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Division of Public Utilities
UTAH DEPARTMENT OF COMMERCE

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Comments

To: Public Service Commission of Utah

From: Utah Division of Public Utilities
Chris Parker, Director
Brenda Salter, Assistant Director
Doug Wheelwright, Utility Technical Consultant Supervisor
Bob Davis, Utility Technical Consultant

Date: March 14, 2025

Re: **Docket No. 25-035-09,** Rocky Mountain Power's Power Quality Report for the Period of January through December 2024

Recommendation (Acknowledge)

The Division of Public Utilities (Division) recommends the Public Service Commission (Commission) acknowledge Rocky Mountain Power's (RMP) 2024 Power Quality Report (Report). This report and future reports will be used to establish a baseline. The Division supports RMP's request to combine the Power Quality Reports and Power Quality Plan Status Reports to maximize efficiency and resources as stated herein.

Issue

On February 10, 2025, RMP filed its Power Quality Report for 2024. The Commission asked the Division to review RMP's Report for compliance and make recommendations by March 12, 2025. On February 12, 2025, the Commission issued its Notice of Filing and Comment Period asking any interested person to submit comments by March 14, 2025.

Background

On May 1, 2020, RMP filed its January 1 through December 31, 2019, Service Quality Review Report (2019 Report)[1] pursuant to the Commission's orders in Docket Nos. 08-035-

[1] *Rocky Mountain Power's Service Quality Review Report*, Docket No. 20-035-22, Report filed May 1, 2020, https://pscdocs.utah.gov/electric/20docs/2003522/313499RMPServQuaRevRepPeriodJanDec20195-1-2020.pdf.

55, 13-035-01, and 15-035-72 as well as the requirements of Utah Administrative Code R746-313, Electrical Service Reliability (Reporting Requirements). On June 1, 2020, the Division filed its comments and recommended the Commission establish a work group to review RMP's reliability baseline standards and make recommendations.[2] On June 16, 2020, RMP filed reply comments supporting the Division's recommendation.[3] On June 23, 2020, the Commission issued an Order directing the Division and RMP to establish a work group led by the Division with the purpose of examining RMP's reliability baseline standards and making recommendations.[4]

In compliance with the Commission's Order, the Division and RMP convened the work group (Work Group) on August 4, 2020. Representatives from the Division, RMP, the Office of Consumer Services, Utah Association of Energy Users, Utah Petroleum Association, Utah Mining Association, and Clean Harbors Aragonite Inc. participated in the Work Group. On December 21, 2020, the Division filed a memorandum containing the Work Group's recommended changes to the control limits and the baseline notification levels.[5]

The Work Group met several times through June 2022, and addressed baselines for the reliability indices and power quality issues raised by representatives of the large industrial customers. On June 28, 2022, RMP filed its proposed Power Quality Reporting template.[6]

The parties each filed comments and reply comments containing suggestions for RMP's proposed reporting template. On November 1, 2022, the Commission approved RMP's proposed reporting template and February filing deadline.[7] The Commission noted in its correspondence that the report template is a work in progress and subject to change as

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[2] *Comments from the Division of Public Utilities,* Docket No. 20-035-22, June 1, 2020, https://pscdocs.utah.gov/electric/20docs/2003522/314067DPUCmnts6-1-2020.pdf.
[3] *Rocky Mountain Power's Reply Comments,* Docket No. 20-035-22, June 16, 2020, https://pscdocs.utah.gov/electric/20docs/2003522/314292RMPRplyCmnts6-16-2020.pdf.
[4] *Order*, Docket No. 20-035-22, June 23, 2020, at 2, https://pscdocs.utah.gov/electric/20docs/2003522/3143552003522o6-23-2020.pdf.
[5] *Division of Public Utilities Memorandum*, Docket No. 20-035-22, December 21, 2020, https://pscdocs.utah.gov/electric/20docs/2003522/316802DPUMemWrkGrp12-21-2020.pdf.
[6] *Rocky Mountain Power's Proposed Reporting for Power Quality*, Docket No. 22-035-34, Rocky Mountain Power's Proposed Reporting for Power Quality, June 28, 2022, https://pscdocs.utah.gov/electric/22docs/2203534/324661PrpsdRprtngPwrQlty6-28-2022.pdf.
[7] *Correspondence from Gary L. Widerburg,* Docket No. 22-035-34, November 1, 2022, https://pscdocs.utah.gov/electric/22docs/2203534/326013CorresWiderburg11-1-2022.pdf.

more data becomes available. Parties are encouraged to re-evaluate the reporting template and recommend further action if necessary.[8]

Discussion

The Division appreciates RMP's efforts to continuously improve its Power Quality Report.[9] RMP's service quality, measured by System Average Interruption Duration Index (SAIDI), System Average Interruption Frequency Index (SAIFI), Customer Average Interruption Duration Index (CAIDI), and Momentary Average Interruption Event Frequency Index ($MAIFI_E$), are evaluated annually.[10] While the service quality report generally refers to system related outages measured by SAIDI and SAIFI, the Power Quality Report refers to system faults that result in system voltage sags[11] from various causes.

