



SOUTHERN CALIFORNIA EDISON COMPANY

2024

TRANSMISSION LINE CIRCUIT AVAILABILITY PERFORMANCE REPORT

April 1, 2025

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2024 Availability Performance Report

I INTRODUCTION

The 2024 Southern California Edison (SCE) Transmission Line Circuit Availability Performance report provides the California Independent System Operator Corporation (CAISO), system availability performance measurements between January 1, 2024 and December 31, 2024. This report is submitted to comply with the maintenance reporting requirements outlined in the California Public Utilities Code and the Transmission Control Agreement.

At the SCE Company, the ISO transmission system is comprised of SCE owned transmission line circuits of 500 kV, 230 kV, 115 kV and 69 kV voltage class that were placed under the operational control of the ISO on or after April 1, 1998. The 2024 performances are monitored through the use of Performance Control Charts, which include three indices: Annual Average Forced Outage Frequency of all Transmission Line Circuits, Annual Average Accumulated Forced Outage Duration of only Transmission Line Circuits with Forced Outages, and Annual Proportion of Transmission Line Circuits with No Forced Outages. Shifts in performance are identified using a set of tests, which can be used to validate changes observed on the control charts. SCE provided the ISO historical information that was used as a base line for control chart limits that were created to establish the availability measurement system used to measure the annual performance of all transmission line circuits in a voltage class and also establish the availability measure target for all transmission line circuits in a voltage class.

The following attachments are made part of this report:

- Control Chart for Mean Outage Frequency of all Transmission Line Circuits, Control Chart for Mean Accumulated Outage Duration of only Transmission Line Circuits with Forced Outages, and Proportion Control Chart for Transmission Line Circuits with No Forced Outages for each voltage class.
- Summary Outage Data

II APPROACH TO AVAILABILITY PERFORMANCE ANALYSIS

Forced outages of each SCE circuit of different voltage class were summarized and rolled-up from 2024 forced outage (raw) data. Performance Control Charts for each voltage class were developed utilizing a statistical program called “Bootstrap Re-sampling Method”. The treatment of Bootstrap procedures is taken directly from Section 4.2.2.2 of the ISO Transmission Maintenance Standards. The Performance Control Charts that were developed are:

1. 500 kV Voltage Class
 - Mean Outage Frequency of all transmission line circuits
 - Mean Accumulated Outage Duration of only transmission line circuits with forced outages
 - Proportion of transmission line circuits with no forced outages
2. 230 kV Voltage Class
 - Mean Outage Frequency of all transmission line circuits
 - Mean Accumulated Outage Duration of only transmission line circuits with forced outages
 - Proportion of transmission line circuits with no forced outages
3. 115 kV Voltage Class
 - Mean Outage Frequency of all transmission line circuits
 - Mean Accumulated Outage Duration of only transmission line circuits with forced outages
 - Proportion of transmission line circuits with no forced outages
4. 69 kV Voltage Class
 - Mean Outage Frequency of all transmission line circuits
 - Mean Accumulated Outage Duration of only transmission line circuits with forced outages
 - Proportion of transmission line circuits with no forced outages

All 2024 events and forced outages that were excluded from the calculation of the Availability Measures and Availability Measure Targets are:

1. Scheduled outages that are scheduled, reviewed, and approved by the ISO in accordance with the Transmission Control Agreement.
2. Forced outages which were caused by events outside the PTO’s system including those outages that originate in other TO systems, other electric systems, and other customer’s equipment.
3. Forced Outages due to earthquakes.

4. Outages classified as “Not a Forced Outage” in the Maintenance Procedures.

Multiple momentary forced outages on the same transmission line circuit in the span of one (1) minute were treated as one (1) outage, and when the operation of the transmission line circuit is restored following a forced outage and transmission line circuit remains in operation for a period that exceeds one (1) minute, and was followed by another forced outage, the outage frequency was counted as two (2) forced outages. Duration's of individual forced outages, which exceeded 4320 minutes, were capped at 4320 minutes.

All forced outages in SCE's detailed forced outage data file for year 2024 were rounded up to the nearest full minute before being summed with the other detailed forced outages and rolled up into the summary data. Basic statistical methodology was applied to this data and the annual average (mean) forced outage frequency of all transmission line circuits and annual average (mean) accumulated forced outage duration of only transmission line circuits with forced outages in its voltage class per year was calculated. The number of transmission line circuits with forced outage frequency per year was also tabulated. The tabulated statistics shows the number of transmission line circuits in its voltage class with no forced outages per year and the number of transmission line circuits in its voltage class with forced outages per year in an ascending order. The proportion of transmission line circuits with no forced outages per year (percentage in “Discussion of Results” section) was also calculated for each voltage class.

The calculated transmission line circuit performance indices were plotted on the Performance Control Charts for comparison and tested for short term changes, for detection of shift up on averages or shift to a lower level, and either a trend of continuous increase or decrease in the average values. The Performance Control Charts also assess the changes in performance during an intermediate period.

Power system events are monitored, recorded and posted by the Grid Control Center. When an interruption or forced outage occurs, personnel from Power Delivery Business Line (PDBL) are actively engaged in tasks that identify and mitigate the interruption or forced outage. Initial or preliminary data is submitted; utilizing the Energy Management System and a PC based system (Outage Request Log) to record station log information. This includes the cause of forced outages or interruptions and corresponding cause codes. Cause code software is utilized and is installed in all switching centers. Following the initial entry of data, interruption/forced outage data is reviewed and validated by supervision to ensure accuracy of data input.

III PERFORMANCE INDICATIONS

Performance Indications provided by control charts were tested. Four tests have been selected to enable identification of exceptional performance in an individual year, shifts in long term performance, and trends in longer-term performance. The four (4) tests were applied to the three (3) indices for each voltage class and the results are as follows:

CONTROL CHART TYPE	TEST		Performance Status Indicated by test results		
	NUMBER	RESULTS	IMPROVEMENT	DEGRADATION	COMMENT
500 kV Annual Forced Outage Frequency	1	Value is above the UCL			Test Not Triggered
		Value is below the LCL when LCL>0			
	2	v1 or more consecutive values above the CL			Test Triggered
		v2 or more consecutive values below the CL	X		
	3	2 out of 3 values above the UWL			Test Not Triggered
		2 out of 3 values below the LWL			
	4	6 consecutive values increasing			Test Not Triggered
		6 consecutive values decreasing			

CONTROL CHART TYPE	TEST		Performance Status Indicated by test results		
	NUMBER	RESULTS	IMPROVEMENT	DEGRADATION	COMMENT
500 kV Annual Forced Outage Duration	1	Value is above the UCL			Test Not Triggered
		Value is below the LCL when LCL>0			
	2	v1 or more consecutive values above the CL			Test Not Triggered
		v2 or more consecutive values below the CL			
	3	2 out of 3 values above the UWL			Test Not Triggered
		2 out of 3 values below the LWL			
	4	6 consecutive values increasing			Test Not Triggered
		6 consecutive values decreasing			

CONTROL CHART TYPE	TEST		Performance Status Indicated by test results		
	NUMBER	RESULTS	IMPROVEMENT	DEGRADATION	COMMENT
500 kV Annual Proportion of Transmission Line Circuits With no Forced Outages	1	Value is above the UCL			Test Not Triggered
		Value is below the LCL when LCL>0			
	2	v1 or more consecutive values above the CL			Test Not Triggered
		v2 or more consecutive values below the CL			
	3	2 out of 3 values above the UWL			Test Not Triggered
		2 out of 3 values below the LWL			
	4	6 consecutive values increasing			Test Not Triggered
		6 consecutive values decreasing			

CONTROL CHART TYPE	TEST		Performance Status Indicated by test results		
	NUMBER	RESULTS	IMPROVEMENT	DEGRADATION	COMMENT
230 kV Annual Forced Outage Frequency	1	Value is above the UCL			Test Triggered
		Value is below the LCL when LCL>0	X		
	2	v1 or more consecutive values above the CL			Test Triggered
		v2 or more consecutive values below the CL	X		
	3	2 out of 3 values above the UWL			Test Triggered
		2 out of 3 values below the LWL	X		
	4	6 consecutive values increasing			Test Not Triggered
		6 consecutive values decreasing			

CONTROL CHART TYPE	TEST		Performance Status Indicated by test results		
	NUMBER	RESULTS	IMPROVEMENT	DEGRADATION	COMMENT
230 kV Annual Forced Outage Duration's	1	Value is above the UCL			Test Not Triggered
		Value is below the LCL when LCL>0			
	2	v1 or more consecutive values above the CL			Test Not Triggered
		v2 or more consecutive values below the CL			
	3	2 out of 3 values above the UWL			Test Not Triggered
		2 out of 3 values below the LWL			
	4	6 consecutive values increasing			Test Not Triggered
		6 consecutive values decreasing			

CONTROL CHART TYPE	TEST		Performance Status Indicated by test results		
	NUMBER	RESULTS	IMPROVEMENT	DEGRADATION	COMMENT
230 kV Annual Proportion of Transmission Line Circuits With no Forced Outages	1	Value is above the UCL	X		Test Triggered
		Value is below the LCL when LCL>0			
	2	v1 or more consecutive values above the CL	X		Test Triggered
		v2 or more consecutive values below the CL			
	3	2 out of 3 values above the UWL	X		Test Triggered
		2 out of 3 values below the LWL			
	4	6 consecutive values increasing			Test Not Triggered
		6 consecutive values decreasing			

