuits with	"Zero" Outages in 2024
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Line Name	kV Class	Outage Class Code	Line Name	kV Class	Outage Class Code	Line Name	kV Class	Outage Class Code
MESA-SANTA MARIA	115	Ν	MORRO BAY-SOLAR SW STA #1	230	Ν	OAKLAND J-GRANT	115	Ν
MESA-SISQUOC	115	Ν	MORRO BAY-TEMPLETON	230	Ν	OLEUM-G #1	115	Ν
METCALF-EDENVALE #2	115	Ν	MOSS LANDING-CRAZY HORSE CANYON SW S	115	Ν	OLEUM-G #2	115	Ν
METCALF-EL PATIO #1	115	Ν	MOSS LANDING-CRAZY HORSE CANYON SW S	115	Ν	OLEUM-MARTINEZ	115	N
METCALF-EVERGREEN #1	115	Ν	MOSS LANDING-DEL MONTE #1	115	Ν	ORO LOMA-MENDOTA	69	N
METCALF-EVERGREEN #2	115	N	MOSS LANDING-GREEN VALLEY #1	115	Ν	P-X #1	115	N
METCALF-GREEN VALLEY	115	N	MOSS LANDING-GREEN VALLEY #2	115	Ν	P-X #2	115	N
METCALF-MORGAN HILL	115	N	MOSS LANDING-LAS AGUILAS SW STA	230	N	PADRE FLAT SW STA-PANOCHE	230	N
METCALF-MOSS LANDING #1	230	N	MOSS LANDING-LOS BANOS	525	N	PALERMO-COLGATE	230	N
METCALF-MOSS LANDING #2	230	N	MOSS LANDING-METCALF	525	N	PALERMO-WYANDOTTE	115	N
MI-WUK-CURTIS	115	N	MOSS LANDING-SALINAS #1	115	N	PANOCHE-EXCELSIOR SW STA #1	115	N
MIDWAY-KERN #1	230	N	MOUNTAIN VIEW-MONTA VISTA	115	N	PANOCHE-MENDOTA	115	N
MIDWAY-KERN #3	230	N	MUSTANG SW STA-GREGG	230	N	PANOCHE-TRANQUILLITY SW STA #1	230	N
MIDWAY-KERN #4	230	N	MUSTANG SW STA-MCCALL	230	Ν	PANOCHE-TRANQUILLITY SW STA #2	230	N
MIDWAY-RENFRO-TUPMAN	115	N	NEWARK E-F BUS TIE	230	Ν	PARKWAY-MORAGA	230	N
MIDWAY-TAFT	115	Ν	NEWARK-AMES #1	115	Ν	PASO ROBLES-TEMPLETON	69	N
MIDWAY-TEMBLOR	115	Ν	NEWARK-AMES #3	115	Ν	PEASE-RIO OSO	115	N
MIDWAY-WHEELER RIDGE #1	230	Ν	NEWARK-AMES DISTRIBUTION	115	Ν	PIERCY-METCALF	115	Ν
MILLBRAE-SAN MATEO #1	115	Ν	NEWARK-APPLIED MATERIALS	115	Ν	PIT #1-HAT CREEK #2-BURNEY	69	Ν
