

**Exhibit No. ISO-23**

California Independent System Operator Corp.  
Docket No. ER00-2019-000

**Exhibit No. ISO-23**

**UNITED STATES OF AMERICA**  
BEFORE THE  
FEDERAL ENERGY REGULATORY COMMISSION

California Independent System            )  
Operator Corporation                    )     Docket No. ER00-2019-0000

PREPARED DIRECT TESTIMONY OF  
KEITH CASEY  
ON BEHALF OF THE  
CALIFORNIA INDEPENDENT SYSTEM  
OPERATOR CORPORATION

1 **Q. PLEASE STATE YOUR NAME, TITLE AND BUSINESS ADDRESS.**

2 A. My name is Keith Casey. My business address is 151 Blue Ravine Road,  
3 Folsom, CA, 95630. I am Manager of Market Analysis and Mitigation in the  
4 Department of Market Analysis of the California Independent System Operator  
5 Corporation ("ISO").

6 **Q. PLEASE SUMMARIZE YOUR EDUCATIONAL AND PROFESSIONAL**  
7 **QUALIFICATIONS**

8 A. I received a Ph.D. in Environmental and Resource Economics from the  
9 University of California, Davis in 1997. I have been with the ISO since December  
10 1997, prior to which I conducted post-doctoral research and taught environmental  
11 economics at the University of California, Davis. At the ISO, I am responsible for  
12 assessing the effects of market rules and design features on ISO market  
13 performance, and for developing market redesign proposals to enhance market  
14 efficiency. My current work involves analyzing the structure of incentives and  
15 bidding strategies associated with existing and alternative design options, to  
16 minimize the opportunity for manipulation of ISO markets and abuse of market  
17 power. Prior to and during the ISO's first year of operation, I had primary  
18 responsibility for developing the ISO's market monitoring system.

19 **Q. PLEASE DESCRIBE THE PURPOSE OF YOUR TESTIMONY.**

20 A. My testimony describes an analysis I performed of the level of "phantom  
21 congestion" that occurred during the past four years within the ISO Control Area.  
22 In addition, I describe qualitatively the adverse impacts that could be expected

1 from this congestion based on my professional experience and a study I  
2 performed of the benefits of upgrading Path 15.

3 **Q. PLEASE SUMMARIZE YOUR CONCLUSIONS.**

4 A. My analysis shows that although “phantom congestion” has been reduced  
5 over the past four years, it remains a significant feature within the ISO Control  
6 Area, particularly over a few key external and internal paths. I have not  
7 quantified the cost impacts of phantom congestion over the past four years.  
8 However, based on my professional experience and a study I performed of the  
9 benefits of upgrading Path 15, I am certain that the benefits of reducing or  
10 eliminating such congestion would be very significant particularly if market power  
11 impacts are considered. If market power impacts are considered, I believe it is  
12 reasonable to expect that the annual benefits of eliminating phantom congestion  
13 in the ISO Control Area could well be in the hundreds of millions dollars order of  
14 magnitude.

15 **Q. PLEASE DESCRIBE WHAT YOU MEAN BY THE TERM “PHANTOM**  
16 **CONGESTION”?**

17 A. I use the term “phantom congestion” to describe a situation where there is  
18 congestion on a particular path in the ISO’s Day-Ahead and Hour-Ahead  
19 congestion management markets and during those congested hours, some  
20 holders of rights under Existing Contracts (“ETCs”) have scheduled less than the  
21 amount of the capacity that has been reserved for ETCs over that particular path.  
22 In these situations, congestion occurs (i.e. schedules are curtailed) despite the  
23 fact that the path is not fully utilized. This does not necessarily mean that

1 Congestion could have been entirely avoided if unused capacity reserved for  
2 ETCs was made available in the Day-Ahead and Hour-Ahead markets but it  
3 would in all cases reduce the amount of curtailments and would likely reduce the  
4 congestion price (i.e. the usage charge assed to non-ETC schedules). It is  
5 important to note that some ETC rights holders have authority to schedule after  
6 the close of the ISO's Hour-Ahead market up to until 20-minutes prior to the start  
7 of the operating hour. Therefore, to measure the full extent of phantom  
8 congestion, one should consider any additional ETC schedules submitted  
9 between the Hour-Ahead and real-time market.