CONTROL CHART TYPE	TEST		Performance Status Indicated by test results		
	NUMBER	RESULTS	IMPROVEMENT	DEGRADATION	COMMENT
115 kV Annual Forced Outage Frequency	1	Value is above the UCL			Test Not Triggered
		Value is below the LCL when LCL>0			
	2	v1 or more consecutive values above the CL			Test Not Triggered
		v2 or more consecutive values below the CL			
	3	2 out of 3 values above the UWL			Test Not Triggered
		2 out of 3 values below the LWL			
	4	6 consecutive values increasing			Test Not Triggered
		6 consecutive values decreasing			

CONTROL CHART TYPE	TEST		Performance Status Indicated by test results		
	NUMBER	RESULTS	IMPROVEMENT	DEGRADATION	COMMENT
115 kV Annual Forced Outage Duration	1	Value is above the UCL			Test Not Triggered
		Value is below the LCL when LCL>0			
	2	v1 or more consecutive values above the CL			Test Not Triggered
		v2 or more consecutive values below the CL			
	3	2 out of 3 values above the UWL			Test Not Triggered
		2 out of 3 values below the LWL			
	4	6 consecutive values increasing			Test Not Triggered
		6 consecutive values decreasing			

CONTROL CHART TYPE	TEST		Performance Status Indicated by test results		
	NUMBER	RESULTS	IMPROVEMENT	DEGRADATION	COMMENT
115 kV Annual Proportion of Transmission Line Circuits With no Forced Outages	1	Value is above the UCL			Test Not Triggered
		Value is below the LCL when LCL>0			
	2	v1 or more consecutive values above the CL			Test Not Triggered
		v2 or more consecutive values below the CL			
	3	2 out of 3 values above the UWL			Test Not Triggered
		2 out of 3 values below the LWL			
	4	6 consecutive values increasing			Test Not Triggered
		6 consecutive values decreasing			

CONTROL CHART TYPE	TEST		Performance Status Indicated by test results		
	NUMBER	RESULTS	IMPROVEMENT	DEGRADATION	COMMENT
69 kV Annual Forced Outage Frequency	1	Value is above the UCL		X	Test Triggered
		Value is below the LCL when LCL>0			
	2	v1 or more consecutive values above the CL			Test Not Triggered
		v2 or more consecutive values below the CL			
	3	2 out of 3 values above the UWL		X	Test Triggered
		2 out of 3 values below the LWL			
	4	6 consecutive values increasing			Test Not Triggered
		6 consecutive values decreasing			

CONTROL CHART TYPE	TEST		Performance Status Indicated by test results		
	NUMBER	RESULTS	IMPROVEMENT	DEGRADATION	COMMENT
69 kV Annual Forced Outage Duration	1	Value is above the UCL		X	Test Triggered
		Value is below the LCL when LCL>0			
	2	v1 or more consecutive values above the CL			Test Not Triggered
		v2 or more consecutive values below the CL			
	3	2 out of 3 values above the UWL		X	Test Triggered
		2 out of 3 values below the LWL			
	4	6 consecutive values increasing			Test Not Triggered
		6 consecutive values decreasing			

CONTROL CHART TYPE	TEST		Performance Status Indicated by test results		
	NUMBER	RESULTS	IMPROVEMENT	DEGRADATION	COMMENT
69 kV Annual Proportion of Transmission Line Circuits With no Forced Outages	1	Value is above the UCL			Test Not Triggered
		Value is below the LCL when LCL>0			
	2	v1 or more consecutive values above the CL			Test Triggered
		v2 or more consecutive values below the CL		X	
	3	2 out of 3 values above the UWL			Test Triggered
		2 out of 3 values below the LWL		X	
	4	6 consecutive values increasing			Test Not Triggered
		6 consecutive values decreasing			

IV DISCUSSION OF RESULTS

In accordance with Maintenance Procedure 2 under Section 2.3.6 SCE captured the first fourteen calendar years of valid Summary Outage data while under ISO Operational Control and used only that data to calculate the Control Chart limits. The first fourteen calendar years of valid Summary Outage data obtained by SCE for only those years while under ISO Operational Control were used in their entirety to establish the Control Chart limits regardless of whether any of the yearly data within the first ten of those fourteen calendar years of valid data triggered any tests. The ten Control Chart annual points from 1998 through 2007 were not used to see if tests were triggered. Only valid Summary Outage data for years 2009 through 2024 were tested for compliance using the testing criteria described in Section 4.2.3 of Appendix C of the TCA. Although tests were triggered in the 2009 and 2024 timeframe all the data was used to calculate the control limits because none of the tests were triggered significantly. Valid data is defined as Transmission Line Circuit forced outage data provided by SCE to the ISO, verified by the ISO, and does not skew the Control Chart limits.

500 kV System

The 500 kV voltage class triggered test 2 in improvement on the frequency index.

The 500 kV voltage class did not trigger any test on the duration indices.

The 500 kV voltage class did not trigger any test on the proportion index.

230 kV System

The 230 kV voltage class triggered test 1, 2 and 3 in improvement on the frequency index.

The 230 kV voltage class did not trigger any test on the duration indices.

The 230 kV voltage class triggered test 1, 2 and 3 in improvement on the proportion index.

115 kV System

The 115 kV voltage class did not trigger any test on the frequency index.

The 115 kV voltage class did not trigger any test on the duration indices.

The 115 kV voltage class did not trigger any test on the proportion index.

69 kV System

The 69 kV voltage class triggered test 1 and test 3 in degradation on the frequency index.

The 69 kV voltage class triggered test 1 and test 3 in degradation on the duration indices.

The 69 kV voltage class triggered test 2 and test 3 in degradation on the proportion index.

While tests 1, 2 and 3 show degradation on the 69 kV class it should be noted that this may not be statistically valid as there are only four lines in this class within the SCE company.

500 kV Voltage Class

- Outage Frequency - The historical average Control Limit (CL) between 2003 and 2024 on SCE 500 kV transmission line circuits under the operational control of the ISO is 1.459 outages per year. In 2024 the outage frequency average was 0.6000 outages per year, which is below the historical average. The range of expected performance for the 500 kV voltage class is:
 1. Upper Control Limit (UCL) = 2.595
 2. Upper Warning Limit (UWL) = 2.232
 3. Lower Warning Limit (LWL) = 0.814
 4. Lower Control Limit (LCL) = 0.582
- Outage Duration - The historical average (CL) between 2003 and 2024 on SCE 500 kV transmission line circuits under the operational control of the ISO is 1561.01 minutes per year. In 2024, the outage duration is an accumulated average of 1667.93 minutes per year, which is above the historical average. The range of expected performance for the 500 kV voltage class is:
 1. Upper Control Limit (UCL) = 3728.52 min
 2. Upper Warning Limit (UWL) = 2967.98 min
 3. Lower Warning Limit (LWL) = 586.62 min
 4. Lower Control Limit (LCL) = 358.02 min
- Proportion - The historical average percentage (CL) between 2003 and 2024 on SCE 500 kV transmission line circuits under the operational control of ISO is 45.7%. In 2024, the average percentage for transmission line circuits that experienced no forced outages is 57.14 %, which is above the historical average. The range of expected performance for the 500 kV voltage class is:
 1. Upper Control Limit (UCL) = 70.1%
 2. Upper Warning Limit (UWL) = 62.1%
 3. Lower Warning Limit (LWL) = 25.8%
 4. Lower Control Limit (LCL) = 18.4%

230 kV Voltage Class

- Outage Frequency - The historical average (CL) between 2003 and 2024 on SCE 230 kV transmission line circuits under the operational control of the ISO is 1.786 outages per year. In 2024, the outage frequency has an average of 0.6800 outages per year, which is below the historical average. The range of expected performance for the 230 kV voltage class is:
 1. Upper Control Limit (UCL) = 2.411
 2. Upper Warning Limit (UWL) = 2.211
 3. Lower Warning Limit (LWL) = 1.402
 4. Lower Control Limit (LCL) = 1.263
- Outage Duration - The historical average (CL) between 2003 and 2024 on SCE 230 kV transmission line circuits under the operational control of the ISO is 1638.49 minutes per year. In 2024, the outage duration accumulated average was 1244.61 minutes per year, which is below the historical average. The range of expected performance for the 230 kV voltage class is:
 1. Upper Control Limit (UCL) = 2486.64 min
 2. Upper Warning Limit (UWL) = 2201.39 min
 3. Lower Warning Limit (LWL) = 1154.52 min
 4. Lower Control Limit (LCL) = 986.17 min
- Proportion - The historical average percentage (CL) between 2003 and 2024 on SCE 230 kV transmission line circuits under the operational control of ISO is 37.6%. In 2024 the average percentage for transmission line circuits that experienced no forced outages was 76.00%, which is above the historical average. The range of expected performance for the 230 kV voltage class is:
 1. Upper Control Limit (UCL) = 49.5%
 2. Upper Warning Limit (UWL) = 45.9%
 3. Lower Warning Limit (LWL) = 29.3%
 4. Lower Control Limit (LCL) = 25.7%