MILLBRAE-SNEATH LANE	69	N	NEWARK-DIXON LANDING	115	Ν	PIT #1-MCARTHUR	69	Ν
MONTA VISTA-HICKS	230	Ν	NEWARK-FREMONT #1	115	Ν	PIT #3-CARBERRY SW STA	230	Ν
MONTA VISTA-LOS ALTOS	69	Ν	NEWARK-FREMONT #2	115	Ν	PITTSBURG-CLAYTON #1	115	Ν
MONTA VISTA-SARATOGA	230	Ν	NEWARK-JARVIS #1	115	Ν	PITTSBURG-CLAYTON #3	115	Ν
MONTAGUE-TRIMBLE	115	Ν	NEWARK-JARVIS #2	115	Ν	PITTSBURG-COLUMBIA STEEL	115	Ν
MORAGA-CASTRO VALLEY	230	Ν	NEWARK-KIFER	115	Ν	PITTSBURG-EASTSHORE	230	Ν
MORAGA-CLAREMONT #1	115	Ν	NEWARK-LOS ESTEROS	230	Ν	PITTSBURG-KIRKER-COLUMBIA STEEL	115	Ν
MORAGA-LAKEWOOD	115	N	NEWARK-MILPITAS #2	115	N	PITTSBURG-MARTINEZ #1	115	Ν
MORAGA-OAKLAND #1	115	N	NEWARK-NORTHERN RECEIVING STATION #1	115	N	PITTSBURG-SAN MATEO	230	Ν
MORAGA-OAKLAND #2	115	N	NEWARK-NORTHERN RECEIVING STATION #2	115	N	PITTSBURG-SAN RAMON	230	N
MORAGA-OAKLAND #3	115	N	NEWARK-NUMMI	115	N	PITTSBURG-TASSAJARA	230	N
MORAGA-OAKLAND #4	115	N	NEWARK-RAVENSWOOD	230	N	PITTSBURG-TESLA #1	230	N
MORAGA-OAKLAND J	115	N	NICOLAUS-CATLETT JCT	69	N	PITTSBURG-TESLA #2	230	N
MORAGA-SAN LEANDRO #1	115	N	NORTECH-NORTHERN RECEIVING STATION	115	N	PITTSBURG-TESORO	230	N
MORAGA-SAN LEANDRO #2	115	N	NORTH DUBLIN-CAYETANO	230	N	PITTSBURG-TIDEWATER	230	N
MORAGA-SAN LEANDRO #3	115	N	NORTH DUBLIN-VINEYARD	230	N	QUINTO SW STA-WESTLEY	230	Ν
MORGAN HILL-LLAGAS	115	N	NORTHERN ORCHARD PV-BITTERWATER SW \$	230	N	RADUM-LIVERMORE	69	N
MORRO BAY-DIABLO	230	N	NORTHERN RECEIVING STATION-SCOTT #1	115	N	RADUM-VALLECITOS	69	N
MORRO BAY-MESA	230	N	NORTHERN RECEIVING STATION-SCOTT #2	115	N	RANCHO SECO-BELLOTA #1	230	N
MORRO BAY-SAN LUIS OBISPO #1	115	N	NOTRE DAME-BUTTE	115	N	RAVENSWOOD-AMES #1	115	N
MORRO BAY-SAN LUIS OBISPO #2	115	N	OAKLAND C-MARITIME	115	N	RAVENSWOOD-BAIR #2	115	N

