Exhibit PUC-2

Analysis of

FERC Order and Staff Report

Prepared by
the Staff of the California Public Utilities Commission

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Analysis of FERC Order and Staff Report

This report was prepared by the staff of the California Public Utilities Commission (CPUC) to assist Commissioners in their review of the November 1st FERC "Order Proposing Remedies For California Wholesale Electric Markets". The CPUC staff has reviewed the FERC order, as well as the FERC staff report , and recently received market data. The CPUC's analysis has been limited, like FERC's by inadequate access to data and inadequate time to completely analyze the data received to date. Based upon this review, the CPUC staff's preliminary analysis indicates that the FERC has erred in attributing nearly all of the Summer 2000 price increases to (1) market fundamentals and (2) flaws in the California market structure and market rules, with very little responsibility assigned to the exercise of market power by specific market participants. The CPUC staff's analysis suggests that the FERC should have gone further in its investigation of the behavior of market participants. The FERC staff acknowledges as much in several instances in its report. Consequently, the CPUC staff has prepared this preliminary report to provide a response to the FERC, and to identify areas where the data available strongly suggest that further investigation should take place before the FERC imposes far-reaching remedies on the California marketplace.

Summary of FERC Order and its Reliance on FERC Staff Report

In issuing its November 1st "Order Proposing Remedies For California Wholesale Electric Markets", the FERC relied extensively on an investigation conducted by the FERC staff into electric bulk power markets in California and the Western region. The FERC states that

> Based on that [Staff] report, as well as other submissions in these dockets and the Commission's experience in dealing with evolving California market issues in over 85 Commission orders since the time the restructured California markets began operation in 1998, and based on the seriousness of market dysfunctions and recent pricing abnormalities in California, in this order the Commission is proposing specific remedies to address dysfunctions in California's wholesale bulk power markets and to ensure just and reasonable wholesale power rates by public utility sellers in California.
>
> The Commission finds in this order that the electric market structure and market rules for wholesale sales of electric energy in California are seriously flawed and that these structures and rules, in conjunction with an imbalance of supply and demand in California, have caused, and continue to have the potential to cause, unjust and unreasonable rates for short-term energy (Day-Ahead, Day-of, Ancillary Services and real-time energy sales) under certain conditions. While this record does not support findings of specific exercises of market power, and while we are not able

> to reach definite conclusions about the actions of individual sellers, there is clear evidence that the California market structure and rules provide the opportunity for sellers to exercise market power when supply is tight and can result in unjust and unreasonable rates under the FPA. Under such conditions, the Commission is obligated under FPA section 206 to take action to establish market rules, regulations and practices that will ensure just and reasonable rates in the future. Accordingly, we herein propose fundamental modifications to the wholesale market structure and rules currently in place in California; we also propose price mitigation measures to ensure that wholesale rates remain just and reasonable during the period it will take to effectuate the market structure and market rule changes being proposed.
> (FERC Order pp. 3-4, footnotes omitted)

The FERC proposes several immediate remedies to address what it describes as certain defects in California wholesale markets:

1. the elimination of the requirement that the three investor-owned utilities (IOUs) -- Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SoCal Edison), and San Diego Gas & Electric Company (SDG&E) -- must sell into and buy from the PX;

2. the addition of a penalty charge for deviations in scheduling in excess of five percent of an entity's hourly load requirements and the disbursement of penalty revenues to the loads that scheduled accurately;

3. the establishment of independent, non-stakeholder Governing Boards for the PX and the ISO; and

4. the establishment of generation interconnection procedures.

In addition, to ensure fair prices while these market reforms are being put in place, the order proposes additional temporary measures to mitigate prices, including modification of the single price auction so that bids above $150/MWh cannot set the market clearing price that is paid to all bidders; imposition of comprehensive reporting and monitoring requirements for sellers bidding above $150/MWh; and retention of a refund remedy for sales from October 2000 through December 2002.

