Exhibit No.: _____
Commissioner: Peevy
Administrative Law Judges: Walwyn, Halligan and Allen
Witness: Mary Jo Thomas

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Establish Policies and Cost Recovery Mechanisms for Generation Procurement and Renewable Resource Development	R.01-10-024

OPENING TESTIMONY OF MARY JO THOMAS REGARDING THE LONG-TERM PROCUREMENT PLANS OF THE INVESTOR OWNED UTILITIES ON BEHALF OF THE CALIFORIA INDEPENDENT SYSTEM OPERATOR

Submitted by the California Independent System Operator

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My name is Mary Jo Thomas, Operations Engineer in the Loads and Resources Group of the Operations, Engineering, and Maintenance Division of the California Independent System Operator Corporation (CA ISO). My duties on behalf of the CA ISO and my qualifications are submitted as an attachment to this testimony. I am submitting this testimony on behalf of the CA ISO.

The purpose of my testimony is to:

1) Set forth the CA ISO's recommendations and comments regarding whether the Investor Owned Utilities' (IOUs or utilities) long term plans have demonstrated that the utilities will be able to meet their forecasted load, and regarding the information that is required to undertake a reasonable assessment of this question. I describe some of the difficulties the CA ISO encountered assessing the utility long-term procurement plans. To avoid these problems in the future, the CA ISO strongly believes that it is important going forward to establish standard formats and assumptions for the preparation of utility long-term procurement plans. It may be helpful to allow parties to attempt to agree upon such standard formats and assumptions through working groups or workshops sponsored by the CPUC.

2) Set forth the CA ISO's recommendations and comments regarding the role of energy efficiency and demand response in meeting the utility resource adequacy obligations.

3) Set forth the CA ISO's recommendations and comments regarding the need to avoid exacerbating over-generation problems.

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I. THE ADEQUACY OF THE IOU PROCUREMENT PLANS AND RECOMMENDATIONS FOR A STANDARD FORMAT FOR SUBSEQUENT PLANS.

A. CA ISO COMMENTS ON THE ADEQUACY OF THE IOU PROCUREMENT PLANS.

Based on the CA ISO's review of the long-term and short-term procurement plans submitted by the utilities, the CA ISO is of the opinion that the CPUC would not be able to develop a conclusion on whether the IOUs will be able to meet their forecasted load over the next five to twenty years because the information provided in the plans is not adequate to evaluate the IOU's ability to obtain resources to meet the forecasted Peak Capacity.

The information that is included in the IOU procurement plans is inadequate in several key ways as follows:

1) The Long-Term Procurement Plans for Southern California Edison (SCE) and Pacific Gas and Electric (PG&E) did not provide an analysis that evaluates the magnitude of resource capacity that would be available to serve load during peak periods. The Procurement Plans provided an analysis of the IOUs' ability to meet the energy requirements, however, they do not demonstrate that the capacity to serve the peak load is available during system peaks without having to shed load. For example, a customer may require 50 MW for 1 hour of the day and 10 MW for 10 different hours of the day, five days a week for a total of 3,000 MWh during a four week month; or a customer may require 10 MW for 15 hours of the day, five days a week and still use 3,000 MWh during that month. In the first example, the utility would require 5 times the amount of capacity in the one hour of the day that the customer requires 50 MWs, than it would require at any time in the second example. If the utility based its purchase plans solely on energy there is a possibility that the utility could under purchase capacity, and load would need to be shed for the one hour when the customer's capacity requirement is higher. The CA ISO recommends that the CPUC require subsequent procurement plans to include an evaluation of the utilities' ability to provide the requisite level of capacity to meet the utilities' aggregate peak that is non-coincidental to the CA ISO peak demand.

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2) There is not a standard methodology used by the three IOUs for developing a load forecast. The CA ISO recommends that a standard methodology be used to develop a load forecast for the utilities such that the reserve requirements and future investment requirements can be appropriately assessed and allocated to each utility. In addition, the IOUs' plans should include enough capacity to meet the target reserve level as discussed in the testimony of Phil Pettingill. The CA ISO is required to maintain the level of operating reserves in real time as set forth by the Western Electricity Coordinating Council (WECC) Minimum Operating Reserve Criteria (MORC). To the extent that the IOUs do not procure enough capacity to cover the Operating Reserve Requirements, and to the extent that such reserves are not available to be acquired by the CA ISO in the Day-Ahead, Hour-Ahead, or Real-time periods, the CA ISO would be required to direct utilities to shed load in order to maintain a reliable grid. The CA ISO strongly urges that such an outcome be avoided through prudent Long and Short Term Planning.