115 kV Voltage Class

- Outage Frequency - The historical average (CL) between 2003 and 2024 on SCE 115 kV transmission line circuits under the operational control of the ISO is 3.449 outages per year. In 2024 the outage frequency average was 3.733 outages per year, which is above the historical average. The range of expected performance for the 115 kV voltage class is:
 1. Upper Control Limit (UCL) = 5.915
 2. Upper Warning Limit (UWL) = 5.119
 3. Lower Warning Limit (LWL) = 2.030
 4. Lower Control Limit (LCL) = 1.567
- Outage Duration - The historical average (CL) between 2003 and 2024 on SCE 115 kV transmission line circuits under the operational control of the ISO is 1389.01 minutes per year. In 2024, the outage duration accumulated average was 1345.00 minutes per year, which is below the historical average. The range of expected performance for the 115 kV voltage class is:
 1. Upper Control Limit (UCL) = 3223.23 min
 2. Upper Warning Limit (UWL) = 2591.51 min
 3. Lower Warning Limit (LWL) = 572.15 min
 4. Lower Control Limit (LCL) = 369.16 min
- Proportion - The historical average percentage (CL) between 2003 and 2024 on SCE 115 kV transmission line circuits under the operational control of ISO is 23.3%. In 2024, the average percentage for transmission line circuits that experienced no forced outages was 26.67%, which is above the historical average. The range of expected performance for the 115 kV voltage class is:
 1. Upper Control Limit (UCL) = 46.5%
 2. Upper Warning Limit (UWL) = 38.5%
 3. Lower Warning Limit (LWL) = 6.4%
 4. Lower Control Limit (LCL) = 1.0%

69 kV Voltage Class

- Outage Frequency - The historical average (CL) between 2003 and 2024 on SCE 69 kV transmission line circuits under the operational control of the ISO is 5.05 outages per year. In 2024, the outage frequency average was 14.00 outages per year, which is above the historical average. The range of expected performance for the 69 kV voltage class is:
 1. Upper Control Limit (UCL) = 7.537
 2. Upper Warning Limit (UWL) = 6.753
 3. Lower Warning Limit (LWL) = 3.540
 4. Lower Control Limit (LCL) = 3.010
- Outage Duration - The historical average (CL) between 2003 and 2024 on SCE 69 kV transmission line circuits under the operational control of the ISO is 2491.85 minutes per year. In 2024, the outage duration mean accumulated average was 6714 minutes per year, which is above the historical average. The range of expected performance for the 69 kV voltage class is:
 1. Upper Control Limit (UCL) = 4068.84 min
 2. Upper Warning Limit (UWL) = 3556.95 min
 3. Lower Warning Limit (LWL) = 1596.38 min
 4. Lower Control Limit (LCL) = 1305.73 min
- Proportion - The historical average percentage (CL) between 2003 and 2024 on SCE 69 kV transmission line circuits under the operational control of the ISO is 13.5%. In 2024, the average percentage for transmission line circuits that experienced no forced outages was 0.00%, which is below the historical average. The range of expected performance for the 69 kV voltage class is:
 1. Upper Control Limit (UCL) = 32.1%
 2. Upper Warning Limit (UWL) = 25.4%
 3. Lower Warning limit (LWL) = 0.7%
 4. Lower Control Limit (LCL) = 0.0%

To achieve future results similar to this year's pattern and to promote the enhancement of availability SCE has in place the following Maintenance activities:

- Continue adherence to transmission and substation ISO field maintenance practices.

V SUMMARY OUTAGE DATA

500 kV Voltage Class

Transmission Owner	Transmission Line ID	Volt Class	Year	Annual Outage Frequency	Annual Outage Duration Min.
SCE	1905	500	2024	0	0
SCE	1906	500	2024	0	0
SCE	1908	500	2024	0	0
SCE	1907	500	2024	0	0
SCE	2268	500	2024	0	0
SCE	945	500	2024	1	15
SCE	943	500	2024	0	0
SCE	959	500	2024	0	0
SCE	942	500	2024	0	0
SCE	958	500	2024	1	4320
SCE	71	500	2024	1	3331
SCE	72	500	2024	1	37
SCE	1983	500	2024	0	0
SCE	106	500	2024	0	0
SCE	116	500	2024	0	0
SCE	121	500	2024	0	0
SCE	79	500	2024	0	0
SCE	83	500	2024	0	0
SCE	129	500	2024	1	16
SCE	81	500	2024	1	360
SCE	1895	500	2024	1	332
SCE	117	500	2024	0	0
SCE	112	500	2024	0	0
SCE	104	500	2024	2	1211
SCE	1966	500	2024	1	519
SCE	1967	500	2024	1	65
SCE	126	500	2024	4	2830
SCE	127	500	2024	1	265
SCE	194	500	2024	3	6940
SCE	1896	500	2024	0	0
SCE	134	500	2024	1	489
SCE	135	500	2024	1	4289
SCE	132	500	2024	0	0

SCE	1914	500	2024	0	0
SCE	1910	500	2024	0	0

230 kV Voltage Class

Transmission Owner	Transmission Line ID	Volt Class	Year	Annual Outage Frequency	Annual Outage Duration Min.
SCE	483	230	2024	0	0
SCE	1063	230	2024	0	0
SCE	488	230	2024	1	4320
SCE	461	230	2024	0	0
SCE	4676	230	2024	2	3020
SCE	4677	230	2024	1	3019
SCE	999	230	2024	0	0
SCE	665	230	2024	2	1132
SCE	655	230	2024	1	52
SCE	946	230	2024	0	0
SCE	195	230	2024	1	472
SCE	196	230	2024	0	0
SCE	174	230	2024	0	0
SCE	175	230	2024	0	0
SCE	1242	230	2024	0	0
SCE	1480	230	2024	0	0
SCE	449	230	2024	0	0
SCE	1082	230	2024	7	4415
SCE	513	230	2024	0	0
SCE	545	230	2024	0	0
SCE	577	230	2024	2	154
SCE	609	230	2024	0	0
SCE	1046	230	2024	1	1
SCE	1058	230	2024	0	0
SCE	7241	230	2024	0	0
SCE	490	230	2024	1	1646
SCE	926	230	2024	2	1652
SCE	690	230	2024	2	4560
SCE	1709	230	2024	0	0
SCE	1710	230	2024	0	0
SCE	1277	230	2024	0	0
SCE	601	230	2024	0	0
SCE	592	230	2024	0	0
SCE	470	230	2024	2	550
SCE	880	230	2024	1	497

SCE	96	230	2024	0	0
SCE	465	230	2024	0	0
SCE	1483	230	2024	1	223
SCE	464	230	2024	0	0
SCE	1062	230	2024	0	0
SCE	514	230	2024	0	0
SCE	1124	230	2024	0	0
SCE	1125	230	2024	0	0
SCE	526	230	2024	0	0
SCE	1135	230	2024	0	0
SCE	1108	230	2024	0	0
SCE	35	230	2024	0	0
SCE	771	230	2024	0	0
SCE	755	230	2024	0	0
SCE	515	230	2024	0	0
SCE	1618	230	2024	0	0
SCE	981	230	2024	0	0
SCE	1591	230	2024	0	0
SCE	1594	230	2024	0	0
SCE	185	230	2024	0	0
SCE	517	230	2024	0	0
SCE	521	230	2024	0	0
SCE	369	230	2024	0	0
SCE	378	230	2024	0	0
SCE	187	230	2024	0	0
SCE	1984	230	2024	0	0
SCE	972	230	2024	0	0
SCE	974	230	2024	0	0
SCE	1901	230	2024	0	0
SCE	1903	230	2024	0	0
SCE	397	230	2024	0	0
SCE	611	230	2024	0	0
SCE	337	230	2024	0	0
SCE	338	230	2024	0	0
SCE	638	230	2024	0	0
SCE	637	230	2024	0	0
SCE	701	230	2024	0	0
SCE	1495	230	2024	0	0
SCE	1951	230	2024	0	0
SCE	920	230	2024	0	0

SCE	1038	230	2024	0	0
SCE	1050	230	2024	0	0
SCE	188	230	2024	0	0
SCE	973	230	2024	0	0
SCE	226	230	2024	0	0
SCE	36	230	2024	1	1196
SCE	37	230	2024	1	2
SCE	982	230	2024	0	0
SCE	4320	230	2024	0	0
SCE	2264	230	2024	0	0
SCE	216	230	2024	0	0
SCE	217	230	2024	0	0
SCE	4488	230	2024	1	121
SCE	4489	230	2024	0	0
SCE	4406	230	2024	0	0
SCE	1478	230	2024	0	0
SCE	1479	230	2024	0	0
SCE	1481	230	2024	0	0
SCE	4540	230	2024	0	0
SCE	219	230	2024	0	0
SCE	290	230	2024	0	0
SCE	289	230	2024	1	1
SCE	299	230	2024	0	0
SCE	306	230	2024	0	0
SCE	38	230	2024	0	0
SCE	39	230	2024	0	0
SCE	654	230	2024	7	1937
SCE	657	230	2024	5	348
SCE	659	230	2024	0	0
SCE	7239	230	2024	2	938
SCE	7240	230	2024	0	0
SCE	8214	230	2024	10	1620
SCE	8342	230	2024	14	4586
SCE	213	230	2024	1	153
SCE	1968	230	2024	0	0
SCE	1969	230	2024	0	0
SCE	1091	230	2024	1	1
SCE	1093	230	2024	1	1
SCE	689	230	2024	0	0
SCE	763	230	2024	0	0