3

2

1

(continued next page)



ANNUAL ELECTRIC TRANSMISSION AVAILABILITY REPORT: 2024

TABLE 8-2: List of Transmission Circuits with "Zero" Outages in 2024

Line Name	kV Class	Outage Class Code	Line Name	kV Class	Outage Class Code	Line Name	kV Class	Outage Class Code
RAVENSWOOD-COOLEY LANDING #1	115	Ν	SIERRA PINES LIMITED	69	Ν	TIVY VALLEY-REEDLEY	69	Ν
RAVENSWOOD-PALO ALTO #1	115	Ν	SMARTVILLE-NICOLAUS #2	69	N	TRANQUILLITY SW STA-KEARNEY	230	Ν
RAVENSWOOD-SAN MATEO #1	230	Ν	SMYRNA-SEMITROPIC-MIDWAY	115	N	TRANQUILLITY SW STA-SCARLET PV	230	N
RAVENSWOOD-SAN MATEO #2	230	Ν	SOBRANTE-G #1	115	N	TRIMBLE-SAN JOSE B	115	Ν
REEDLEY-DINUBA #1	69	Ν	SOBRANTE-G #2	115	Ν	TRINITY-COTTONWOOD	115	Ν
REEDLEY-OROSI	69	Ν	SOBRANTE-GRIZZLY-CLAREMONT #1	115	Ν	TULUCAY-NAPA #2	69	Ν
RIO BRAVO HYDRO	69	Ν	SOBRANTE-GRIZZLY-CLAREMONT #2	115	Ν	VACA-LAKEVILLE #1	230	Ν
RIO OSO-BRIGHTON	230	Ν	SOBRANTE-MORAGA	115	N	VACA-LAMBIE SWITCHING STATION	230	Ν
RIO OSO-GOLD HILL	230	Ν	SOBRANTE-R #1	115	N	VACA-PARKWAY	230	Ν
RIO OSO-NICOLAUS	115	Ν	SOLAR SW STA-CALIENTE SW STA #1	230	N	VACA-PLAINFIELD	69	Ν
SALADO-CROW CREEK SW STA	69	Ν	SOLAR SW STA-CALIENTE SW STA #2	230	N	VACA-SUISUN	115	Ν
SALINAS-FIRESTONE #2	69	Ν	SOLEDAD #3	69	Ν	VACA-TESLA	525	Ν
SALINAS-FORT ORD #2	69	Ν	SOLEDAD #4	69	Ν	VACA-VACAVILLE-CORDELIA	115	Ν
SAN BERNARD-TEJON	69	Ν	STAGG-COUNTRY CLUB #1	69	N	VALLEY SPRINGS-BELLOTA	230	N
SAN JOSE A-SAN JOSE B	115	Ν	STAGG-COUNTRY CLUB #2	69	N	VALLEY SPRINGS-CALAVERAS CEMENT	69	N
SAN JOSE B-STONE-EVERGREEN	115	Ν	STAGG-HAMMER	69	N	VALLEY SPRINGS-MARTELL #1	69	Ν
SAN LEANDRO-OAKLAND J #1	115	Ν	STAGG-TESLA	230	Ν	VASONA-METCALF	230	Ν
SAN LUIS OBISPO-CAYUCOS	69	Ν	STELLING-MONTA VISTA	115	Ν	VINEYARD-NEWARK	230	Ν
SAN MATEO-BAY MEADOWS #1	115	Ν	STONE-EVERGREEN	115	Ν	VOLTA-DESCHUTES	69	Ν
SAN MATEO-BAY MEADOWS #2	115	Ν	STONE-EVERGREEN-METCALF	115	Ν	VOLTA-SOUTH	69	Ν
SAN MATEO-BELMONT	115	Ν	SUTTER HOME SW STA-STAGG	69	N	WARNERVILLE-WILSON	230	Ν
SAN MATEO-HILLSDALE JCT	69	Ν	TABLE MOUNTAIN-TESLA	525	N	WAUKENA SW STA-CORCORAN	115	Ν
SAN MATEO-MARTIN	230	Ν	TABLE MTN- PEACHTON	69	N	WEBER-FRENCH CAMP #1	69	Ν
SAN MATEO-MARTIN #3	115	Ν	TASSAJARA-NEWARK	230	Ν	WEST SACRAMENTO-BRIGHTON	115	Ν
SAN MATEO-MARTIN #4	115	N	TEMBLOR-KERNRIDGE	115	N	WHEELER RIDGE-SANDRINI PV	230	N
SAN MIGUEL-PASO ROBLES	69	N	TEMPLETON-ATASCADERO	69	N	WILSON-ATWATER #2	115	N
SAN RAMON-MORAGA	230	N	TEMPLETON-GATES	230	N	WILSON-BORDEN #1	230	N
SAN RAMON-RADUM	69	N	TESLA-LAWRENCE LAB	115	N	WILSON-BORDEN #2	230	N
SANGER-MALAGA	115	N	TESLA-METCALF	525	N	WILSON-MERCED #1	115	N
SANTA MARIA-SISQUOC	115	N	TESLA-NEWARK #2	230	N	WILSON-MERCED #2	115	N
SANTA TERESA-EDENVALE	115	N	TESLA-RAVENSWOOD	230	N	WILSON-ORO LOMA	115	N
SARATOGA-VASONA	230	N	TESLA-SALADO #1	115	N	WINDSOR -FITCH MOUNTAIN	69	N
SCHINDLER-FIVE POINTS SW STA	69	N	TESLA-TRACY	525	N	WOODLEAF-PALERMO	115	N
SCHULTE SW STA-KASSON-MANTECA	115	N	TESLA-TRACY #1	230	N	WOODWARD-SHEPHERD	115	N
SCHULTE SW STA-LAMMERS	115	N	TESLA-TRACY #2	230	N	X-Y #1	115	N
SEMITROPIC-CHARCA	115	Ν	TESLA-WESTLEY	230	N	ZA-1	230	N
SEMITROPIC-MIDWAY #1	115	Ν	TESORO-SOBRANTE	230	N			
SEMITROPIC-WASCO	69	N	TIDEWATER-SOBRANTE	230	N			
SF AIRPORT-SAN MATEO	115	Ν	TIGER CREEK-ELECTRA	230	N			
SHAFTER-RIO BRAVO	115	N	TIGER CREEK-VALLEY SPRINGS	230	N			

3 (End of **TABLE 8-2**).