3) The utility plans do not demonstrate whether the levels of capacity to be procured can be delivered to the utilities' loads during the times that the monthly peak demands occur. (This is a deliverability issue that is addressed further in the testimony of Mr. Robert Sparks.)

4) It is not clear that the utility plans have considered risks associated with buyouts of Qualifying Facility (QF) generation and retirements of old generation in the CA ISO Control Area. There is approximately 2,300 MW of thermal generation operating in California that is over 40 years old that have not notified the CA ISO that they will retire, whereas the owners others thermal generators built in this era have.

5) It is not possible to determine from the plans whether and how the IOUs have qualified the capacity that can be expected to be available from each resource. First, it is not clear whether the IOUs' reported capacities are based on nameplate capacity or net dependable capacity. Net dependable capacity is defined as the power level that a generating unit can sustain, on average, measured at or compensated to the point of delivery to the electric

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grid by both telemetry and CA ISO revenue metering systems if there are no equipment, operating or regulatory restrictions. It is mathematically equal to gross dependable capacity minus any capacity utilized for the unit's auxiliary load, on-site load if applicable, and step-up transformer and project transmission losses. If the Generating Unit provides Ancillary Services, the net dependable capacity must be tested and certified by the CA ISO. Next, it is not clear whether the capacity reported has been discounted for outages, environmental limitations, transmission limitations, etc.

Because this last point is particularly important, the CA ISO offers the following thoughts for qualifying the capacity that can be expected to be available for different types of resources. These could be discussed further and refined in workshops to develop a common reporting format. These recommendations provide general methodologies for determining the deliverable capacity that should be assumed to be available during peak times for a number of different types of resources.

a) Thermal capacity should be reported as the maximum net dependable capacity that can be delivered to the grid (less auxiliary station service, and load netted behind the meter) and then de-rated for scheduled and forced outages, and environmental limitations.

b) The capacity reported as contract capacity for thermal generation for which the utilities do not have knowledge of the traditional outage schedules, should be based on the historical metered contribution levels at the time that daily peak demands occurred. Solar generation should be treated in the same way. Note that the maximum scheduled outage for the month should be used given that the peak demand could occur at any time during the month.

c) Run-of-river hydro capacity should be based on the metered historical contribution levels at time of daily peak demands. Low hydro year conditions should be used for purposes of determining the adequacy of Long-Term Procurement Plans.

d) Pond storage, and pumped storage hydro capacity should be based on the maximum level the generator is able to deliver to the grid based on the ability of the reservoir to release water during times of daily peak while applying limitations for known scheduled

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generation outages. Low hydro year conditions should be used for purposes of determining the adequacy of the Long-Term Procurement Plans.

e) Historical metered capacity levels contributed from pond storage, or pumped storage hydro generators during daily peak demands should be used when the utilities do not have knowledge of the traditional outage rates or the level of capacity the generator is able to deliver to the grid based on reservoir levels.

f) Wind capacity is an important resource to serve load in the CA ISO Control Area. Wind generation, on occasion, provided over 1, 300 MW of environmentally clean capacity. However, historical operating levels of wind generation during summer peak conditions are very low because the wind is generally stagnant on the hottest summer days. For this reason, to accurately reflect the capacity that can be expected from wind resources, the contribution of wind generation during peak days should be based on the dependable capacity levels that have historically been available during the daily peaks of the specific season being assessed.

g) New Generation can be classified as Large Merchant, Municipal, and Utility-owned Generation, Peaker Plants, Renewable Generation, Distributed Generation, and Self-Generation. These types of generation all have different risk factors that should be considered when including them in future procurement plans. Large generation typically takes three years to develop and transition to commercial status. Peakers Plants, Renewable Generation, Distributed Generation, and Self Generation can be developed in considerably less time. However, each of these types of generators have their own associated risk. Peaker Plants historically have been canceled as fast as they are planned. Distributed Generation is assumed to have the same issues as the Peaker Plants with the exception that less emphasis has to be placed on transmission capacity. Self Generation is dependent on the financial benefit to the end-use customer given current gas rates, environmental regulations and other permitting issues, the current financial status of the corporation, and other economic trends. These risks should be considered in the plans