According to the FERC,

- the elimination of the IOU sell/buy requirement will free the IOUs to pursue a portfolio of long- and short-term resources and access whatever wholesale markets are suited to meeting the needs of their retail customers (including bilateral markets, the PX, and others such as Automated Power Exchange, Inc.) or by providing power from their own resources to serve their own load and self provide the necessary ancillary services;

- the addition of the penalty charge for deviations in scheduling will improve reliability and ensure that loads do not rely excessively on the ISO as the provider of last resort;

- the establishment of independent, non-stakeholder Governing Boards for the PX and the ISO will improve the effectiveness of these entities as they address problems with market rules and structure; and

- the establishment of generation interconnection procedures will provide standard procedures to facilitate the interconnection of new generators or existing generators seeking to increase the rated capacity of their facilities are needed in California.

Finally, the FERC envisions that the $150/MWh cap will provide sufficient protection to allow time to effectuate all the longer term market structure and market rule changes that the FERC believes are required.

Summary of FERC Staff Report

As the FERC Staff describes its report, its focus "is primarily directed toward answering the questions, why prices behaved the way they did and what should be done about it." (Staff Report at 1-1). The report is divided into 6 sections:

- Section 1 provides an overview of the Report and its conclusions.
- Section 2 finds that tight supply and demand conditions existed throughout the West during most of this summer, with emergency conditions concentrated in California.
- Section 3 finds that wholesale power prices were high throughout the West in the summer of 2000, but their implications were most acutely felt in California.
- Section 4 outlines the statutory and regulatory framework related to energy markets in the West.
- Section 5 discusses the issues that were raised as possibly causing the high prices of this summer. These fall into three general categories: (a) competitive market forces, (b) market design problems and (c) market power.
- Section 6 provides a range of options to address the problems identified in the report. Staff also attempts in this section to provide the possible benefits and drawbacks of various options.

Finally, the FERC staff notes that its investigation "was conducted on an expedited basis so there was not enough time to address all issues in depth. This report is intended to provide the Commission with 'the big picture'." (Staff Report at 1-4)

To provide a very brief summary of the analysis and conclusions in the Staff report, the FERC staff poses the question of "why were prices high this summer?", and answers it in the following manner:

There are three possible factors that can contribute to high prices. This section is divided into three subsections to discuss the effect of each factor on western prices in the summer of 2000:

A. *Competitive market force*s. Prices can be driven up by the normal forces of a competitive market, such as increases in costs of fuel or environmental compliance, or by scarcity of supply.

B. *Market design problem*s. The rules of market institutions may contribute to prices higher than those that would prevail under competitive forces or with more efficient rules.

C. *Market power exercis*e. If sellers possess market power, they have the potential to influence price. If conditions are conducive, the market price can be raised significantly above competitive levels.

This staff investigation found that all three factors played some role in the high prices seen in the West in the summer of 2000.

- The data clearly show that a general scarcity of power in the West and increased costs to produce power were factors causing these high prices.
- It is also clear that existing market rules exacerbated the situation and contributed to the high prices.
- The data also indicate some attempted exercise of market power, if the standard of bidding above marginal running cost is used, and some actual market power effects, to the extent that prices, at least in June, were significantly above competitive levels. However, the data do not isolate specific exercises of market power or suggest that the exercise of market power was more important than other explanatory factors.

The FERC staff concludes that "competitive forces, flawed market rules and, to some extent, market power contributed to the unusually high prices the past summer. These results seem to suggest that some change in market rules is required. Additionally, some further steps during a 'transition' period to 2002, when new capacity will be available, may also be necessary." (Staff Report at 5-23)

CPUC Staff Analysis of FERC Staff Report and Relevant Market Data

The FERC staff has prepared a wide-ranging analysis of the summer, 2000 prices in California and the West, especially given the short time available to complete its work. Nevertheless, the CPUC staff is concerned that the FERC staff was, in certain instances, too quick to reach conclusions on factual questions while simultaneously acknowledging that the facts suggest that certain events of last summer required further investigation. In turn, the FERC's reliance upon the staff report for support of some of the conclusions in its Order may be unwarranted.

