

Introduction

The Western Electricity Coordinating Council (WECC) is the Regional Entity responsible for coordinating and promoting Bulk Electric System reliability in the Western Interconnection. In addition, WECC provides an environment for coordinating the operating and planning activities of its members as set forth in the WECC Bylaws.

WECC is geographically the largest and most diverse of the eight Regional Entities that have Delegation Agreements with the North American Electric Reliability Corporation (NERC). WECC's service territory extends from Canada to Mexico. It includes the provinces of Alberta and British Columbia, the northern portion of Baja California, Mexico, and all or portions of the 14 Western states between.

Membership in WECC is open to all entities who meet the qualifications in the WECC Bylaws. WECC strives for transparency and open participation in all of its meetings and processes.

The Event

"On the afternoon of September 8, 2011, an 11-minute system disturbance occurred in the Pacific Southwest, leading to cascading outages and leaving approximately 2.7 million customers without power. The outages affected parts of Arizona, Southern California, and Baja California, Mexico. All of the San Diego area lost power, with nearly one-and-a-half million customers losing power, some for up to 12 hours. The disturbance occurred near rush hour, on a business day, snarling traffic for hours. Schools and businesses closed, some flights and public transportation were disrupted, water and sewage pumping stations lost power, and beaches were closed due to sewage spills. Millions went without air conditioning on a hot day.

"The loss of a single 500 kilovolt (kV) transmission line initiated the event, but was not the sole cause of the widespread outages. The system is designed, and should be operated, to withstand the loss of a single line, even one as large as 500 kV. The affected line—Arizona Public Service's (APS) Hassayampa-N. Gila 500 kV line (H-NG)-is a segment of the Southwest Power Link (SWPL), a major transmission corridor that transports power in an east-west direction, from generators in Arizona, through the service territory of Imperial Irrigation District (IID), into the San Diego area. It had tripped on multiple occasions, as recently as July 7, 2011, without causing cascading outages.

"With the SWPL's major east-west corridor broken by the loss of H-NG, power flows instantaneously redistributed throughout the system, increasing flows through lower voltage systems to the north of the SWPL, as power continued to flow into San Diego on a hot day during hours of peak demand. Combined with lower than peak generation levels in San Diego and Mexico, this instantaneous redistribution of power flows created sizeable voltage deviations and equipment overloads to the



north of the SWPL. Significant overloading occurred on three of IID’s 230/92 kV transformers located at the Coachella Valley (CV) and Ramon substations, as well as on Western Electricity Coordinating Council (WECC) Path 44, located south of the San Onofre Nuclear Generating Station (SONGS) in Southern California.

“The flow redistributions, voltage deviations, and resulting overloads had a ripple effect, as transformers, transmission lines, and generating units tripped offline, initiating automatic load shedding throughout the region in a relatively short time span. Just seconds before the blackout, Path 44 carried all flows into the San Diego area as well as parts of Arizona and Mexico. Eventually, the excessive loading on Path 44 initiated an intertie separation scheme at SONGS, designed to separate SDG&E from SCE. The SONGS separation scheme separated SDG&E from Path 44, led to the loss of the SONGS nuclear units, and eventually resulted in the complete blackout of San Diego and Comisión Federal de Electricidad’s (CFE) Baja California Control Area. During the 11 minutes of the event, the WECC Reliability Coordinator (WECC RC) issued no directives and only limited mitigating actions were taken by the Transmission Operators (TOPs) of the affected areas.

“As a result of the cascading outages stemming from this event, customers in the SDG&E, IID, APS, Western Area Power Administration-Lower Colorado (WALC), and CFE territories lost power, some for multiple hours extending into the next day.

“Specifically,

- SDG&E lost 4,293 Megawatts (MW) of firm load, affecting approximately 1.4 million customers.
- CFE lost 2,150 MW of net firm load, affecting approximately 1.1 million customers.
- IID lost 929 MW of firm load, affecting approximately 146,000 customers.
- APS lost 389 MW of firm load, affecting approximately 70,000 customers.
- WALC lost 74 MW of firm load, 64 MW of which affected APS’s customers. The remaining 10 MW affected 5 WALC customers.