10 **Q. HAVE YOU ESTIMATED THE LEVEL OF PHANTOM CONGESTION**  
11 **THAT HAS EXISTED IN THE ISO DURING THE PAST FOUR YEARS?**

12 A. Yes I have. The charts provided in Exhibit ISO-24 set forth my estimates  
13 of the extent of phantom congestion for the most heavily utilized paths (Branch  
14 Groups) in the ISO's market. My analysis covers the period of January 1999  
15 through December 2002. The charts set forth on a monthly basis for each path,  
16 the total amount of market schedules ("New Firm Use" or "NFU") actually  
17 curtailed in the ISO's Day-Ahead congestion management market and an  
18 estimated of what those total curtailments would have been had capacity that  
19 was reserved for ETCs in the Day-Ahead market but not used in the Day-Ahead  
20 Market or in subsequent scheduling periods (i.e. Hour-Ahead market and up to  
21 until 20-minutes prior to the operating hour) been available for New-Firm Use in  
22 the Day-Ahead market. The difference between the left and right bars in these  
23 charts is the amount of phantom congestion created by unscheduled ETC

1 capacity (i.e. curtailments that could have been avoided had the unscheduled  
2 ETC capacity been available to the Day-Ahead market).

3 **Q. FROM YOUR ANALYSIS DO YOU CONSIDER THAT PHANTOM**  
4 **CONGESTION REMAINS A SIGNIFICANT PROBLEM?**

5 A. Yes. The Exhibit demonstrates that while "phantom congestion" has  
6 generally declined over the past four years, it has remained a significant and  
7 persistent problem over certain key external and internal paths including: the  
8 California-Oregon Intertie ("COI")(or across the California-Oregon Border "COB"),  
9 Path 15, Path 26, and Palo Verde.

10 **Q. PLEASE DESCRIBE THE METHODOLOGY YOU USED FOR YOUR**  
11 **ANALYSIS.**

12 A. I calculated the actual levels of unscheduled ETC for the external Branch  
13 Groups (COI, Nevada Oregon Border ("NOB"), Palo Verde, El Dorado) using the  
14 following procedure:

15 1. The calculation was undertaken only for the hours in which these Branch  
16 Groups were congested in the Day-ahead Market in the import direction.

17 2. For the hours identified in Step 1, I calculated unscheduled ETC as the  
18 lower of:

19 a. The difference between the Hour-Ahead Total Transmission  
20 Capability (TTC) of the Branch Group in the import direction and  
21 the total real-time schedules for that Branch Group. This approach  
22 accurately captures any additional ETC schedules that are

1                    scheduled between the close of the Hour-Ahead market and real-  
2                    time. The Hour-Ahead TTC is used as a proxy for the real-time TTC  
3                    because data on real-time TTCs is not available.

4                    b. The difference between the amount of ETC reserved in the Hour-  
5                    Ahead market and the amount of ETC scheduled in the Hour-  
6                    Ahead market.

7                    This “lower of” approach is adopted to reflect the fact that to the extent ETC  
8                    rights holders submit real-time schedules on these Branch Groups in the export  
9                    direction, the total net schedules on the Branch Group would decline. This effect  
10                    is really a counter-flow effect rather than a measure of the amount of  
11                    unscheduled ETC in the import direction.

12                    I calculated Unscheduled ETC for the internal Branch Groups—Path 15  
13                    (North to South, South to North) and Path 26 (North to South)—based only on  
14                    steps 1 and 2.b above. Step 2.a is not implemented because real-time scheduled  
15                    flows are not tracked by the ISO for the internal Branch Groups.

16                    **Q.        WHAT DO THE RESULTS OF YOUR ANALYSIS SHOW?**

17                    A.        The results of my analysis show that making the full ETC capacity  
18                    available in the Day Ahead market would substantially reduce Day-Ahead and  
19                    Hour-Ahead congestion. As Exhibit ISO-24 shows, the full integration of ETC  
20                    capacity into ISO Day-Ahead scheduling would: (1) essentially eliminate Day-

1 Ahead congestion on COI; and (2) significantly reduce Day-Ahead congestion on  
2 the NOB, Path 15 (both directions), Path 26, and Palo Verde.