SCE	1897	230	2024	0	0
SCE	1898	230	2024	0	0
SCE	594	230	2024	1	523
SCE	599	230	2024	0	0
SCE	602	230	2024	0	0
SCE	1813	230	2024	1	132
SCE	845	230	2024	0	0
SCE	729	230	2024	0	0
SCE	731	230	2024	0	0
SCE	1989	230	2024	0	0
SCE	775	230	2024	1	87
SCE	778	230	2024	0	0
SCE	1607	230	2024	0	0
SCE	1899	230	2024	0	0
SCE	1900	230	2024	0	0
SCE	667	230	2024	0	0
SCE	624	230	2024	0	0
SCE	776	230	2024	0	0
SCE	664	230	2024	0	0
SCE	677	230	2024	0	0
SCE	1925	230	2024	0	0
SCE	669	230	2024	3	595
SCE	1073	230	2024	1	1
SCE	1083	230	2024	14	4002
SCE	6644	230	2024	5	1755
SCE	708	230	2024	0	0
SCE	707	230	2024	0	0
SCE	785	230	2024	0	0
SCE	1188	230	2024	0	0
SCE	1189	230	2024	0	0
SCE	471	230	2024	0	0
SCE	881	230	2024	0	0
SCE	770	230	2024	3	999
SCE	474	230	2024	1	95
SCE	475	230	2024	0	0

115 kV Voltage Class

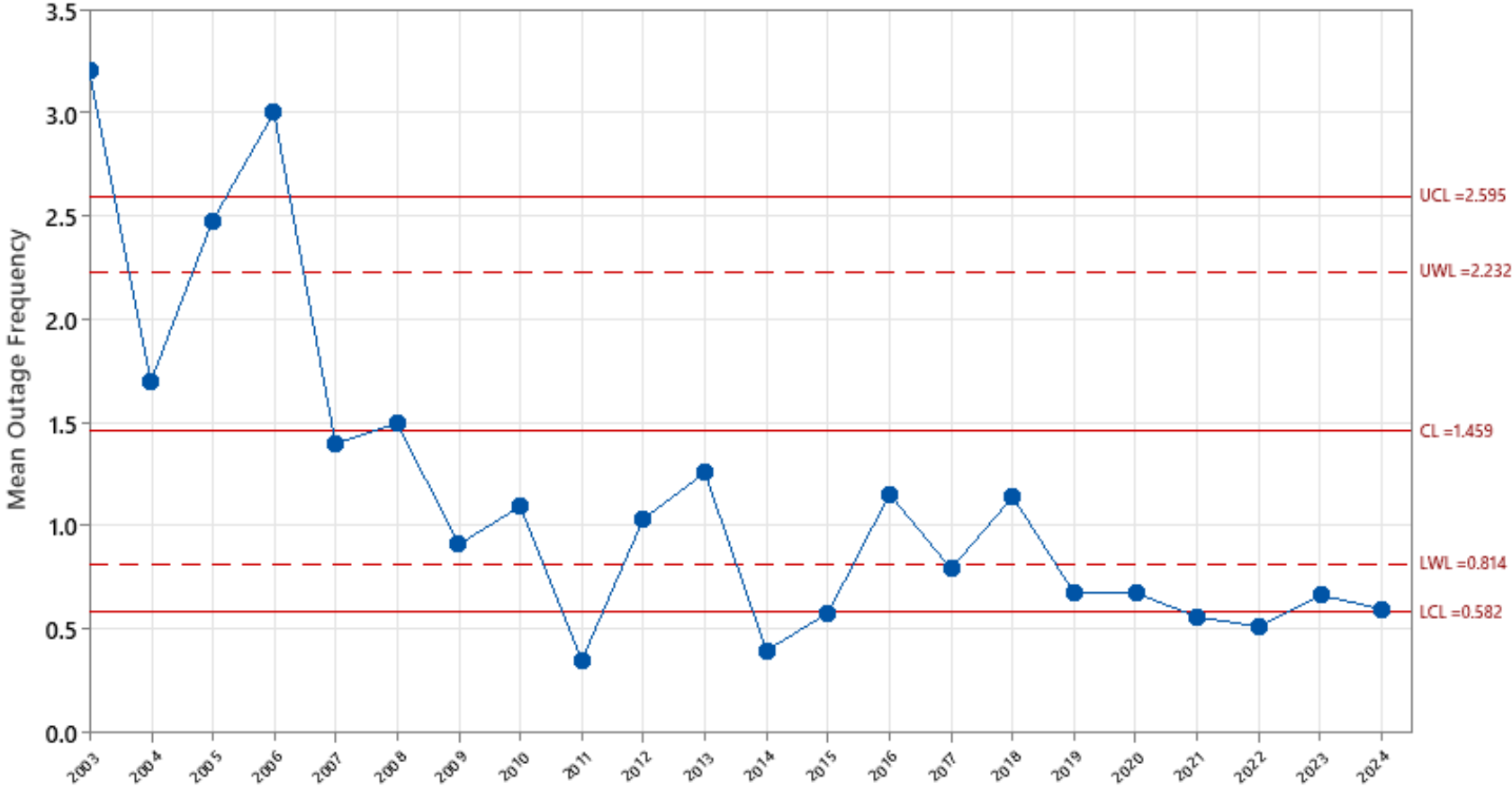
Transmission Owner	Transmission Line ID	Volt Class	Year	Annual Outage Frequency	Annual Outage Duration Min.
SCE	77246	115	2024	10	3082
SCE	CONTROL-COSO-HAIWEE-INYOKERN; INYOKERN TAP	115	2024	0	0
SCE	77245	115	2024	18	4217
SCE	CONTROL-HAIWEE-INYOKERN; INYOKERN TAP	115	2024	0	0
SCE	1064	115	2024	4	2046
SCE	1363	115	2024	2	40
SCE	180	115	2024	6	1249
SCE	561	115	2024	0	0
SCE	948	115	2024	3	7
SCE	949	115	2024	1	3021
SCE	199	115	2024	0	0
SCE	560	115	2024	7	926
SCE	1118	115	2024	2	180
SCE	200	115	2024	1	2
SCE	75165	115	2024	2	25

69 kV Voltage Class

Transmission Owner	Transmission Line ID	Volt Class	Year	Annual Outage Frequency	Annual Outage Duration Min.
SCE	76337	69	2024	23	12603
SCE	76438	69	2024	30	12938
SCE	285	69	2024	1	3
SCE	827	69	2024	2	1310