Voltage sags or spikes and the duration of the events can create problems for all customers but primarily industrial customers due to the ride-through[12] capabilities of their equipment. Many equipment manufacturers follow standards established by the Underwriters Laboratories (UL), International Electrotechnical Commission (IEC), Institute of Electrical and Electronics Engineers (IEEE), and Conformité Européene (CE).[13] Most manufacturers follow the SEMI-F47 Curve developed by the semiconductor industry to ensure that control and manufacturing equipment would not require operator intervention in the event of a voltage sag or spike. The SEMI-F47 Curve is based on a table of metrics that establishes maximum durations in seconds of sags or spikes at percentages of the nominal voltage.[14]

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[8] *Id.* at 2.
[9] *Rocky Mountain Power's Power Quality Report for 2024*, Docket No. 25-035-09, February 10, 2025, https://pscdocs.utah.gov/electric/25docs/2503509/3381792024PwrQltyRprt2-10-2025.pdf. The Division assumes RMP meant to use Docket No. 25-035-09 versus Docket No. 24-035-09 in its subject line.
[10] *Rocky Mountain Power's Service Quality Review Report,* Docket No. 22-035-14, April 29, 2022, https://pscdocs.utah.gov/electric/22docs/2203514/323803RMP2021SrvcQltyRvwRprt4-29-2022.pdf.
[11] A voltage sag is defined as a decrease in voltage magnitude below 90% of nominal, but not a complete interruption. Pacific Gas and Electric Company, Voltage Sag Immunity Standards – SEMI F47 and F42, Power Quality Bulletin No. 3, https://www.pge.com/includes/docs/pdfs/about/news/outagestatus/powerquality/power_quality_bulletin-issue_no.3-volt_sagImm_std-8-10-07.pdf.
[12] *Id.* Ride-through is generally defined as the ability for equipment to withstand voltage or frequency disturbances for some duration of time without creating a fault.
[13] *Rocky Mountain Power's Power Quality Report for 2022*, Docket No. 23-035-05, Feb. 14, 2023, Glossary, at 2, https://pscdocs.utah.gov/electric/23docs/2303505/3269992022UtPwrQltyRprt2-14-2023.pdf.
[14] Docket No. 22-035-17, *supra* note 10.

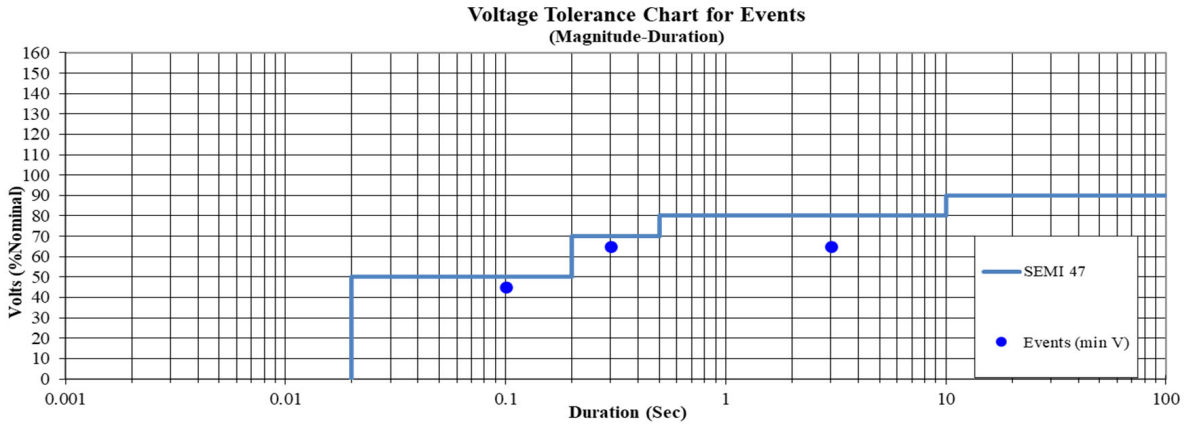
Table 1[15] illustrates the metrics and Illustration 1 is an **example** of the SEMI-F47 Curve showing sample voltage sags and duration.[16]