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and furthermore, generation that relies on the Transmission System should be included in the CA ISO Transmission Expansion Plan in order to assess any potential transmission constraints that could be placed on the system as a result of the new generation.

h) There are two different types of energy efficiency programs, (1) projects that directly reduce demand, for example programs that result in the installation of more efficient equipment such as more efficient lights or motors and (2) programs that require a discretionary management decision to obtain savings. The CA ISO notes that programs that require a discretionary management decision to achieve savings may have less sustainable savings than other energy efficiency programs. As is discussed in section II of my testimony, it is important that savings for all energy efficiency programs listed in utility long-term procurement plans be based on adequate empirical evidence and projected savings associated with the two types of projects should be treated differently when evaluating the risk and the level of sustainable reduction over time. It is not apparent from the long-term procurement plans whether the IOUs have considered erosion of project savings.

i) The level of capacity reported for contracted capacity should equal the level of capacity that can be delivered pursuant to the contracts, given any transmission limitations affecting delivery during the daily peak. For example the level of capacity reported for contracts for power from generators located on the border of Mexico and in the Southwest should reflect any transmission limitations that would reduce the ability to transport the power into the CA ISO Control Area during the daily peak.

II. THE ROLE OF ENERGY EFFICIENCY AND DEMAND RESPONSE PROGRAMS.

This section sets forth the CA ISO's recommendations and comments regarding the role of energy efficiency and demand response in meeting the utility resource adequacy obligations. The three IOUs propose in their long-term procurement plans to use energy efficiency and demand response programs very aggressively in order to meet the resource needs of their loads in the next five to twenty year period. In addition, PG&E in its long term resource plan states "[f]inally, it is critical that the

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Commission work with the ISO and other stakeholders to quickly determine whether and to what extent demand response programs will contribute to meeting reserve requirements. The Commission has adopted and PG&E has embraced aggressive standards for new demand response programs. However, if these programs do not count toward PG&E's reserve requirements, PG&E would be required to purchase capacity in an amount equal to the program. . . . If the ISO will not recognize demand response programs as satisfying reserve requirements, the programs will need to be adjusted to satisfy the ISO requirement." PG&E's Long-Term Procurement Plan at 1-18. This section of my testimony sets forth the CA ISO's thoughts in light of the utilities' proposals and responds to the request by PG&E for some clarity about the resources that will count towards satisfying reserve requirements.

I should clarify upfront that the CA ISO is supportive of the addition of all types of resources within California, including generation, transmission, demand-response and energy efficiency. Moreover, the CA ISO particularly welcomes the addition of effective demand response programs within California since such programs are one of several key structural elements that should be added to the California electricity market in order to prevent the exercise of market power by suppliers.

A. THE NEED FOR EMPIRICAL EVIDENCE TO SUPPORT PROJECTIONS OF SAVINGS.

While the CA ISO is supportive of energy efficiency and demand response programs, the CA ISO is also concerned about ensuring that there will be adequate resources to meet utility customer loads. Accordingly, the CA ISO is concerned that the impact of energy efficiency and demand response on customer loads be estimated accurately and based on empirical evidence.

The CA ISO is not an expert in the area of energy efficiency and demand response. However, the CA ISO notes that the utilities propose to rely very aggressively on energy efficiency and demand response to meet the resource needs of their customers in the next five to twenty years. The CA ISO understands that relying on aggressive energy efficiency and demand response is consistent with the direction given to the utilities by the CPUC in D.02-10-062 at 27-28. Nonetheless, the CA ISO is concerned about the utilities making overly optimistic assumptions about the savings from energy efficiency and demand response programs and an insufficiency of resources if the goals are not achieved. The CA ISO notes that sizable reductions in load are forecast from demand-response

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programs that have little track record in California. Moreover, the utilities are proposing to engage in energy efficiency investments at levels substantially higher than those that have been successfully implemented in the last several years.