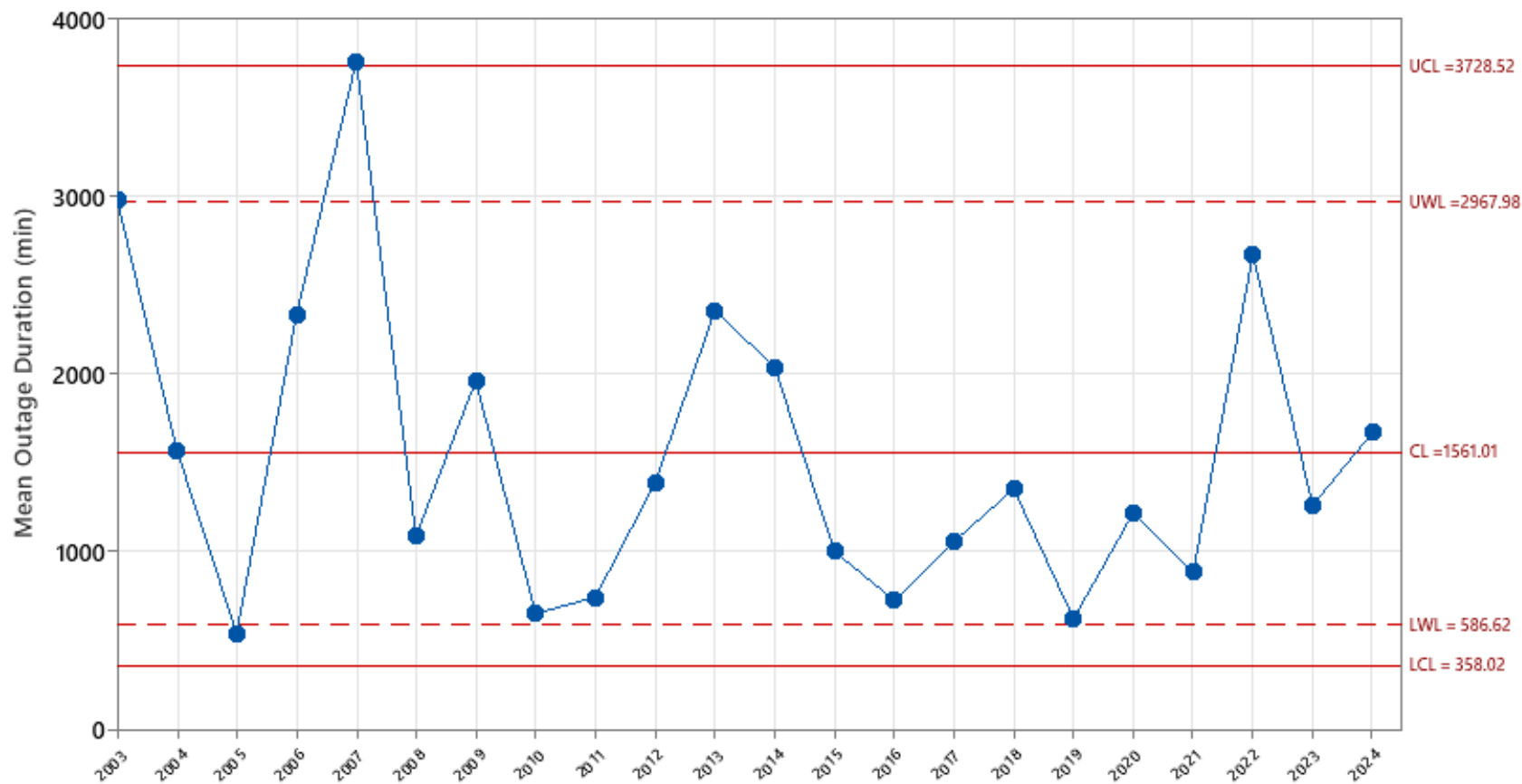
VI CONTROL CHARTS

Bootstrap CC for Mean Outage Frequency SCE500kV

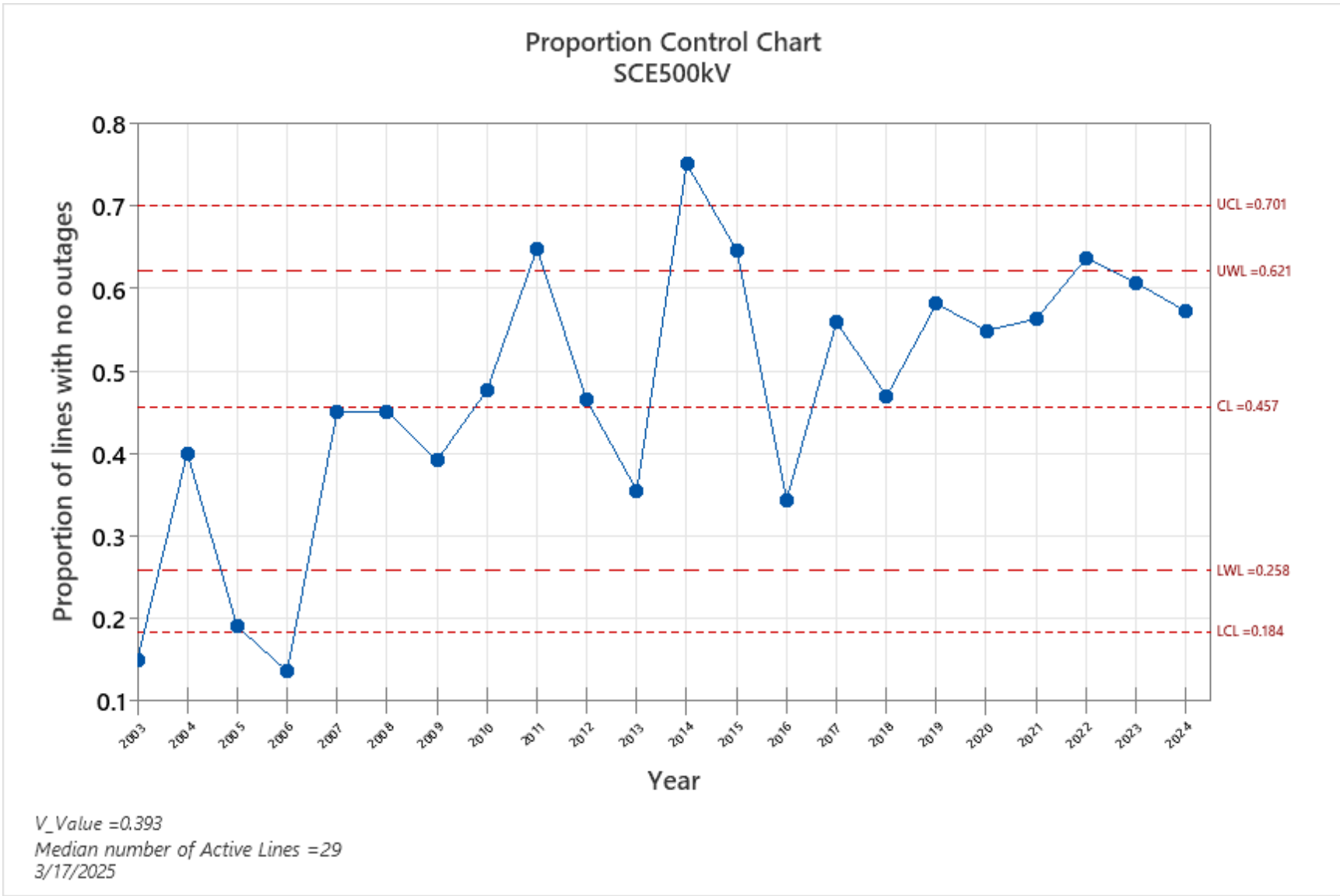


Sample Size =22
V-value =0.546545
3/17/2025

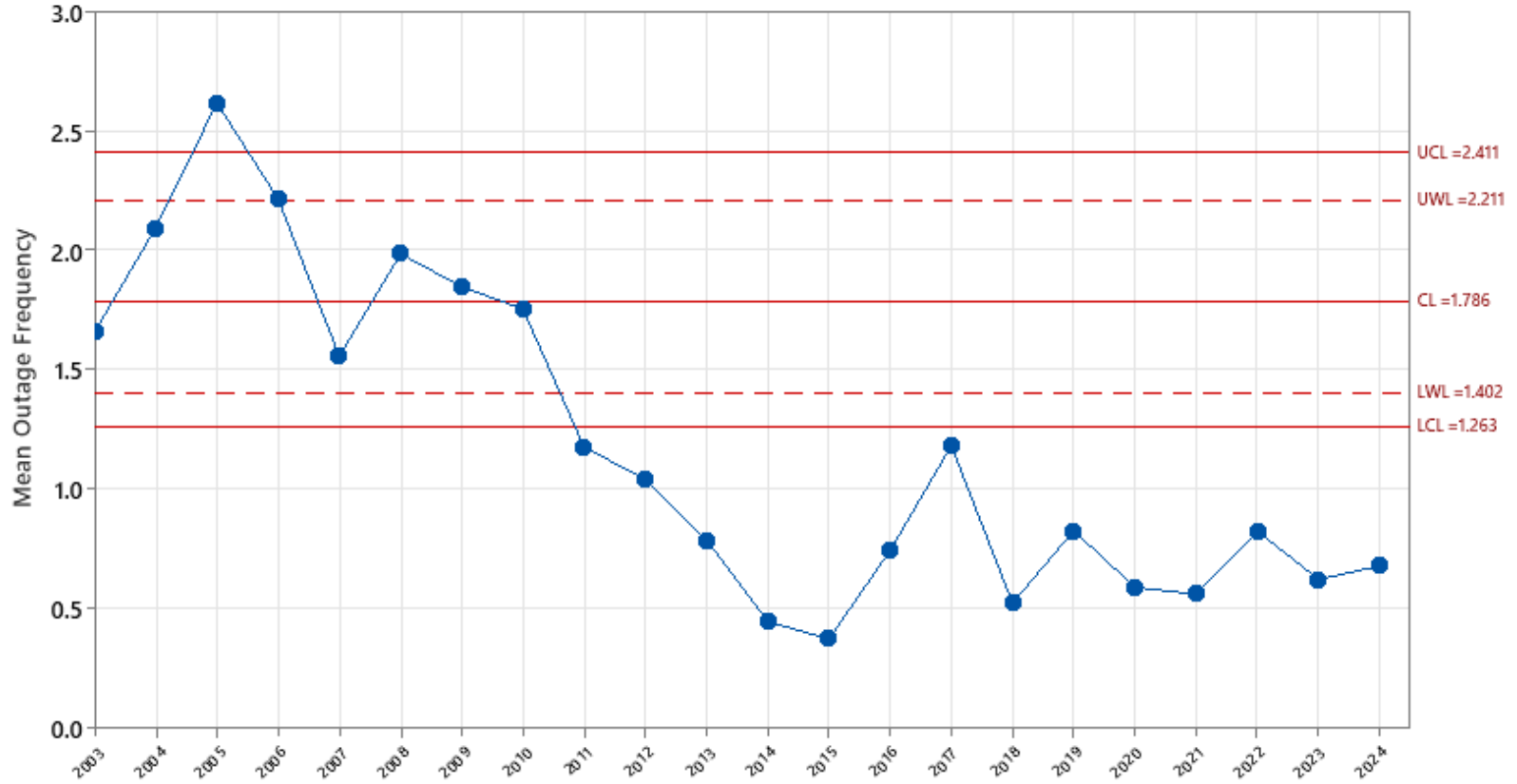
Bootstrap CC for Mean Outage Duration SCE500kV