“After the blackout, the affected entities promptly instituted their respective restoration processes. All of the affected entities had access to power from their own or neighboring systems and, therefore, did not need to use “black start” plans. Although there were some delays in the restoration process due to communication and coordination issues between entities, the process was generally effective. SDG&E took 12 hours to restore 100% of its load, and CFE took 10 hours to restore 100% of its load. IID, APS, and WALC restored power to 100% of their customers in approximately 6 hours. The affected entities also worked to restore generators and transmission lines that tripped during the event. IID and APS restored generation—333 MW for IID and 76 MW for APS—in 5 hours. Meanwhile, CFE restored 1,915 MW of tripped generation in 56 hours; SDG&E restored 2,229 MW of tripped generation in 39 hours; and SCE restored 2,428 MW of tripped generation in 87 hours. IID restored its 230 kV transmission system in 12 hours and its 161 kV system in 9 hours; APS restored H-NG in 2 hours;

SDG&E restored its 230 kV system in 12 hours; WALC restored its 161 kV system in 1.5 hours; and CFE restored its 230 kV system in 13 hours and its 115 kV system in 10 hours.¹

Event Follow-Up Activities

On May 1, 2012, the Federal Energy Regulatory Commission (FERC) and the North American Electric Reliability Corporation (NERC) released a joint report titled "Arizona-Southern California Outages on September 8, 2011: Causes and Recommendations" (Joint Report) summarizing the causes and findings of their eight-month review of the September 8, 2011 Southwest event that affected nearly three million customers in Southern California, Arizona, and Baja California, Mexico. The report identified 27 recommendations for preventing similar future events in the West.

In a letter to WECC dated July 26, 2012, Gerry Cauley, President and CEO of NERC, presented his thoughts on the Joint Report and eight broader systemic concerns that NERC identified. Mr. Cauley requested that WECC leadership provide a comprehensive, Interconnection-wide detailed report outlining near-term remediation actions completed or in progress and plans for additional actions going forward.

On September 28, 2012, a Response Report by the Western Electricity Coordinating Council (WECC) was prepared in response to the Joint Report and Mr. Cauley's letter. WECC and its members have been working diligently since the event and the issuance of the Joint Report to address underlying issues and the specific recommendations contained therein.

Facts Related to the Event

1. WECC received a Notice of Alleged Violations from FERC's Office of Enforcement in December 2012.
2. The alleged violations stemmed from activities of the Reliability Coordinator function that had previously belonged to WECC. As of February 13, 2014, the Reliability Coordinator function is the responsibility of a new company, Peak Reliability.
3. As the Regional Entity, and prior to the creation of Peak Reliability, WECC undertook a number of activities to enhance reliability across the West. This includes, but is not limited to, the following.
 - a. Preliminary analyses of sub-100 kV elements that have an impact on the Bulk Electric System and should be monitored have been completed. This information has been coordinated with impacted Transmission Operators.

¹ Federal Energy Regulatory Commission and North American Electric Reliability Corporation. (2012) *Arizona-Southern California Outages on September 8, 2011: Causes and Recommendations*. Washington, D.C. Retrieved from <http://www.ferc.gov/legal/staff-reports/04-27-2012-ferc-nerc-report.pdf>

- b. The Remedial Action Scheme (RAS) Reliability Subcommittee reviewed all RAS in the Western Interconnection and established a RAS special taskforce to address the Recommendations from the Joint Report, which included identifying, categorizing, and prioritizing all relevant protective relaying and all RAS/Special Protection Schemes (SPS) within the Western Interconnection. In addition, this taskforce determined an appropriate process for the development of protection and RAS/SPS models, and the collection of associated data for inclusion in WECC base cases and member's operating cases.
4. The following activities initiated by WECC have now be completed or implemented by Peak Reliability.
 - a. Improved situational awareness as a result of enhanced data sharing among entities through next-day study inputs and results being posted on a secure Reliability Coordinator website – previously www.weccrc.org, now www.peakrc.org. The Joint Report cited the lack of sharing next-day studies among entities as a contributing factor to the September 8, 2011 Event.
 - b. Revised the System Operating Limit (SOL)/Interconnection Reliability Operating Limit (IROL) methodology to define IROL identification.
 - c. Hired additional Reliability Coordinator staff as approved by the WECC Board of Directors in late 2012.
5. WECC is paying the financial penalty to FERC.