To address these concerns, the CA ISO offers two recommendations:

1) The CA ISO considers that the CPUC should require some form of empirical information to support the utility projections about the impact of energy efficiency and demand response programs on load. For example, where it is available, historical information regarding the impact of such programs should be provided. The CA ISO does not have the expertise to assess whether the utilities' projections are sound. Nonetheless, the CA ISO urges the CPUC to solicit input from entities with this expertise such as the California Energy Commission and persons within the Energy Division and Office of Ratepayer Advocates and undertake, with the assistance of these entities, a thorough review of the utilities' projections to verify that there is adequate information to support them.

2) It will be important to undertake periodic reviews of the projections of savings and demand reductions to ensure that they are modified appropriately as experience with implementation is gained. This will be particularly important as to innovative programs, for which there is little or no historic information. As is discussed in the testimony of Mr. Phil Pettingill, periodic updating of the long-term procurement plans is important in any event. The results from the evaluation of energy efficiency and demand response programs should be incorporated into these periodic reviews so that load projections remain as accurate as possible based on the latest and best available information.

B. USE OF DEMAND-BASED PROGRAMS AS RESERVES.

The testimony of Mr. Phil Pettingill regarding the provision of reserves for direct access customers, community aggregators, and distributed and self-generation customers notes that it is important to distinguish between the provision of operating reserves in real-time, and the provision of planning reserves and/or resource adequacy. Moreover, Mr. Pettingill's testimony describes how

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demand response can count towards meeting a utility's monthly reliability obligation.

Energy efficiency and demand response programs can provide benefit to the CA ISO in three ways: (1) they can reduce planning load forecasts, (2) they can be used to meet a portion of the MORC requirements, (3) they can be bid into the CA ISO Supplemental Energy market.

As explained above, energy efficiency and demand response programs can reduce planning load forecasts. To the extent that there is empirical information to support assumptions about the impact of energy efficiency and demand response programs on load, these programs can legitimately be used by the utilities to reduce their planning reserves and/or resource adequacy requirement by reducing their load forecast.

Demand response programs can also be used to meet a portion of the operating reserve requirements. The CA ISO already has a program, the Participating Load program, which permits load-based programs to provide operating reserves to the CA ISO in the form of non-spinning and replacement reserves. Some of the requirements for Participating Loads are set forth in the CA ISO Tariff section 2.5. In addition, the CA ISO has developed technical requirements for participation in the Participating Load programs, which are currently under review. As soon as the revision of the technical requirements is completed, the CA ISO would be happy to make the requirements available to the CPUC and the parties in this proceeding.

It is important to note that the requirements in the Participating Load program are designed to assure that the resources that participate in the program comport with WECC requirements for operating reserves. Thus, for example, to participate in the CA ISO's Ancillary Service markets, the mechanism by which the CA ISO assures that adequate operating reserves are available within the CA ISO Control Area, Participating Loads must be able to comply with CA ISO directions within ten minutes and must have adequate interval meters and telemetry that allows the CA ISO to monitor the status of the resource and verify in real time that CA ISO directions with regards to the resource are complied with.

It is also important to understand that at this time, the CA ISO does not believe that demand-response or other load-based programs can meet the WECC requirements for spinning reserves. This is because spinning reserve, as defined in MORC, is unloaded generation that is synchronized and ready to

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serve additional demand and is frequency responsive. Demand-based programs can provide non-spinning reserves because MORC provides that a control area's requirements for non-spinning reserves can be met by use of the following:

- Interruptible load,
- Interruptible exports,
- On-demand rights from other entities or control areas,
- Spinning Reserve in excess of the requirement, and
- Off-line generation which qualifies as non-spinning reserve.

The demand response programs can also be bid into the Supplemental Energy market. Such programs must also meet the requirements of the CA ISO's Participating Load program. The Supplemental Energy market offers a mechanism for price responsive load to bid into the CA ISO markets at a price it is willing to receive for interrupting voluntarily. Demand response programs that qualify to provide Supplemental Energy to the CA ISO could be used by the utilities to meet the monthly reliability obligation proposed in Mr. Pettingill's testimony.

