UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Reliability Technical Conference	Docket No. AD18-11-000

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on behalf of the California Independent System Operator Corporation

My name is Eric Schmitt. I currently serve as Vice President, Operations at the California ISO (CAISO) and am responsible for overseeing the operation of the Bulk Electric System, real-time engineering and market services in the CAISO's Balancing Authority Area. Prior to joining California ISO, I served as Senior Vice President at Science Applications International Corporation. Over the course of my career, I have held a variety of technical and management positions within the electric industry, including significant responsibilities in electricity production; transmission; operations; technical support; and information technology. I have also consulted at various electric utilities worldwide; working with clients to assist them with operations, engineering, business process and technology challenges. I hold a Master of Business Administration from the University of Texas and a Master of Environmental Science from the Florida Institute of Technology. I earned a Bachelor of Science from the University of Notre Dame. My remarks today address changes occurring in the Western Interconnection, including the establishment of the CAISO as a Reliability Coordinator and the expansion of organized electricity markets.

I. The CAISO is planning to provide Reliability Coordinator services by the third quarter of 2019

In January 2018, the CAISO announced that it plans to become its own Reliability Coordinator and offer these services to other Balancing Authorities and Transmission Operators in the West. At that time, the CAISO provided a notice of withdrawal from the Peak Reliability (Peak) funding agreement. The notice initiated a 20-month withdrawal period. Since providing notice, the CAISO has worked through an open and transparent process with all interested stakeholders to discuss its efforts to become a Reliability Coordinator. In addition, the CAISO has begun to hire personnel to fulfill the Reliability Coordinator function. We are undertaking efforts necessary to meet the certification processes required by North American Electric Reliability Corporation (NERC) and Western Electricity Coordinating Council (WECC) in a timely manner. The CAISO is planning to complete these processes and commence providing Reliability Coordinator services by the third quarter of 2019 for its own Balancing Authority Area; and for others, beginning in the fourth quarter of 2019.

Under NERC's functional model, Reliability Coordinators work to enhance the reliability of the transmission system by identifying threats to reliability and directing coordinated action to mitigate those threats and respond to emergencies. Reliability Coordinators must also be capable of calculating operating limits for the transmission lines on the electricity grid that it serves. NERC defines Reliability Coordinator to mean:

> The entity that is the highest level of authority who is responsible for the Reliable Operation of the Bulk Electric System, has the Wide Area view of the Bulk Electric System, and has the operating tools, processes and procedures, including the authority to prevent or mitigate emergency operating situations in both next-day analysis and real-time operations. The Reliability Coordinator has the purview that is broad enough to enable the calculation of

> Interconnection Reliability Operating Limits, which may be based on the operating parameters of transmission systems beyond any Transmission Operator's vision.

Reliability Coordinators fulfill these requirements through monitoring and awareness, which is supported by outage coordination and day-ahead planning. In addition, Reliability Coordinators must provide coordination or direction to entities when emergencies arise in real-time. The CAISO's overarching reliability and operating philosophy is to prevent an emergency condition by use of rigorous processes supporting outage planning, day-ahead analysis, as well as proactive monitoring and mitigation.

The effort to become a Reliability Coordinator requires the CAISO to ensure it can perform all tasks and functions required of Reliability Coordinators by the applicable reliability standards as well as ensure proper coordination among all affected Reliability Coordinators, Balancing Authorities, and Transmission Operators during the process of onboarding customers. Over the last several months, the CAISO has worked with potential customers that have executed a letter of intent to take Reliability Coordinator services from the CAISO to develop the procedures and practices required for implementation and certification. The CAISO established a project steering committee to facilitate this effort and also developed working groups to address various issues, including seams; operations planning; real-time operations; data sharing, emergency preparedness and system restoration; training; settlements; and operational issues. These working groups are comprised of subject matter experts from the Balancing Authorities and Transmission Operators that have expressed interest in receiving Reliability Coordinator services from the CAISO. The technical materials developed

through this process will support the Reliability Coordinator certification process and will be incorporated into the CAISO operating procedures. The project steering committee is also providing input into the formation of a future Reliability Coordinator oversight committee that will provide oversight of the reliability coordination function and will be comprised of representatives from balancing authorities and transmission operators that elect to take reliability coordination service from the CAISO.