Table 1

VOLTAGE SAG DURATION				***VOLTAGE SAG***
Second (s)	Milliseconds (ms)	Cycles at 60 hz	Cycles at 50 hz	Percent (%) of Equipment Nominal Voltage
<0.05 s	<50 ms	<3 cycles	<2.5 cycles	Not specified
0.05 to 0.2 s	50 to 200 ms	3 to 12 cycles	2.5 to 10 cycles	50%
0.2 to 0.5 s	200 to 500 ms	12 to 30 cycles	10 to 25 cycles	70%
0.5 to 1.0 s	500 to 1000 ms	30 to 60 cycles	25 to 50 cycles	80%
>1.0 s	>1000 ms	>60 cycles	>50 cycles	Not specified

Illustration I

(SEMI-F47 Curve Example)



On November 1, 2023, RMP filed with the Commission its Service Quality (as opposed to the Power Quality Report) Report for the 1st half of 2023.[17] In its report, RMP requested two changes to its reporting template: first, subdividing the state into five reliability reporting areas, and second, reporting activities associated with RMP's Wildfire Mitigation Plan.[18] The

[15] *Id*.
[16] *Supra* note 11.
[17] *Rocky Mountain Power's Service Quality Review Report,* Docket No. 23-035-21, November 1, 2023, https://pscdocs.utah.gov/electric/23docs/2303521/330553RMPSrvcQltRvwRprtJan1Jun30202311-1-2023.pdf.
[18] *Id*. at 4.

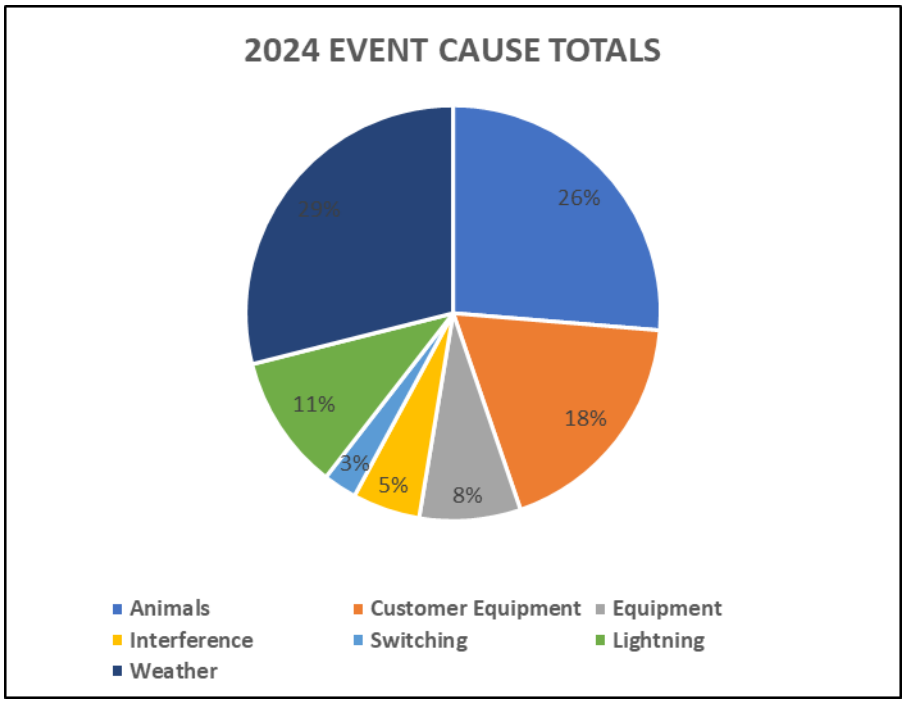
Commission approved RMP's modifications on December 12, 2023.[19] RMP modified its 2023 *Power* Quality Report to include four reporting areas: North, West, Central, and South to better match the service reliability study areas.[20] RMP's 2022 power quality report contained data from 24 monitoring points throughout the state. Since that time, RMP has added to that initial number of reporting points. In the 2024 Report, RMP indicates that it has a total of 43 monitoring points and plans to add 31 new monitoring points in 2025.[21]

RMP's monitors captured 127 total events, 85 unique voltage sag events, and 70 events from new meters.[22] RMP reports this year's unique voltage sag events is a 14.9% increase over 2023. Approximately 55% of this year's reported unique sag events are purportedly the result of the new meters.[23]

RMP compiles the meter data from the four reporting regions throughout Utah into major event causes. The Division notes that the event cause categories may differ slightly from year-to-year but still serves as an important year-over-year comparison of major events leading to power quality issues and remedies. Illustration II shows this reporting period's major event causes as a percentage of the total events.