Like most analyses of the high prices in Summer 2000, the FERC staff identifies market fundamentals, market structure, and the behavior of market participants as possible causes of the unusually high prices. In the remainder of this report, the CPUC staff reviews certain findings and conclusions of the FERC staff report and identifies instances where the FERC's own analysis appears to suggest conclusions substantially different from those reached by the FERC.

Fundamental Market Forces: Costs and Scarcity

In its discussion of market fundamentals, the FERC Staff notes that "prices can be driven up by the normal forces of a competitive market, such as increases in costs of fuel or environmental compliance, or by scarcity of supply.", and concludes that "the data clearly show that a general scarcity of power in the West and increased costs to produce power were factors causing these high prices." (FERC Staff Report at 5-1 and 5-2).

The FERC Staff Report discussion of fundamentals was organized into separate sections on (1) increased power production costs and (2) the scarcity of resources throughout the Western United States.

Increased Power Production Costs

Sections 3 and 5 of the Staff Report note that suppliers' costs of generating electricity increased over the summer. The primary causes of the increase were rising prices for natural gas and NOx credits; according to the FERC staff, these input price increases drove up the marginal operating cost of a combustion turbine from about $70/MWh in May to more than $190/MWh in August (FERC Staff Report at 5-2 and 5-3). Unfortunately, with little further analysis, the FERC staff concludes that "as a result, market clearing prices that approached the $250/MWh price cap in August may have reflected the true cost of the resource rather than the exercise of market power." (Staff Report at 5-3)

This conclusion appears to overestimate the impacts of increased natural gas and NOx costs. First, FERC staff has not determined when its hypothetical "expensive" combustion turbine was actually operating in the California market. Second, NOx trading is applicable only to about 20% of California generation located in the Los Angeles area. Third, the FERC staff's analysis focuses only on August prices—NOx Reclaim prices were much lower in the May through July period, so the higher prices in those months cannot be explained solely with reference to higher input prices, because these prices were not as high as they were in August. See, the Testimony of Michael Scheible of the California Air Resources Board discussing emissions cost issues in detail.

Scarce Resources Throughout the West

The FERC Staff reviews the widely cited factors that market observers believe contributed to a scarcity of power in the West, including low reserve margins, unusually high temperatures, increased demand due to economic growth, reduced imports to California, and increased outages. The Staff notes that "even in a well functioning market, prices can be driven up when costs increase or supplies become scarce." (Staff Report at 5-3). The FERC staff believes that the balance between available market supply and actual demand was extremely tight in the Summer of 2000, and cites tight reserve margins, unusually high temperatures, increased demand, reduced net imports to California, increased plant outages as the reasons.

The CPUC staff's preliminary analysis indicates that supply and demand conditions were not as tight as the FERC has concluded and that the price increases experienced over the summer do not correlate very well with high demand conditions. CPUC Staff Exhibit PUC-3 discusses Summer 2000 supply conditions; CPUC Staff Exhibit PUC-7 analyzes the degree of correlation between high loads and high prices. This difference of opinion has significant implications for other conclusions about the relative influence on prices of market supply and demand fundamentals, market rules, and market power. Simply stated, if supply and demand fundamentals carry less explanatory weight than the FERC staff believe, one must turn to market rules and structures, and market participants' manipulation of prices using those rules and structures, as carrying more weight than suggested by FERC's conclusions.

Market Structure and Market Rules

In its discussion of market structure and rules, the FERC Staff notes that "the rules of market institutions may contribute to prices higher than those that would prevail under competitive forces or with more efficient rules", and concludes with regard to California prices in the summer of 2000 that "it is also clear that existing market rules exacerbated the situation and contributed to the high prices."

FERC staff concludes that among the factors that appear to have contributed to the recent high electricity prices in western markets, and California in particular, are rules and policies of the PX and the Cal-ISO, and statutory requirements and regulations administered by state and local regulatory bodies. The CPUC Staff's analysis of these factors is set forth below.