In parallel, the CAISO has undertaken a stakeholder process to establish the rates, terms, and conditions of the new Reliability Coordinator service. On June 20, 2018, the CAISO issued a draft final proposal for this initiative.[1] To establish a rate for Reliability Coordinator services, the CAISO proposes to develop an annual funding requirement for Reliability Coordinator services. This funding requirement will be a percentage of the CAISO's overall revenue requirements and will represent the direct and indirect time and expense necessary for the CAISO to perform Reliability Coordinator services. The CAISO has proposed volumetric billing determinants for entities receiving Reliability Coordinator services as well as a minimum charge for entities that have low to no trackable volumes in the Reliability Coordinator footprint. The CAISO estimates it can provide Reliability Coordinator services to its own Balancing Authority Area at less than half of the current funding requirements for Reliability Coordinator services. To provide Reliability Coordinator services to a significant portion of the Western Interconnection, the CAISO estimates its annual cost

[1] A copy of the CAISO's draft final proposal is available at the following website: http://www.caiso.com/Documents/DraftFinalProposal-ReliabilityCoordinatorRateDesign-Terms-Conditions.pdf

to be approximately $19 million, which is also less than half of the current funding requirements for Reliability Coordinator services in the Western Interconnection.

A. The CAISO is prepared to collaborate as necessary with multiple Reliability Coordinators in the Western Interconnection

Today, all Balancing Authorities and Transmission Operators in the Western Interconnection (with the exception of the Alberta Electric System Operator), including the CAISO, obtain Reliability Coordinator services from Peak. In addition to the CAISO, the Southwest Power Pool (SPP) has expressed its intent to offer Reliability Coordinator services in the Western Interconnection. The CAISO must anticipate that some entities will continue to obtain Reliability Coordinator services from Peak and some entities may elect to take Reliability Coordinator services from SPP. Accordingly, the CAISO is planning to operate with other Reliability Coordinators in the Western Interconnection. The CAISO will ensure it collaborates with these entities to provide effective and reliable service to its customers while also supporting overall reliability of the Western Interconnection. This collaboration will span both the operational planning and real-time operating horizons and will involve discussions related to modeling, outage management, day ahead schedules, and real time operations. There are already multiple Reliability Coordinators operating in the Eastern Interconnection, so a model for collaboration among Reliability Coordinators already exists.[2] Indeed, having multiple Reliability Coordinators could even increase reliability awareness due to overlapping monitoring of critical facilities and stability studies for the Western Interconnection.

[2] *See* NERC website: https://www.nerc.com/pa/rrm/TLR/Pages/Reliability-Coordinators.aspx

B. The CAISO will enhance the reliability of electric service by providing Reliability Coordinator services

The CAISO's election to provide Reliability Coordinator services will enhance the reliability of electric service in its own Balancing Authority Area and for other entities that elect to receive Reliability Coordinator service from the CAISO. The CAISO also strongly believes it can provide enhanced Reliability Coordinator services to utilities in non-market areas. The CAISO is well-situated to provide Reliability Coordinator services due to its ability and infrastructure availability to assess transmission reliability issues in advance of real-time. It has the ability to coordinate potential emergency operations among the operating entities within the Western Interconnection. The CAISO's market tools enable more effective forecast and monitoring capability because it can identify potential reliability threats such as transmission line overloads or resource deficiencies hours in advance of operating hour. This gives affected utilities more time to address these potential threats.

Without advanced forecasting ability, the primary information about reliability threats available to a Reliability Coordinator arrives through telemetry in real-time. In contrast, the CAISO receives this same information within its Balancing Authority Area as well as the area covered by the Western Energy Imbalance Market (EIM) ahead of operating hours, thereby allowing CAISO to better predict, forecast and avoid potential reliability threats as well as emergency conditions of future operating hours. Current participants in the EIM include PacifiCorp, NV Energy, Arizona Public Service, Puget Sound Energy, Portland General Electric, Idaho Power and Powerex. Additional entities plan to join and, by 2020, the EIM footprint will cover approximately two-thirds of load in the Western Interconnection. Visibility across the CASIO Balancing Authority Area and

EIM area will also benefit entities that do not participate in the CAISO markets because the CAISO will detect and prevent issues that otherwise could have reliability implications for those entities.

In order to operate its markets, the CAISO currently receives the same type of data that a Reliability Coordinator receives with respect to generation and transmission resources, including e-tags for interchange transactions between Balancing Authority Areas, schedules showing plans for generation output, and data about expected load. The CAISO uses this data to run additional processes associated with its market to assess the feasibility of those transactions and schedules that are not otherwise available to a Reliability Coordinator that is not a market operator. As a result, the CAISO is able to forecast two key reliability challenges – resource deficiencies and transmission line overloads – beginning at approximately 1:00 pm on the day before the operating day in its balancing authority area and again with more current data throughout the operating day 4.5 hours in advance of actual operations within its Balancing Authority Area and the EIM area.