[19] *Acknowledgment Letter from the Public Service Commission,* Docket No. 23-035-21, December 12, 2023, https://pscdocs.utah.gov/electric/23docs/2303521/331230AckLtrfromPSC12-12-2023.pdf.
[20] *Rocky Mountain Power's Power Quality Report for 2023,* Docket No. 24-035-06, February 15, 2024, https://pscdocs.utah.gov/electric/24docs/2403506/3324252023UPwrQltyRprt2-15-2024.pdf. These areas differ from the five regions reported in the service quality reporting.
[21] Docket No. 25-035-09, supra note 9, *Cumulative Yearly Monitor Locations*, Table 1, at 4.
[22] *Id.* pgs. 6-7.
[23] *Id.* at 6.

Illustration II



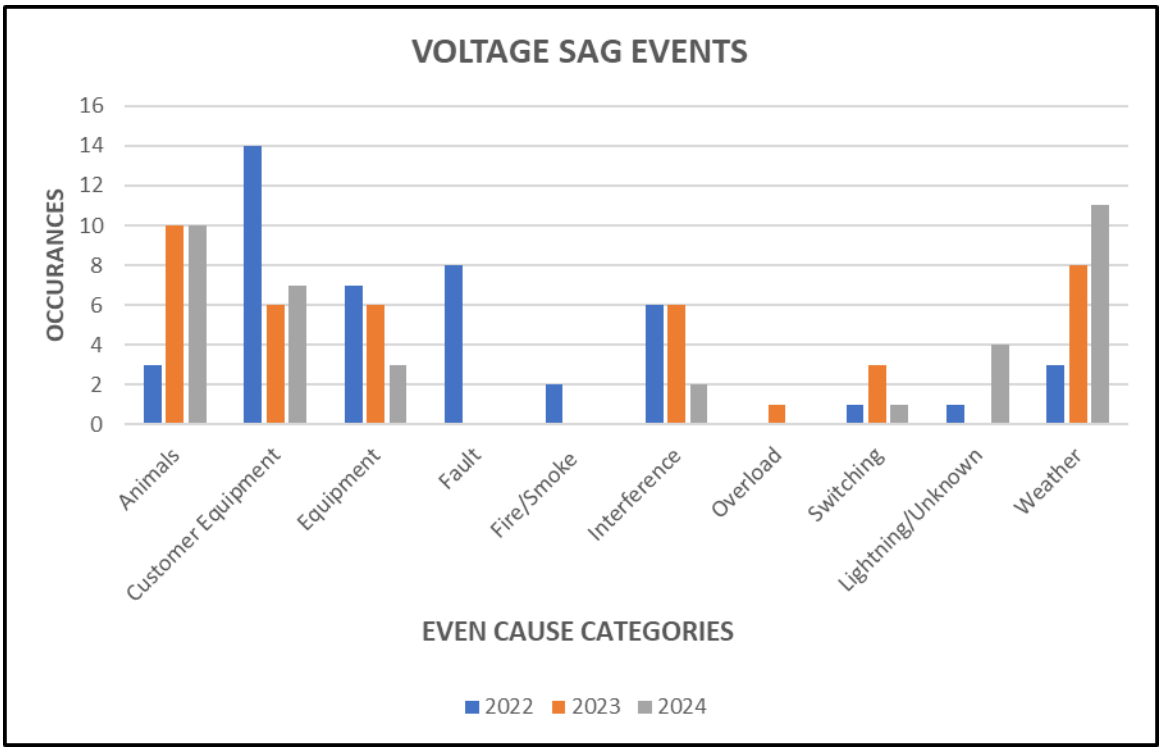
RMP reports the 38 main event causes during 2024 of: 10 Animals, 7 Customer Equipment, 3 Utility Equipment, 2 Interference, 4 Lightning, 1 Switching, and 11 Weather events.[24] The Division notes that the 38 major event causes reported this year are an improvement from last year's 45 major event causes.

The Division concludes that tracking the major event causes year-over-year is important for interested parties to better understand the causes leading to poor power quality sag events. Illustration III provides a trend of 2022 and 2024 major event causes. While three years of data does not provide significant results, the Division hopes trending this data will provide a better understanding of power quality in the future. It also plans to explore different ways to illustrate the data as it continues to collect year-over-year metrics.

[24] *Id.* at 10.