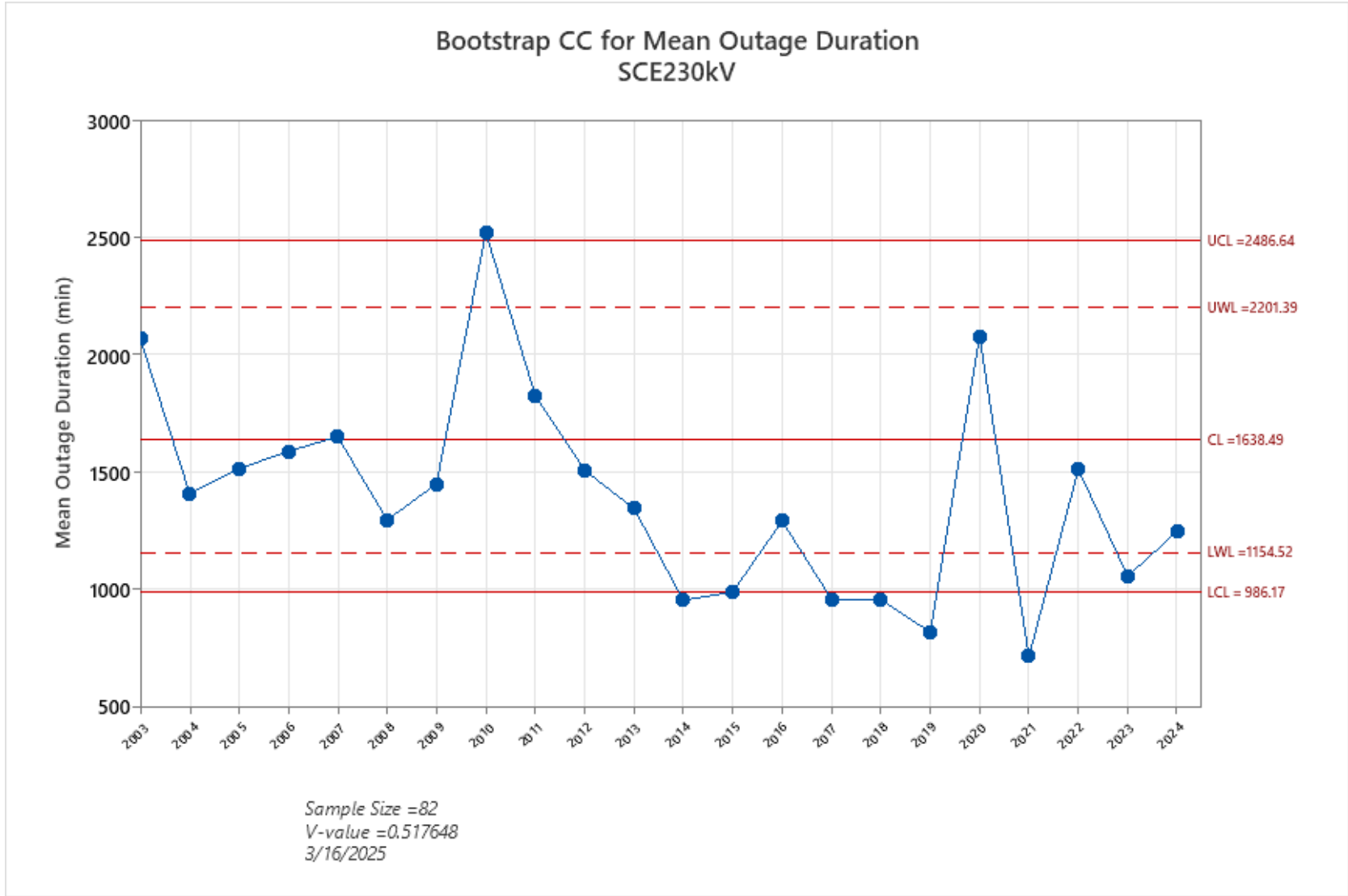
Sample Size = 13
V-value = 0.548845
3/17/2025