3 **Q. HOW COULD THIS ETC CAPACITY BE MADE AVAILABLE IN THE**  
4 **ISO'S DAY-AHEAD MARKET?**

5 A. As Ms. Le Vine explains in her testimony, participation by the current ETC  
6 rights holders (*i.e.*, California's non-participating Transmission Owners) in the  
7 ISO would make all of the currently unused ETC capacity available to the ISO on  
8 a Day-Ahead basis.

9 It is also important to note that, to the extent that potential  
10 New Participating Transmission Owners (such as the Los Angeles Department of  
11 Water and Power) would also bring into the ISO all those Transmission Facilities  
12 that are not currently under ISO control, the congestion management and market  
13 power benefits would go well beyond the elimination of phantom congestion.

14 **Q. PLEASE DESCRIBE THE ADVERSE IMPACTS ASSOCIATED WITH**  
15 **"PHANTOM CONGESTION".**

16 A. I believe there are four main detrimental impacts from phantom  
17 congestion.

18 1. Phantom congestion results in inefficient dispatch of generation resources  
19 as higher cost generation is unnecessarily substituted for lower cost generation  
20 to relieve the phantom constraint. Thus, phantom congestion unnecessarily  
21 raises total production costs.



1 2. Phantom import congestion on the inter-ties (for example, the California-  
2 Oregon Border and Palo Verde) raises the energy cost of California Load Serving  
3 Entities as they will be unnecessarily restricted from purchasing cheaper imports  
4 due to the phantom constraint. Phantom congestion also reduces market  
5 competition, as fewer imports will be able to compete with supply internal to the  
6 ISO Control Area. This is also true for phantom congestion on the ISO's internal  
7 paths (Path 15 and Path 26) in that the artificial constraint imposed by phantom  
8 congestion will reduce the ability of generation in southern California to compete  
9 against generation in northern California and vice-versa. Later in this testimony, I  
10 describe an analysis I performed of the potential benefits of upgrading Path 15  
11 that provides some insights on the potential magnitude of the cost impact of  
12 phantom congestion on northern California Load if market power impacts are  
13 considered.

14 3. Phantom congestion creates incorrect price signals for investment in  
15 transmission upgrades and the location of new generation. In the long run, this  
16 will lead to sub-optimal investment and higher costs to consumers. For example,  
17 phantom import congestion on the Pacific Northwest inter-ties will tend to drive  
18 up prices in northern California that in turn could lead to an over-investment in  
19 new generation in northern California.

20 4. The ability to create phantom congestion by over-reserving ETCs could be  
21 used to exercise market power in the congestion management market. For  
22 example, if an ETC rights holder also owned Financial Transmission Rights

1 ("FTRs"), the holder could drive up congestion prices by creating phantom  
2 congestion and then realize the profits from this strategy through its FTR  
3 position.

4 **Q. DO YOU HAVE ANY INDICATION OF WHAT THE MAGNITUDE OF THE**  
5 **COSTS FROM PHANTOM CONGESTION COULD BE?**

6 A. I have not conducted a comprehensive analysis of the magnitude of the  
7 costs from "phantom congestion" in the ISO Control Area over the past four  
8 years. However, an analysis I performed of the estimated benefits of upgrading  
9 Path 15 provides some indication of the potential order of magnitude of the  
10 impacts.

11 **Q. PLEASE DESCRIBE GENERALLY THE ANALYSIS YOU PERFORMED**  
12 **OF THE BENEFITS OF UPGRADING PATH 15.**

13 A. In Fall of 2001, I participated in a study to assess the benefits of an  
14 upgrade to Path 15. The study assessed the potential benefits of such upgrade  
15 in a particular year, 2005. The study assessed the impact of additional capacity  
16 over Path 15 on electricity costs to northern California Load taking into account  
17 how such additional capacity would reduce the ability of suppliers in the  
18 California market to exercise market power. The ISO undertook the study to  
19 support an application by Pacific Gas and Electric Company for a Certificate of  
20 Public Convenience and Necessity before the California Public Utilities  
21 Commission. The study is attached as Exhibit ISO-25.