III. OVERGENERATION AND DISPATCHABILITY.

This section of my testimony explains the concerns of the CA ISO regarding the potential to exacerbate over-generation problems and the advantages of dispatchability. The CA ISO believes that the utilities' portfolios of resources, and long-term contracts for power should be designed to minimize the potential to exacerbate over-generation problems and to provide adequate operating flexibility.

The CA ISO raised similar concerns to the CPUC in the April 1, 2003 testimony of Mr. Kevin Graves in this docket regarding implementation of the renewables portfolio standard in this docket. As Mr. Graves stressed during his cross-examination, the CA ISO's concerns about over-generation problems are not limited to renewables. Rather, it is important that the entire portfolio of a utilities' resources be designed to minimize over-generation problems, and that the collection of long-term power contracts entered into by the utilities afford the utilities and the CA ISO adequate flexibility and dispatchability to address system problems such as over-generation. To ensure an adequate record in this phase of the proceeding, this testimony describes the issue and repeats much of the information that

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was set forth in Mr. Graves' testimony.

Over-generation occurs when supply (i.e. generation and imports) exceeds demand (loads and exports), and the ability of system operators to back down generation to balance the system is constrained. These conditions generally occur during off-peak hours during the spring and early summer seasons. Some examples of generators that system operators may have difficulties backing down in over-generation conditions include: 1) must-take generators (e.g. nuclear plants and qualifying facilities that have take or pay contracts with the utilities) that the CA ISO does not have authority to re-dispatch to reduce output; 2) generators that are already operating at minimum load and that are likely to be needed within a time frame (i.e. to meet the next day's peak load) that does not permit a generating unit to shut down and restart; and 3) hydroelectric generators that are operating at minimum levels based on current hydro conditions (i.e. high runoff) and the only way to reduce output is to spill water. Over-generation conditions generally occur during light load periods (off-peak hours) during the spring and early summer seasons.

Section 2.3.4 of the CA ISO tariff addresses over-generation and sets out a number of sequential steps that can be taken by the CA ISO to address over-generation circumstances. Ultimately, the CA ISO can instruct scheduling coordinators to reduce their generation or import schedules on a pro rata basis, or in more extreme circumstances, the CA ISO can issue mandatory dispatch instructions directing reductions from particular generating units and/or external imports.

Even though the CA ISO tariff addresses over-generation, the CA ISO considers that the CPUC should strive to minimize over-generation in this docket. First, over-generation circumstances can create operational difficulties. If over-generation circumstances exist due to the characteristics of the generating units that remain on line there may be physical limitations on the ability of the CA ISO to manage an over-generation situation. For example, there are physical limitations on the ability of nuclear units to be turned on and off. Second, there are financial consequences to over-generation. For example, if the CA ISO orders units subject to take-or-pay contracts to reduce their output to address over-generation circumstances, utilities may nonetheless be required to pay for the output.

To avoid exacerbating over-generation problems, the utility long-term procurement plans should

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strive to have the expected output shape of the portfolio of resources procured by the utilities match the load shape of the utilities' customers. In addition, there should be adequate flexibility in a reasonable proportion of the resources available to the utilities to ensure that there are not too many resources required to be on-line when there is inadequate load available to absorb the output. Particular attention should be taken to consider the impact of resources that are non-dispatchable either because of their particular characteristics, and/or because of contractual arrangements.

In addition, the CPUC should afford the IOUs adequate contracting flexibility to ensure that they can negotiate contracts that do not bind them into accepting and/or paying for resources that will exacerbate over-generation conditions. Moreover, the CA ISO favors providing for dispatchability in standard utility contracts and provisions that would allow the CA ISO to work with the utilities to direct generators to alter their schedules as needed to address conditions on the grid such as over-generation.

Further, the CPUC could include a requirement that generators that qualify as Participating Generators under the CA ISO tariff sign a Participating Generator Agreement with the CA ISO, and hence agree to abide by the CA ISO tariff. This would ensure that the CA ISO would be able to order reductions in the output from these generators if necessary to address over-generation circumstances. Further, the CPUC could limit the number of resources subject to "as available" or "take-or-pay" terms and conditions, particularly with regards to resources that are expected to operate during off-peak time periods.

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