Report to the Utah Public Utility Commission

Electric Service Reliability - Major Event Report UT-16-3

Event Dates:	May 19 – May 20, 2016
Date Submitted:	July 1, 2016
Primary Affected Locations:	Ogden, Salt Lake City Metro
Primary Cause:	Lightning/Loss of Supply
Exclude from Reporting Status:	Yes
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Report Approved by:	Heide Caswell / Ken Shortt/Scott Derrick/Chris Spencer

Event Description

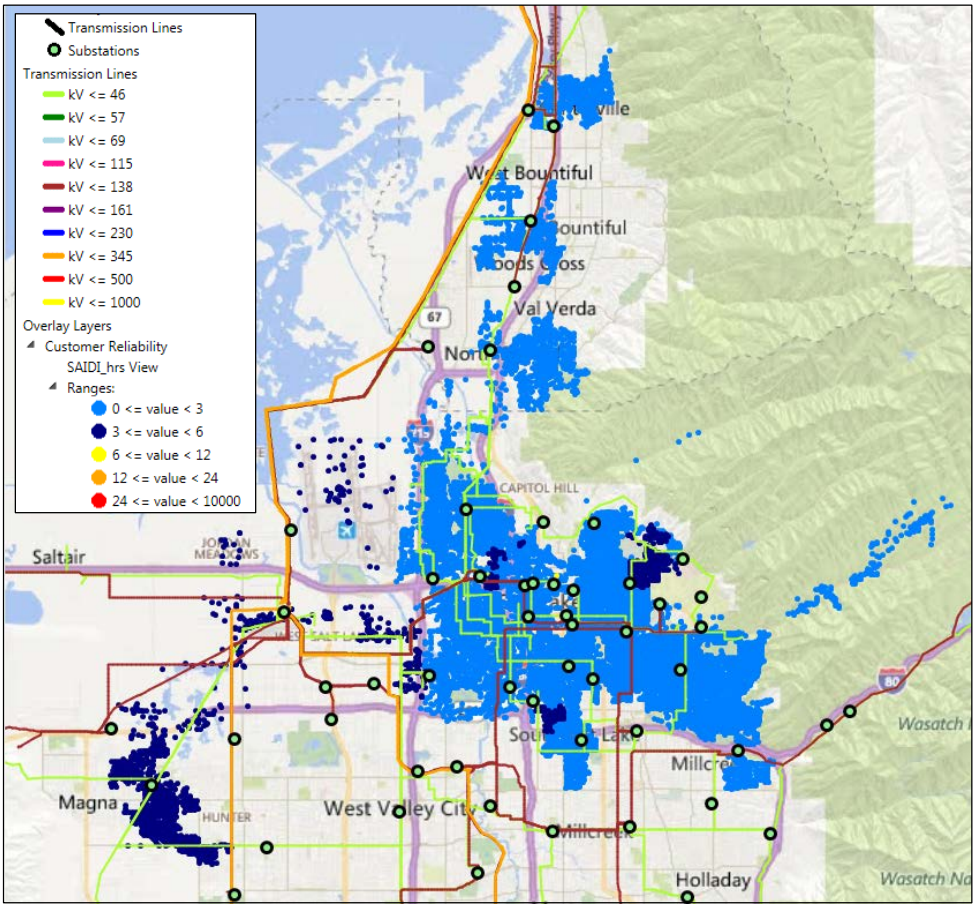
On May 19, 2016, a lightning storm made its way across the northern portion of Utah. The storm brought wind and lightning to the area causing large scale outages to the distribution and transmission network. Transmission feeds were heavily impacted when lightning destroyed static lines[1] which then dropped into transmission lines, causing several circuit breakers to trip and de-energize. As several transmission feeds were lost, loading levels on alternate sources increased, causing those sources to overload and de-energize consistent with reliability standards requirements.

Over the course of the major event loss of transmission outages accounted for 95% of all customer minutes lost and 97% of the total customers who experienced an outage. At 11:06 pm on May 19 the number of customers without power peaked at 95,486. In total 100,592 customers in Utah experienced an outage during the event, 90% of which were restored within 3 hours with no customers out over 24 hours. The following figures show the customer outages which occurred due to the loss of supply event in Salt Lake City and lighting strikes which occurred in the area.