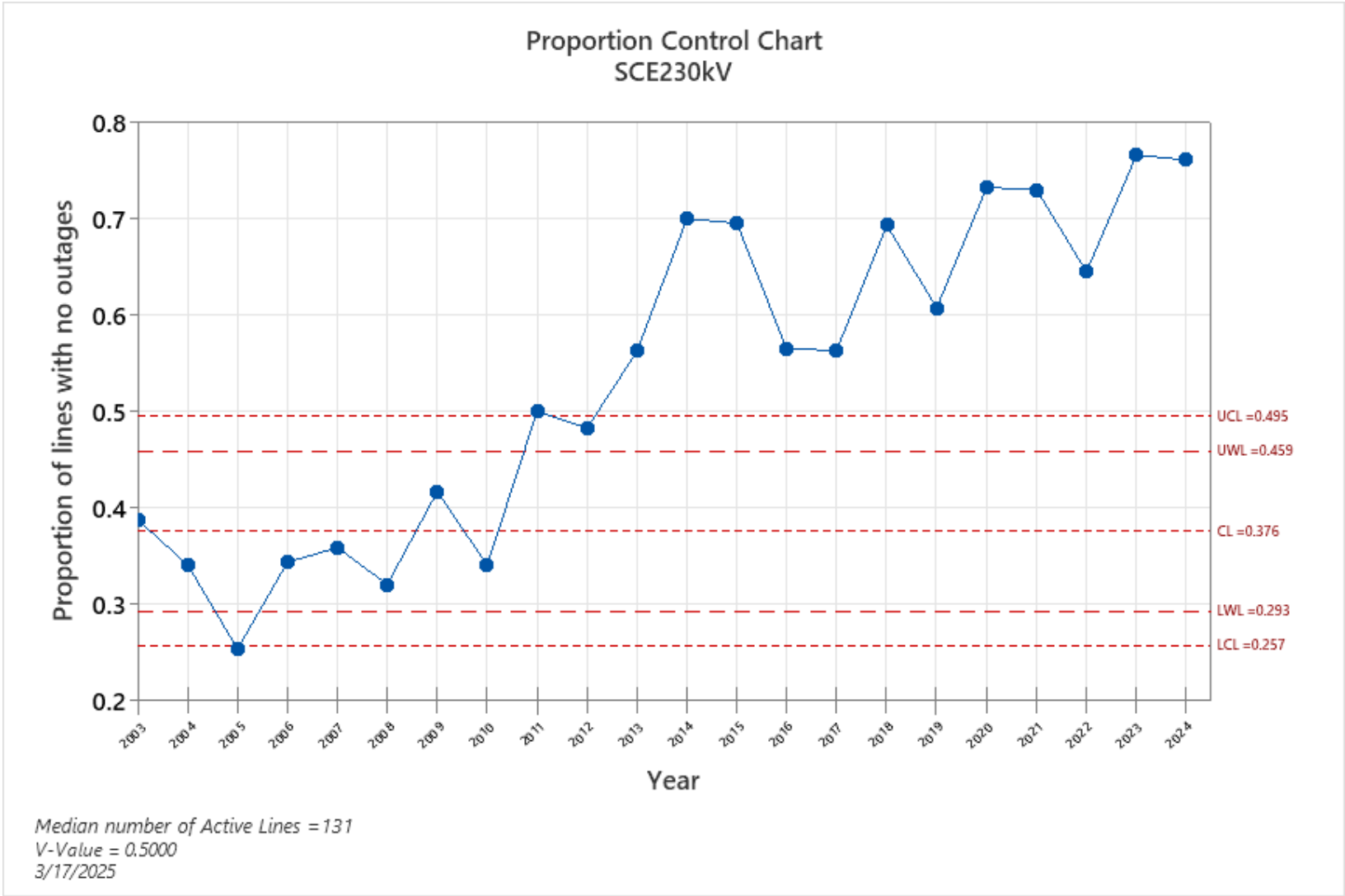


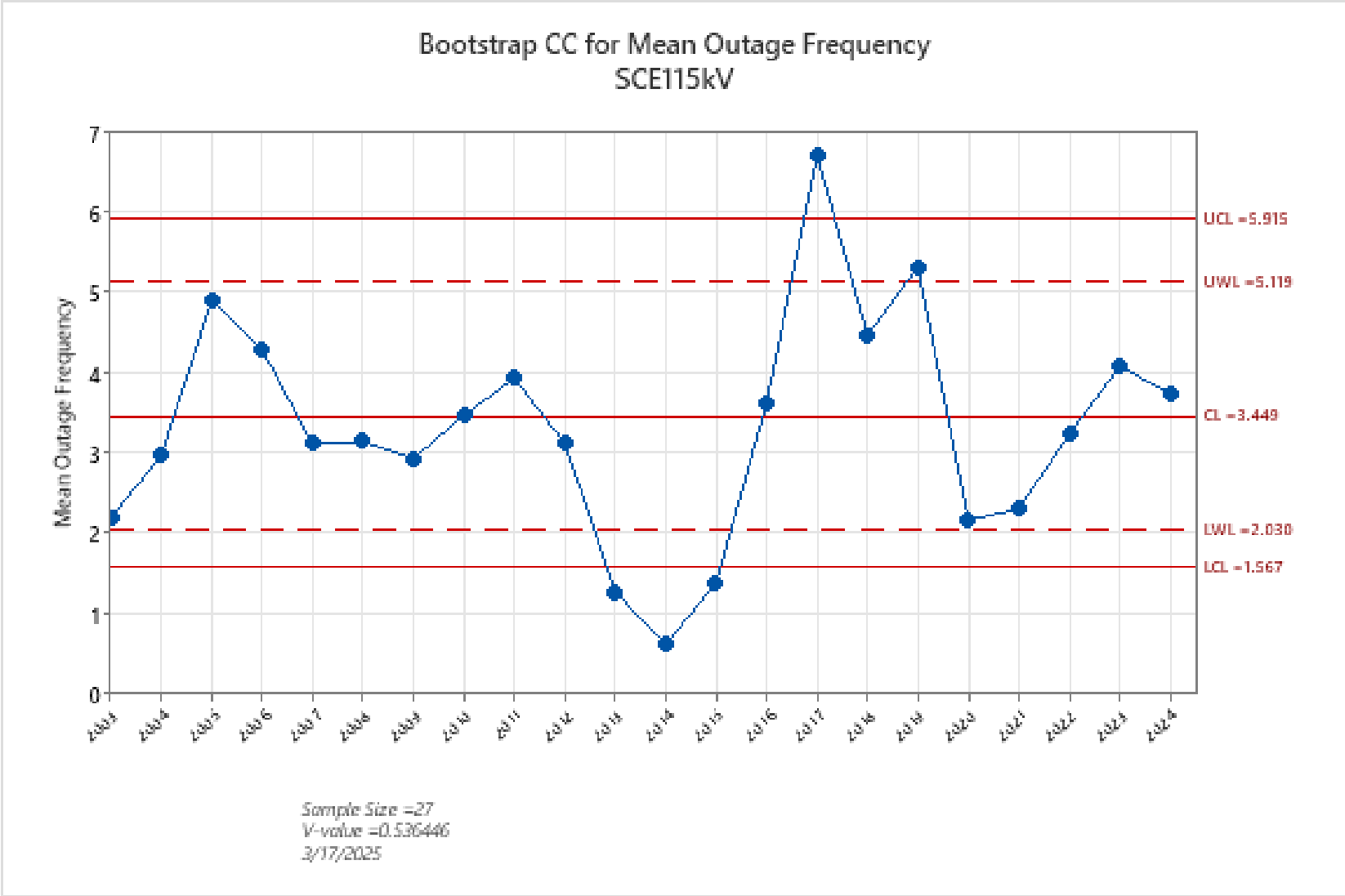
Bootstrap CC for Mean Outage Frequency SCE230kV



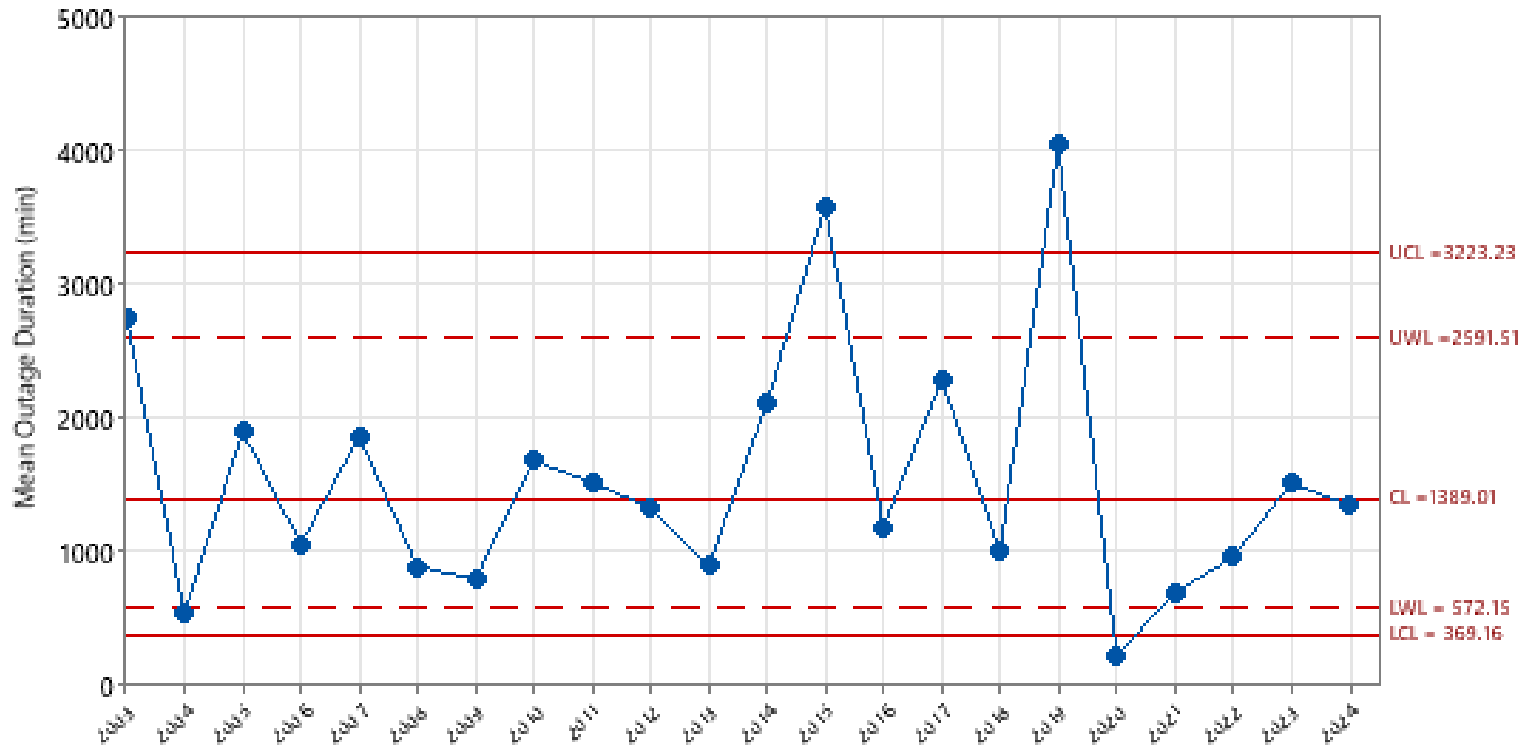
Sample Size = 131
V-value = 0.513049
3/17/2025