Lack of Forward Contracting

The FERC staff notes that prior to prior to August 2000, the three investor-owned utilities (IOUs) in California were required to purchase their power through the PX with little or no ability to purchase through forward contracts. According to the FERC staff, "requiring the three IOUs to purchase and sell through the PX exposed them to the volatility of the spot market without the ability to mitigate the summer price volatility."

The FERC staff's analysis overstates the limitations on the IOUs. The CPUC is committed to providing utilities with necessary flexibility, and has been responsive to IOU requests for flexible buying authority. Beginning in July of 1999, the utilities were authorized to purchase forward power contracts through the California Power Exchange's Block Forward Market. Beginning in August of 2000, the CPUC has allowed the utilities to purchase contracts for forward power outside of the PX as well.

CPUC Staff Exhibits PUC-11 and PUC-12 provide, respectively, a discussion of recent regulatory history of forward power purchases by utilities, and data about California utilities' use of forward markets and hedging instruments.

Exports/Imports

The FERC staff notes that in the summer of 2000 increases in exports out of California were not compensated by increases in imports, and that therefore net imports into California were reduced. As also noted by the staff, several concerns have been raised about the reduction in net imports.

The first concern is one of reliability, because the reduction in scheduled imports contributed significantly to the problem of underscheduling. The ISO needed to purchase

additional imports for real time, either through replacement reserves or out-of-market purchases at the last minute, contributing to the high incidence of emergency alerts and concerns of maintaining the reliability of the system.

The second concern noted by the FERC staff is that generators exporting power were gaming the system in order to increase prices. Under the scenario described by the staff, by selling to entities outside California, who may be the same entities who supply imported power in real time, the increased exports decrease supply in day ahead and hourly energy markets and increase prices. This supply then becomes available in replacement reserve markets at the ISO, or as out-of-market purchases in emergencies. Out of market purchases were not large (less than 1 percent of energy costs), but replacement reserve purchases were very high on certain days in the summer

FERC staff's conclusions point conclusively to the need for further investigation of the possibility of intentional market manipulation by market participants. CPUC Staff Exhibit PUC-8 provides an analysis of the questionable patterns of behavior in Summer 2000.

Market Power

The FERC Staff discusses market power in Section 5.C. of its report. The FERC Staff places the issue of market power in the context of scarcity and considers whether the apparent shortages in Summer 2000 arose because of withholding and hence whether the high prices in the West were the result of the exercise of market power.

The staff report notes that "if sellers possess market power, they have the potential to influence price. If conditions are conducive, the market price can be raised significantly above competitive levels." Overall, the Staff concludes that

> the data also indicate some attempted exercise of market power, if the standard of bidding above marginal running cost is used, and some actual market power effects, to the extent that prices, at least in June, were significantly above competitive levels. However, the data do not isolate specific exercises of market power or suggest that the exercise of market power was more important than other explanatory factors. (Staff Report at 5-2)

FERC staff acknowledges that "there is evidence suggesting that sellers had the **potential** to exercise market power during this past summer", but concludes that "the evidence available and analyzed during this investigation, to evaluate whether there were **actual** exercises of market power, is inconclusive." (FERC Staff Report at 5-16). The staff states that the considerable data it reviewed "was not sufficient to make determinations regarding exercises of market power by individual sellers" and that "further study of high-priced bidding by individual firms or periods when individual generators were not running would be needed to substantiate any charges of market power abuse." (Id). Unfortunately, and inexplicably given the tone of its analysis, the FERC staff does not recommend pursuing this additional investigation.

The CPUC staff's preliminary analysis of the same facts examined by the FERC suggests that market power was exercised to a very substantial degree over the past six months, and that further investigation is absolutely necessary. In the sections below, the CPUC staff comments on the FERC analysis and identifies areas that would benefit from such investigation.