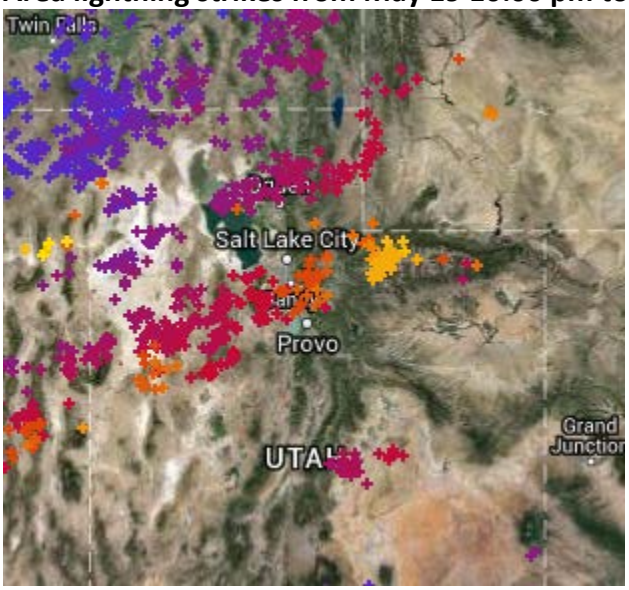
Event Outage Summary	
# Interruptions (sustained)	242
Total Customer Interrupted (sustained)	100,592
Total Customer Minutes Lost	9,896,845
Event SAIDI	11.29 Minutes
CAIDI	98
Major Event Start	5/19/16 5:37 PM
Major Event End	5/20/16 5:37 PM

[1] Static lines are suspended above transmission lines acting as a lightning rod, providing a low resistance path to the ground.

Salt Lake City metro area loss of supply customer outages by duration from 5/19 - 5/20



Area lightning strikes from May 19 10:00 pm to May 20 6:00 am



Restoration Summary

On the evening of May 19th a severe storm began impacting service to Northern Utah. At 10:36 pm a suspected lightning strike hit a transmission static line, damaging the line. As the static line dropped it contacted the transmission line it was protecting, causing a fault, tripping open the circuit breaker at Terminal substation, and de-energizing the Terminal bus. In addition, a second area static line break occurred, due to lightning. When this line broke it also contacted transmission circuits below, producing a fault which operated the substation circuit breaker. Combined these events caused several transmission feeds to de-energize in Salt Lake City area.

On the morning of May 19th, a circuit breaker replacement project began at the McClelland substation, where an air break switch was used to sectionalize the substation bus. As additional energy requirements grew that evening, the circuits feeding the McClelland substation began to experience a load imbalance due to the open phase pole. Eventually the phase imbalance was too much and the breaker tripped open. Immediately following the trip an additional feed overloaded, triggering a further transmission breaker to trip open.

Dispatch quickly began restoration activities, as area substation feeds were de-energized. Local crews were dispatched to the failed transmission supply lines to investigate the outages and begin the restoration process. In the meantime, area dispatch was able to quickly identify switching orders in an effort to restore feeds across the Salt Lake City region. As a result 91% of all customers affected during the loss of supply event were restored in 3 hours.

While the majority of the system impacts were the result of the lightning-triggered transmission outages, the same lightning and accompanying wind, resulted in localized effects within the distribution system, including pole fires and downed conductor. In a few locations the lightning caused various circuit breakers to operate, it is also believed that a lightning strike damaged an underground cable. Responders moved rapidly to replace fuses and poles, and remove tree limbs entangled in lines.

There were two company and one commission customer complaints made regarding the major event.

Restoration Intervals

Total Customers Sustained	< 3 Hrs.	3 - 24 Hrs.	24+ Hrs.
100,592	90,994	9,598	0

Restoration Resources

Personnel Resources	
Troublemen/Assessors	18
Internal Crewmembers (local)	51
Internal Crewmembers (borrowed/non-local)	1
External Crewmembers (contract)	14
Substation Crewmembers	2
Vegetation Crewmembers	13
TOTAL	**99**

Materials	
# Poles (distribution)	9
# Poles (transmission)	1
Approximate Line Feet (conductor)	3,297
# Transformers	2
# Crossarms	2

State Estimated Major Event Costs

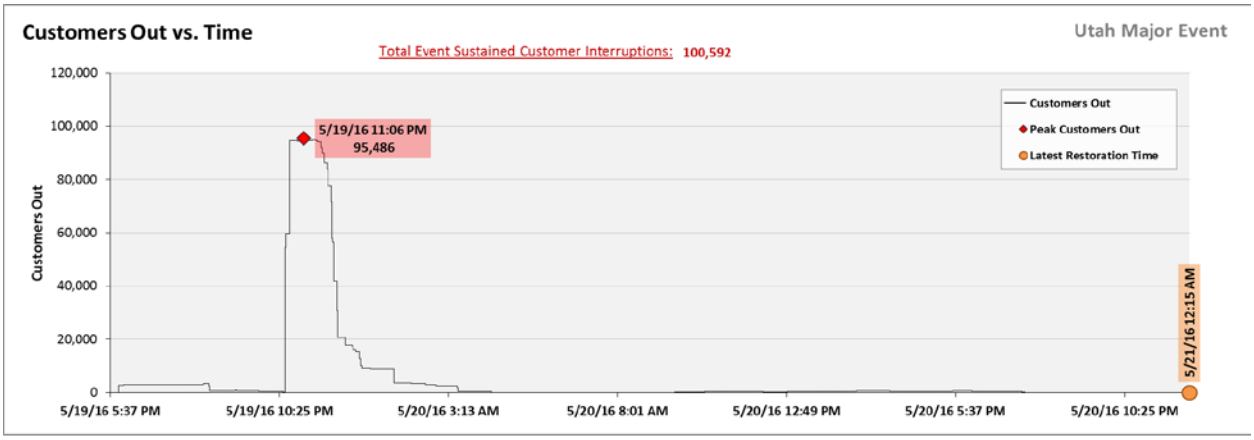
Estimate $	Labor	Contracts	Materials	Overhead	Total
Capital	$ 118,096	$ 50,383	$ 46,822	$ 41,149	$ 256,450
Expense	$ 49,000	$ 14,320	$ 2,315	$ 550	$ 66,185
Total	**$ 167,096**	**$ 64,703**	**$ 49,137**	**$ 41,699**	**$ 322,635**