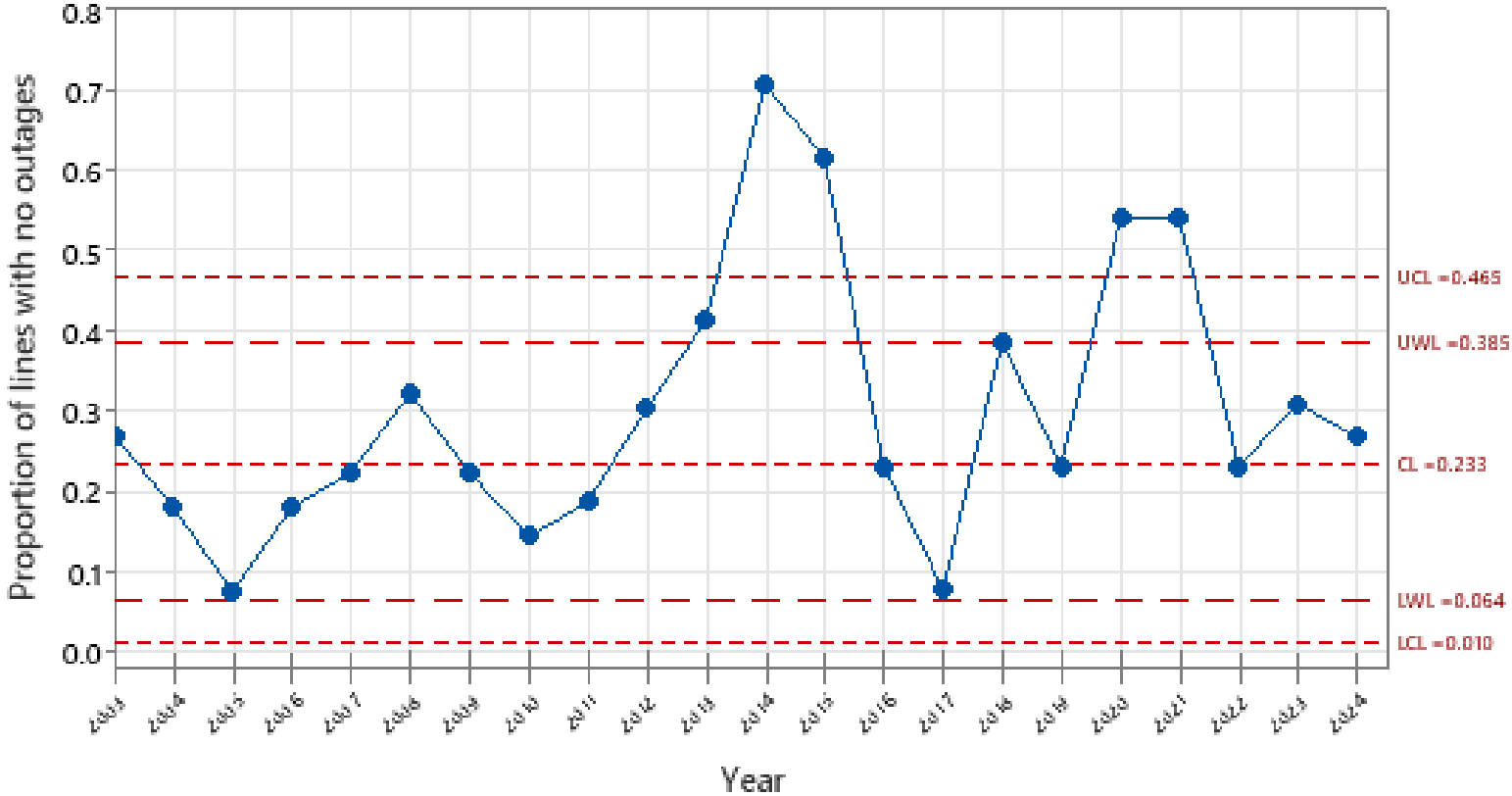


Bootstrap CC for Mean Outage Duration SCE115kV

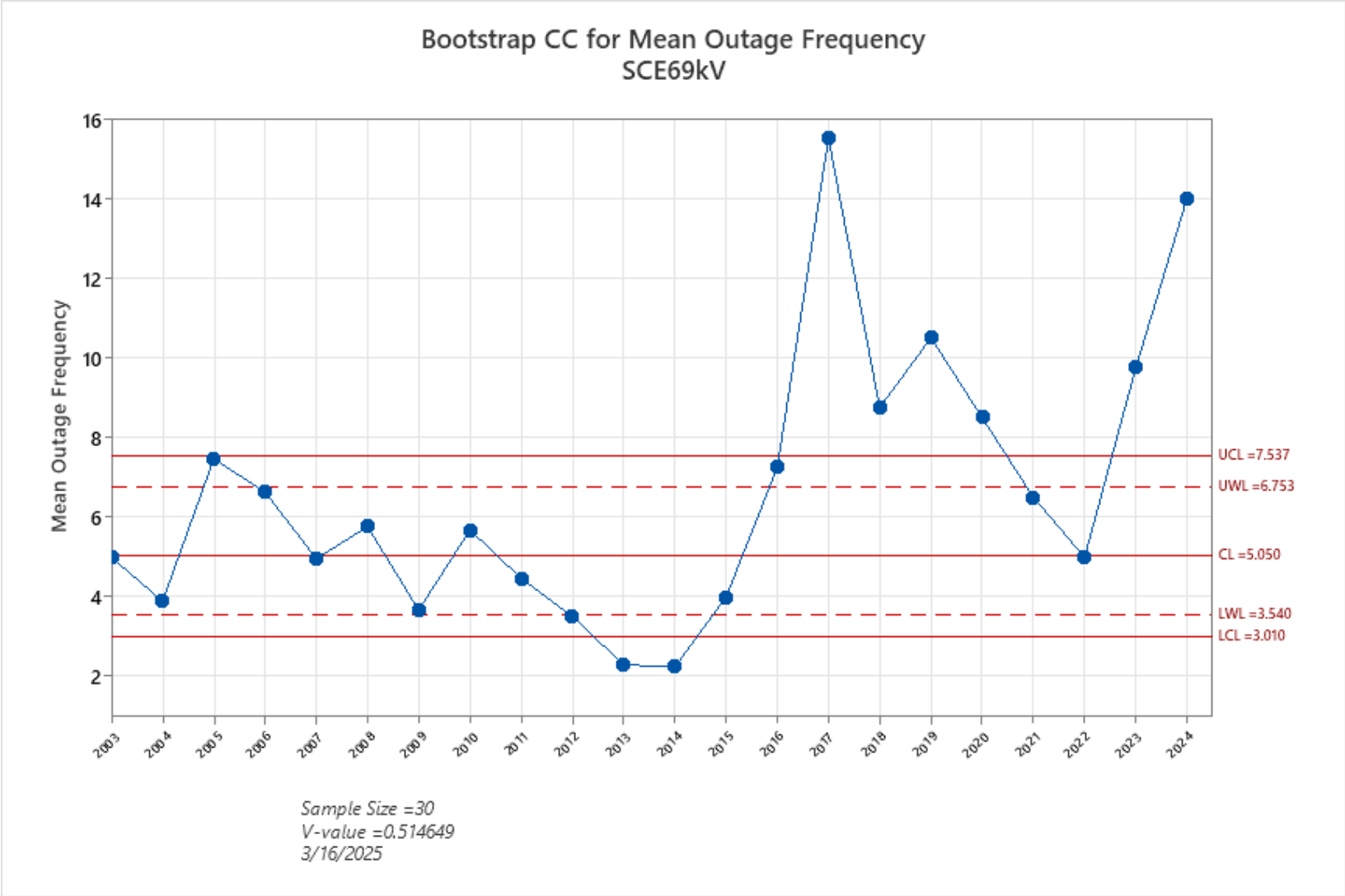


Sample Size = 10
V-value = 0.557844
3/17/2025

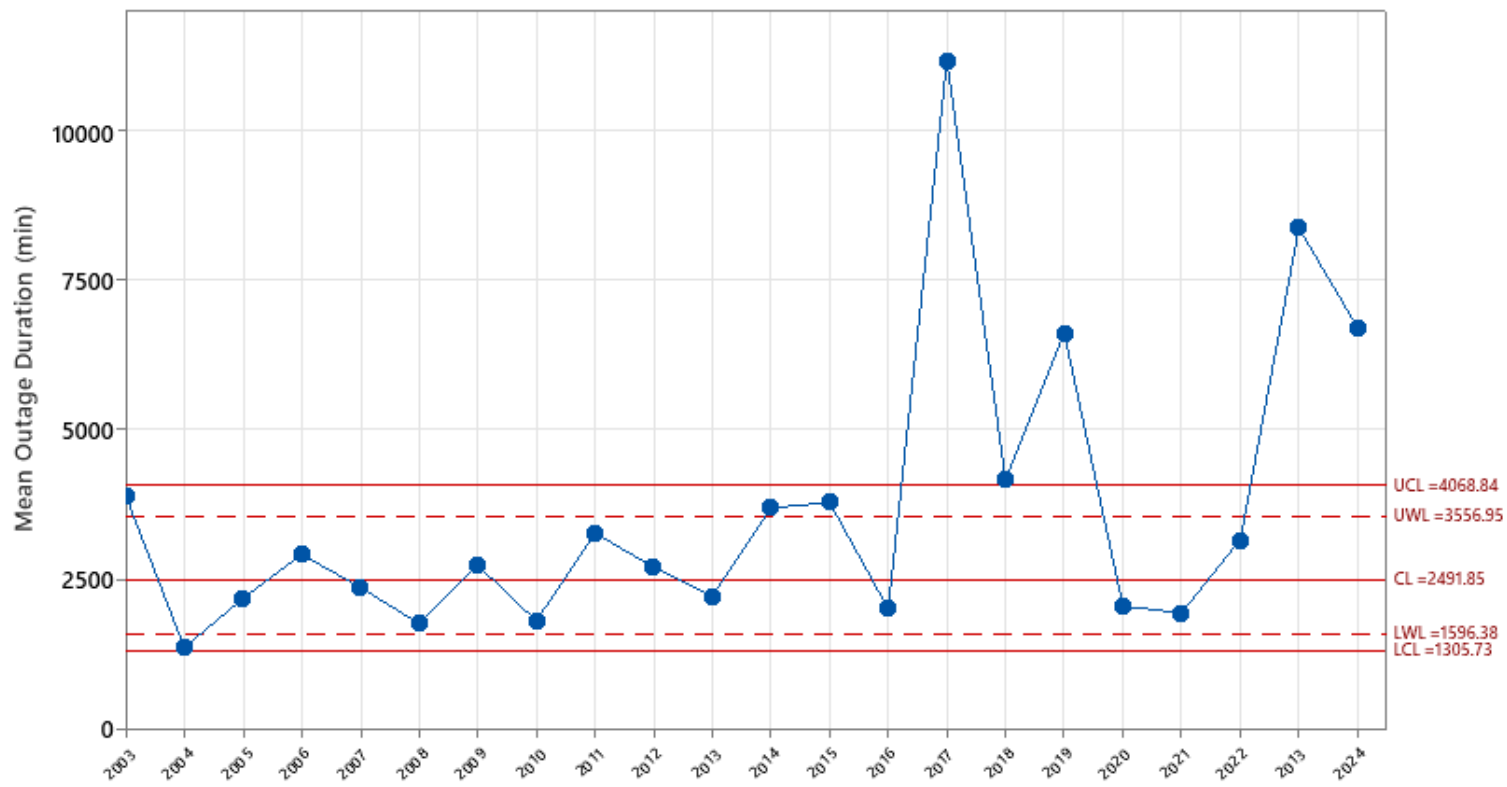
Proportion Control Chart SCE115kV



V_Value = 0.372
 Median number of Active Lines = 27
 3/17/2025



Bootstrap CC for Mean Outage Duration SCE69kV



Sample Size =27
V-value =0.521448
3/16/2025