Measuring the Effects of Market Power on Price

The FERC staff notes that when market power is exercised, the market clearing price exceeds the price that would have been set under competitive conditions, while defining a generator's true marginal cost as the generator's "opportunity cost" of selling into a particular market. [1]

[1] In the FERC's example, "if the running cost of a unit is $40 per MWh, but that unit is physically able to sell into a market in which the price would be $80 per MWh if that generator participated in that market, then the opportunity cost of selling into another market is $80 per MWh. As long as the generator bids its

The FERC Staff defines an analytical approach whereby in order to estimate the degree to which market power is being exercised, the supply curve for a particular hour would have to be reconstructed, replacing the bids received with the marginal cost of each bidding generator. According to the FERC staff, the effect of market power on the price would be the difference between the actual market clearing price and what the market clearing price would have been if all the generators had bid their true marginal cost.

The FERC Staff notes that the Market Surveillance Committee (MSC) of the California ISO has performed such an analysis, and has estimated that prices were 182 percent higher than they would have been under competitive conditions in June.[2] As the FERC staff dryly observes, "these findings certainly suggest that market power was exercised in June by the standard of short run marginal costs." FERC staff's further observation that although prices were even higher in August "costs were also much higher, so it is unclear whether, or to what extent, market power appears to be a continuing concern," (Staff Report at 5-17), considerably understates the very strong evidence that market power contributed to a substantial portion of California market costs, amounting to billions of dollars. See CPUC Staff PUC-6.

Market Power and Scarcity

The FERC staff notes that because in both the PX and ISO, all generators supplying energy receive the market-clearing price, during periods of scarce supply, the market-clearing price will greatly exceed the marginal running costs of most of the generators supplying energy. Thus, in the view of the FERC staff, high prices during periods of supply scarcity are a normal feature of a properly-functioning market, and in fact serve to attract more entrants into the market. (Staff Report at 5-18)

At the same time, the staff notes that "it is difficult to separate scarcity from market power", and acknowledges that during periods of scarcity, the **ability** and the **incentive** to exercise market power also increase. The ability to exercise market power increases because the market is clearing in the steep (inelastic) portion of the supply curve, so that a slight reduction in output will significantly increase the market-clearing price. At the same time, the incentive to exercise market power increases because the payoff increases significantly. (Staff Report at 5-18)

The FERC staff follows this excellent exposition of the workings of market power with a description of actual market prices in California in June 2000. The staff notes that during the 106 hours in June when the available supply was between 100 percent and 110 percent of the system demand, the average cost of procuring real-time energy was **$324**

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true opportunity cost into a market, it will never receive less than the true value of its output" (Staff Report at 5-17).

[2] FERC incorrectly reads the MSC report as indicating that prices were 64.6% above competitive levels in June. In fact, the MSC concluded that 64.6% in overall market costs was in excess of anticipated competitive levels. Put another way, anticipated competitive costs were $1.05 billion. The actual market costs were $3.1 billion, which is 182% of the competitive level. Thus, $2.05 billion of the June market costs were attributable to market power.

per MWh. (Staff Report at 5-19, citing Department of Market Analysis, California IS*O. Report on California Energy Market Issues and Performance: May - June, 200*0, p. 51)

As the FERC staff itself admits, "even considering the increase in marginal cost of operating gas-fired generators in Southern California, a price of $324 per MWh exceeds estimates of the marginal cost of the last unit supplying energy. In June, the highest marginal operating cost was about $160/MWh." (Staff Report at 5-19) Remarkably, the FERC staff draws no conclusions from its own observation that average prices were **double** marginal costs 14% of the time in June. These figures raise a vivid red flag about the possible exercise of market power by some market participants, and the FERC should either investigate the factual circumstances underlying its own observations, or provide the CPUC with access to the information to do so itself.