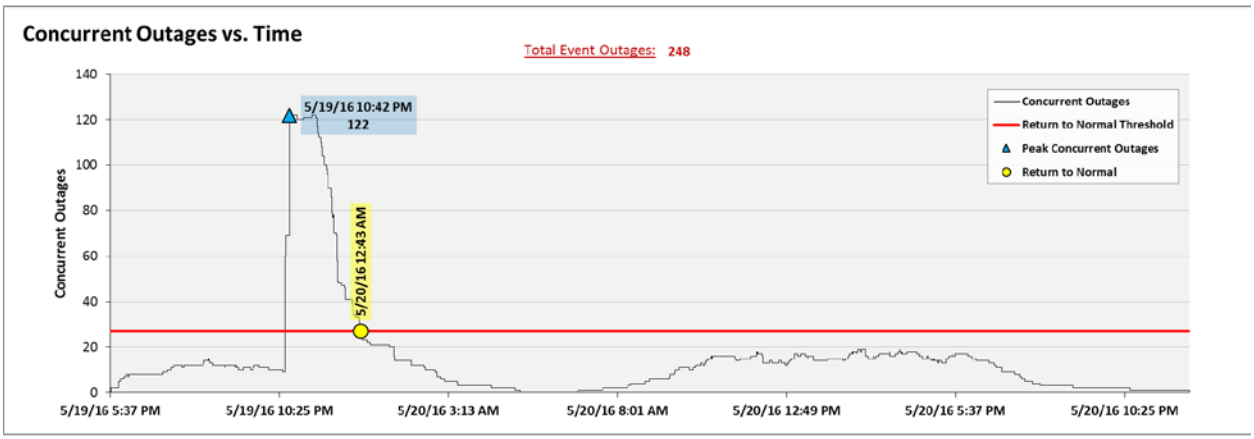
Major Event Declaration

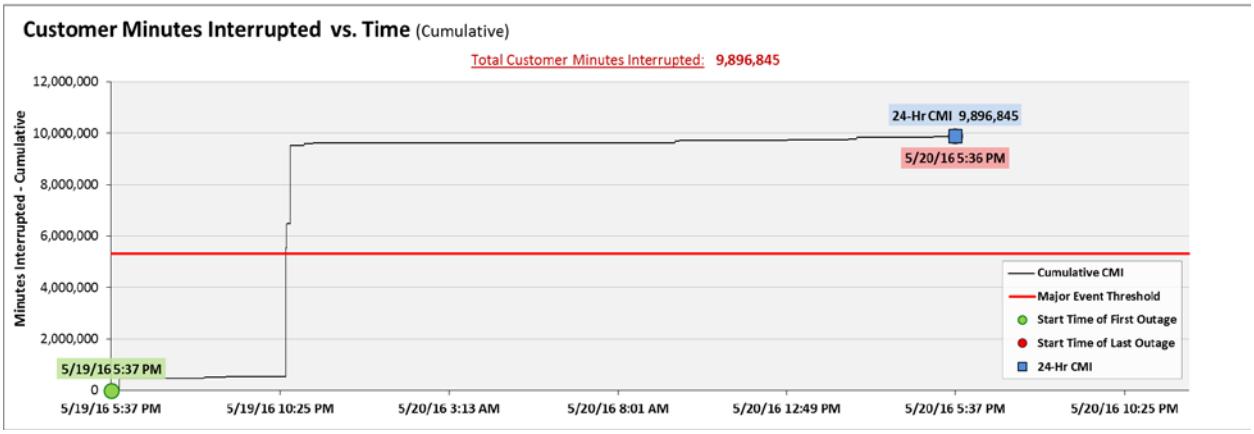
Rocky Mountain Power is requesting designation of this storm and its consequences to be classified as a "Major Event" for exclusion from network performance reporting. This major event exceeded the company's current Utah threshold for customer minutes lost in a 24-hour period, consistent with Utah Administrative Code R746-313.

The 2016 annual threshold for Utah is 5,312,799 minutes (i.e., 6.06 state SAIDI minutes).

Event Detail







SAIDI, SAIFI, CAIDI by Reliability Reporting Region

Please see the attached system-generated reports.