Illustration III

Voltage SAG Event Cause Trends

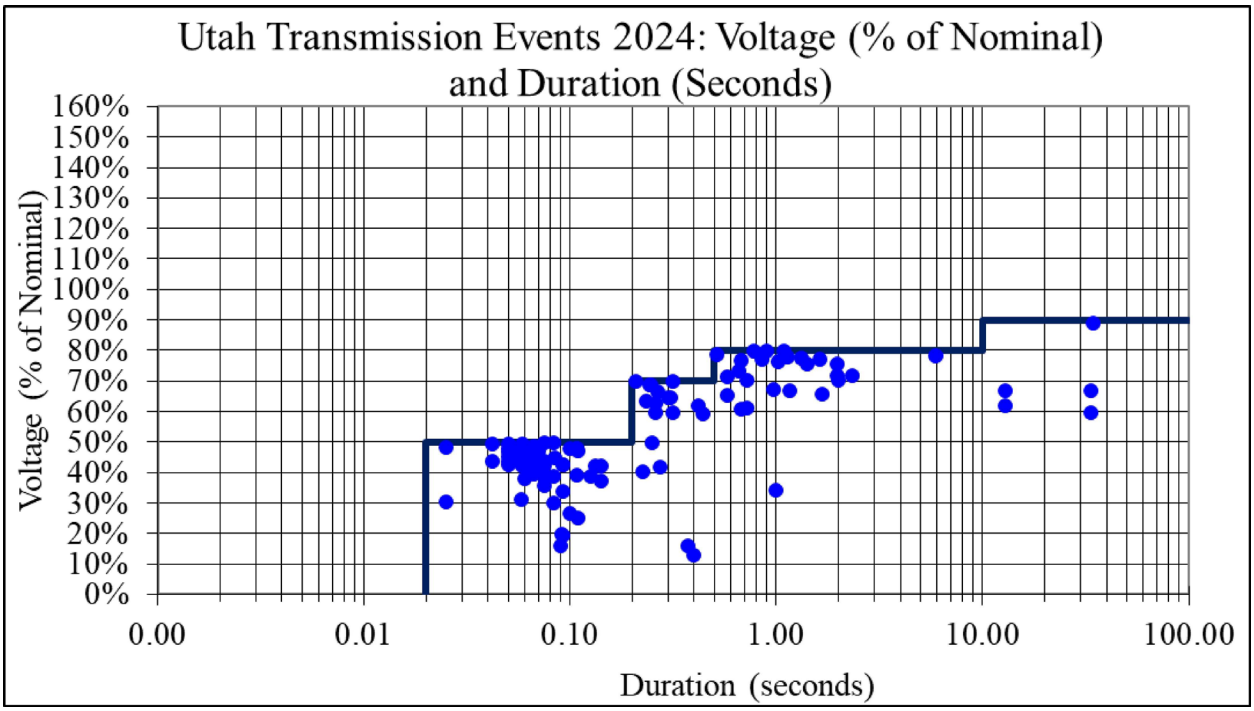


RMP does not report voltage spikes that would appear above the SEMI-F47 line. Voltage sags are generally more detrimental to power quality than spikes, however the Commission may wish to require reporting voltage spikes in future power quality reports to provide a more comprehensive view of variations that could affect customers' service and equipment. Illustration IV shows RMP's compiled 2024 SEMI-F47 sag events including the new meter stations and regions.[25]

[25] *Id.* at 6.

Illustration IV

RMP SEMI-F47 2024 Curve



The Division has continuing concerns with the number of events occurring below the SEMI-F47 line, especially events lasting between 1 and 10 seconds. The Division understands that voltage sags are inevitable given the many factors that are generally out of RMP's control. This year's report does not indicate a significant variance from last year's SEMI-F47 Curve. This year's report indicates that animals and weather are the leading event cause contributors with customer equipment also contributing to the cause of power quality issues. Last year's report was substantially comprised of customer equipment, utility equipment, and interference as leading event causes. However, this is RMP's third power quality report, and the Division has no baseline on which to evaluate its concerns or make recommendations. The Division intends to monitor RMP's SEMI-F47 curves and the event causes in future years to develop a baseline before offering any recommendations.

The Division appreciates RMP's efforts to combine the Power Quality Report and Power Quality Plan Status Report to maximize efficiency.

Conclusion

The Division has reviewed RMP's Power Quality Report for 2024 and determined that it reflects the Commission's approved template. Therefore, the Division recommends the Commission acknowledge RMP's Report. The Division supports RMP's request to combine the Power Quality Reports and Power Quality Plan Status Reports to maximize efficiency.

cc: Jana Saba, RMP
Michele Beck, OCS
Service List