1 **Q. DID THE STUDY ASSESS THE COSTS OF PHANTOM CONGESTION**  
2 **OVER PATH 15 IN 2005?**

3 A. The study was not designed to assess the costs of phantom congestion  
4 over Path 15. However, a key assumption that had a significant impact on the  
5 outcome of the study was whether and to what extent capacity would continue to  
6 remain subject to "phantom congestion". For example, the study showed that,  
7 without the upgrade, in a medium generation build-out and normal hydro year  
8 scenario, if it was assumed that capacity subject to Existing Contracts remained  
9 unavailable in the Day-Ahead and Hour-Ahead markets, suppliers would be able  
10 to obtain approximately \$311 million through the exercise of market power;  
11 whereas if that capacity were available, suppliers would be able to obtain a little  
12 less than \$80 million through the exercise of market power. In a medium  
13 generation, drought hydro year scenario, the figures went from over \$611 million  
14 without the capacity reserved for Existing Contracts, to a little over \$163 million  
15 with such capacity. Table 4 of Exhibit ISO-25 sets out the results for different  
16 scenarios.

17 Of course, not all of the transmission capacity that was reserved for  
18 Existing Contracts is subject to phantom congestion; in fact, after further analysis  
19 during the course of the hearings, the ISO concluded that a reasonable  
20 assumption for 2005 would be that 29% of the capacity reserved for Existing  
21 Contracts would continue to remain unused by the Existing Contract rights  
22 holders. Nonetheless, even applying a 29% factor to the difference between the

1 costs from the exercise of market power with and without the capacity reserved  
2 for Existing Contracts, the costs that can be ascribed to phantom congestion  
3 could be very significant. In the medium generation, normal hydro scenario, this  
4 amount would be \$ 67 million for a single year for Path 15 alone (.29 x (311 –  
5 80)). In the medium generation, drought hydro scenario, the amount would be  
6 \$ 130 million (.29 x (611-163)).

7 **Q. WHAT DOES THE PATH 15 STUDY INDICATE TO YOU ABOUT THE**  
8 **POTENTIAL MAGNITUDE OF BENEFITS FROM ELIMINATING PHANTOM**  
9 **CONGESTION?**

10 A. The Path 15 study suggests that if market power impacts are considered,  
11 the annual cost impact of phantom congestion for Path 15 alone could well be in  
12 the hundred million dollar range for load in northern California. When one  
13 considers the potential additional benefit of eliminating phantom congestion on  
14 other paths (e.g. COI, Palo Verde, NOB, Path 26) and when one factors in the  
15 potential market power impacts to load in southern California, it is reasonable to  
16 expect that the potential annual cost impact of phantom congestion could well be  
17 in the hundreds of millions of dollars order of magnitude. Moreover, while the  
18 Commission has and should continue to maintain mechanisms in place to control  
19 the ability of suppliers to exercise market power, the Path 15 analysis illustrates  
20 that eliminating phantom congestion could be a very powerful means to  
21 structurally reduce the ability of suppliers to exercise market power.

1 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

2 **A. Yes it does.**

UNITED STATES OF AMERICA  
BEFORE THE  
FEDERAL ENERGY REGULATORY COMMISSION

California Independent System )  
Operator Corporation )

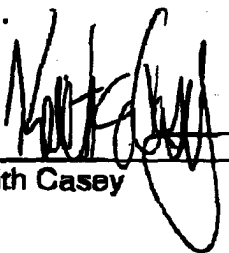
Docket No. ER00-2019-000

\_\_\_\_\_  
County of Sacramento )  
State of California )

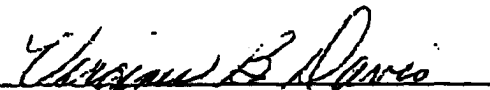
**AFFIDAVIT OF WITNESS**

Keith Casey, being duly sworn, deposes and says that he has read the foregoing questions and answers labeled as his testimony; that if asked the same questions his answers in response would be as shown; and that the facts contained in his answers are true and correct to the best of his knowledge, information, and belief.

Executed on this 13 day of February, 2003.

  
\_\_\_\_\_  
Keith Casey

Subscribed and sworn to before me this 13<sup>th</sup> day of February, 2003.

  
\_\_\_\_\_  
Notary Public  
State of California