Traditionally, Reliability Coordinators perform operational planning analysis for day-ahead operations by focusing on the ability to serve load reliability by assessing the "peak" hour of the coming day, when load is the highest. While the peak hour has historically posed the greatest operating risk to utilities in the Western Interconnection, operating risks during non-peak hours are rising significantly as a result of variation in both load and supply. In any event, there is reliability risk at all times, not just during the peak hour. The information available to the CAISO, which has practices to perform

operational planning analysis that cover each of the 24 hours of the following day, allows the CAISO to offer enhanced Reliability Coordinator services to all customers.

In addition to obtaining advance information about potential reliability threats during each of the 24 hours of the following day, the CAISO has always had other tools for analyzing the transmission system in the Western Interconnection. For example, the CAISO has an Automated Load Forecasting System, which provides a reliable load forecast. Another tool that the CAISO uses performs transient stability analysis to determine whether an event (*e.g.*, the loss of line or generator) could potentially create an instability. This tool simulates the behavior of the system over time assuming the loss of an element specified by the CAISO. The tool is useful to assess any number of contingencies, such as a fire approaching a transmission line, so that operators know whether the loss of that line would pose reliability problems. This information allows operators to take mitigating steps in advance of the contingency. The CAISO has utilized a transient stability analysis tool for many years. Access to information through its market processes and the use of available tools will enable the CAISO to improve the reliability of electric service by providing Reliability Coordinator services in its Balancing Authority Area and other areas of the Western Interconnection.

II. Organized markets in the West continue to grow and enhance reliability

As the Commission is aware, the CAISO operates day-ahead market and real-time markets to ensure there is a sufficient supply of electricity to satisfy demand in the region while maintaining the reliability of the transmission system the CAISO operates. The EIM, for which the CAISO serves as the market operator, extends the CAISO's real-time market platform to other Balancing Authorities. The EIM has now produced

over $330 million in benefits since its start in November 2014. The EIM optimizes supply to meet load at least cost every fifteen and five minutes by relying on economical transfers between participating Balancing Authority Areas. The EIM emphasizes voluntary participation and local control. Participating entities are able to maintain control over their assets and retain responsibility for balancing requirements in their footprints. In addition, entities can chose not to bid into the market at any given time and leave the market at any time without exit fees. The EIM also contributes to significant grid reliability by providing situational awareness and enhancing the ability of participating entities to respond to major contingencies. Stakeholders throughout the West have fostered the development of this voluntary market as well as a governance structure that ensures robust participation from all interested parties.

The CAISO is currently considering how the day-ahead market could better account for ramping needs on the CAISO system and for uncertainty that materializes in real-time. Among other changes, the CAISO will consider market interval changes from hourly to 15 minute intervals as well as a new day-ahead flexible ramping product to address uncertainty in real-time. This product would ensure that the real-time market has sufficient economic bids to meet imbalance needs. The CAISO anticipates completing its design of day-ahead market enhancements this fall and submitting tariff revisions to the Commission in 2019. In concert with the day-ahead market changes, the CAISO is scoping an effort to make day-ahead market functionality available to EIM participants. This effort will present an opportunity for EIM participants to expand their market participation into the day-ahead timeframe, which would significantly increase coordination and cost savings.

As utilities look for means to provide reliable electric service at reasonable costs, the EIM and a day-ahead market platform can provide significant economic benefits and help address reliability issues. For example, fifteen and five minute transfer capability across a large geographic area helps manage steep ramps utilities now face as they integrate renewables and serve net loads. Combining net load curves across the western region in the day-ahead time frame would provide an even more effective tool to mitigate balancing challenges. The CAISO strongly supports exploring greater collaboration among utilities across the Western Interconnection and urges the Commission to support these efforts and allow utilities to pursue solutions that meet their needs.

In addition, as inverter based resources develop the capabilities that conventional synchronous resources have typically provided to the Bulk Electric System, a coordinated dispatch across a larger geographic area will help utilities balance resources and loads. As the Commission is aware, the CAISO has experienced transmission system faults that resulted in the unanticipated loss of inverter based resources. With respect to the observed transmission line faults, these cleared in four cycles or less. Inverter based resources should not have tripped for any of these events.

NERC and the industry have undertaken significant studies and developed recommendations as well as a draft guideline regarding these events. In addition to these efforts, the CAISO has submitted standards authorization requests to NERC to develop a protection and control reliability standard for inverter based resources as well as clarify existing NERC Reliability Standard PRC-024-02.

A NERC guideline, while helpful, is neither compulsory nor enforceable. Having a standard that identifies minimum acceptable performance for inverter based resources will ensure that these resources receive comparable treatment and operate in a uniform manner across the Bulk Electric System. For this reason, the Commission should support efforts to ensure inverter based resources are uniformly configured to ride through transmission faults as well as voltage and frequency disturbances similar to conventional synchronous resources. The CAISO requests that the Commission encourage the industry to develop an appropriate reliability standard for the control and protection of inverter based resources.