Methods of Exercising Market Power

The FERC Staff notes that a generator could exercise market power through either economic or physical withholding: "in the case of **economic** withholding, a generator would submit bids in excess of its opportunity cost in order to raise the market clearing price. In the case of **physical** withholding, the generator would not supply all of its available energy in order to increase the market-clearing price." (Staff Report at 5-19) The staff notes the difficulty of determining whether either type of withholding is occurring, since determining physical withholding from real unit outages that occur during periods of high demand is difficult, and determining economic withholding is difficult because of the difficulty in assessing a firm's true opportunity cost of selling into a market, and because generators face environmental, reliability, technical and regulatory constraints that also prevent them from running their plants at certain times.

The FERC staff raises reasonable concerns about the difficulty of distinguishing withholding activity from other circumstances, but none of these challenges seem sizable enough to justify abandoning the effort. California ratepayers paid billions of dollars above what even the FERC acknowledges were actual marginal costs during the Summer of 2000, and both the FERC and the CPUC have sufficient investigatory powers to gather the data and information needed to provide these ratepayers with a full accounting of what actually happened in California markets over the summer.

Evidence from Summer of 2000

The FERC staff's discussion of unit availability and outage data from the Summer of 2000 is disappointing. For example, the staff notes that one method of withholding output would be to call an unplanned plant outage and that an increase in unplanned outages shortly before or during price spikes would be an indicator of physical withholding. The staff further notes that the amount of capacity unavailable due to unplanned outages was 2,787 MW greater in August 2000 than it had been in August 1999and that given the significant cost increase of the marginal units and their associated bid price increase, the absence of 2,787 MW significantly increased the market-clearing

price. Unfortunately, rather than gathering and analyzing specific information about specific outages from generators, the FERC relies on correlation data for the entire period of May through August 2000 to minimize the importance of the August 2000 data. This conclusion appears to contradict the staff's own conclusion earlier in its report regarding the correlation data: *"facts such as these can be explained in a number of ways, but they do suggest that there may be more to the explanation than a simple physical response to running generating plants at higher levels under high load and price conditions"*. (Staff Report at 2-21) The CPUC Staff's preliminary analysis raises questions about the reasons for increased unit outages, and demonstrates the need for additional investigation in this regard. See CPUC Staff PUC-4 and PUC-5.

To cite a second example, the FERC Staff notes that firms could also exercise market power through the bids they submit to the ISO and PX, and acknowledges that the bid curves offered in the PX change their shape through the summer as the price cap lowers. But rather than investigate this observed pattern of intentional behavior by generators any further, the FERC staff offers the most forgiving explanation available: "the change in behavior was exhibited by all categories of participants, so it is as likely to be a response to increased costs as it is to be intentional behavior by any individual firms or groups of firms to raise the lowest price offered to compensate for reduction in the price cap." (Staff Report at 5-21) This analysis is incomplete. The CPUC notes that the PX Market Monitoring Committee's March 1999 report indicates that it is possible to analyze individual bidding patterns in the PX and make conclusions about efforts to exercise market power. The MMC concluded that the owners of divested utility generation had exhibited "learned behavior" in the summer of 1998, and submitted bids consistent with efforts to exercise market power. There is little reason to believe that similar behavior did not take place in 2000. This suggests one line of further investigation.

The CPUC staff has begun to undertake the effort necessary to establish a complete factual explanation for the events of Summer 2000, and has made considerable progress, even with the limited data it has been able to obtain from market participants. The preliminary analyses are attached to this report, and they demonstrate both the importance of further analysis, and the importance of the FERC assisting this analysis by helping the CPUC gain access to necessary data. For example, Staff Exhibit PUC-6 uses actual operating cost information to estimate marginal costs over the summer period, and demonstrate the lack of any fundamental connection between generator costs and market prices. Staff Exhibit PUC-9 describes modeling results that establish several realistic withholding scenarios under which certain suppliers could possibly game the market. Staff Exhibit PUC-5 examines ISO records related to the bidding and use of major divested fossil fuel generating units on Stage II emergency days, to highlight actual instances of generator activity on high price days that should be further investigated. Staff Exhibit PUC-8 examines data about export and import activity during the summer of 2000 in light of what even the FERC staff acknowledges to be real incentives for generators to manipulate the system using exports.