

Memorandum

To: Market Issues/ ADR Committee

From: Kellan Fluckiger, Vice President, Operations
Ziad Alaywan, Director, Market Operations

CC: ISO Board, ISO Officers

Date: August 18, 1999

Re: ***Addition of a New Congestion Zone to Address Path 26 Intrazonal Congestion***

EXECUTIVE SUMMARY

This matter involves a proposed Board action. Analysis of the operational costs of mitigating intra-zonal congestion of Path 26 indicates that a new congestion zone can be justified based on the guidelines specified in Section 7.2.7 of the ISO Tariff. We have now completed our analysis for the first 12 months of ISO operations and have concluded that a new congestion zone is required to address congestion on Path 26 in the forward and real-time markets, and to provide essential economic signals for the use of the transmission system.

Consequently, the ISO Management recommends that the ISO Governing Board approve the following motion:

MOVED, that the Committee recommends that the Board approve creation of a new congestion zone between Path 15 and Path 26, referred to as ZP26 and SP26, by converting Path 26 to an inter-zonal interface. Congestion on Path 26 shall become inter-zonal congestion addressed by inter-zonal congestion management and priced at marginal cost according to the ISO Tariff.

If approved, the creation of a new zone would be coordinated with the release of Firm Transmission Rights (FTRs), scheduled for February 1, 2000. Any available FTRs on Path 26 will be released in the primary FTR auction pursuant to the ISO Tariff at the 99.5% reliability level.

ISSUE STATEMENT

Path 26 is a recognized WSCC transmission path, and part of the ISO Controlled Grid, that consists of three parallel 500 kV transmission lines between PG&E's Midway and SCE's Vincent Substations. Both ends of Path 26 are located within the SP15 Congestion Zone (south of Path 15). Therefore, Path 26 is currently an SP15 intra-zonal interface. Congestion on Path 26 will continue to be managed solely in real time until the ISO inaugurates intra-zonal congestion management in the forward markets, in early 2000. Because congestion across Path 26 is currently intra-zonal, costs for relieving congestion on Path 26 are allocated proportionately to all demand within SP15 through the Grid Operations Charge. Were

Path 26 instead an inter-zonal interface, costs to relieve congestion would be allocated directly to SCs scheduling on the path, thus sending appropriate price signals.

In the first 12 months of the ISO’s operation, Path 26 has been congested in the north to south direction during many hours. During these hours, the ISO has managed congestion by increasing the output of resources south of Path 26 and decreasing the output of resources north of Path 26. Incremental and decremental adjustments were paid and charged as bid, respectively, according to the intra-zonal congestion management protocol.

The congestion costs (net of payments minus charges) that the ISO has incurred in the first 12 months of operations are listed in the following table:

Table 1. Path 26 intra-zonal congestion costs for the first 12 months of operation

| Month | Congestion Hours | Congestion Cost |
|-----------------------|------------------|---------------------|
| April-98 | 0 | \$ - |
| May-98 | 45 | \$ 56,781 |
| June-98 | 136 | \$ 1,692,991 |
| July-98 | 103 | \$ 1,433,252 |
| August-98 | 59 | \$ 742,033 |
| September-98 | 0 | \$ - |
| October-98 | 2 | \$ 4,745 |
| November-98 | 0 | \$ - |
| December-98 | 6 | \$ 173,031 |
| January-99 | 5 | \$ 4,875 |
| February-99 | 6 | \$ 82,181 |
| March-99 | 36 | \$ 530,102 |
| 12-Month Total | 398 | \$ 4,719,991 |

Congestion costs have increased dramatically during the last four months of operations:

Table 2. Path 26 intra-zonal congestion costs for the last 4 months of operation

| Month | Congestion Hours | Congestion Cost |
|-------------------------|------------------|----------------------|
| April-99 | 88 | \$ 3,771,514 |
| May-99 | 94 | \$ 6,425,428 |
| June-99 | 107 | \$ 15,085,123 |
| July-99 | 76 | \$ 2,158,999 |
| Four-Month Total | 277 | \$ 27,441,064 |

Section 7.2.7 of the ISO Tariff includes provisions for creating, modifying, and eliminating congestion zones. Two criteria must be met for the creation of a new congestion zone:

- 1. The total cost of mitigating congestion on an intra-zonal interface within a period must exceed a specified threshold. The relevant section of the ISO Tariff reads as follows:**

7.2.7.2.1 If over a 12-month period, the ISO finds that within a Zone the cost to alleviate the Congestion on a path is equivalent to at least 5 percent of the product of the rated capacity of the path and the weighted average Access Charge of the Participating Tos, the ISO may announce its intention to create a new Zone. In making this calculation, the ISO will only consider periods of normal operations. A new Zone will become effective 90 days after the ISO Governing Board has determined that a new Zone is necessary.

For Path 26, the cost threshold, according to the calculations in the following table, amounts to five percent of \$74,372,400, or \$3,718,620. Clearly, the first criterion for creating the new congestion zone has been met.

Table 3. Path 26 maximum transmission revenue

| PTO | Access Charge | Ownership | Rated Capacity | Yearly Cost |
|--------------|----------------------|------------------|-----------------------|--------------------|
| PG&E | \$3.53/MWh | 16.67% | 500 MW | \$15,461,400.00 |
| SCE | \$2.69/MWh | 83.33% | 2500 MW | \$58,911,000.00 |
| SDG&E | \$6.82/MWh | 0.00% | 0 MW | |
| Total | | 100.00% | 3000 MW | \$74,372,400.00 |

2. There must exist *workable competition* on both sides of the new inter-zonal interface. The relevant section of the ISO Tariff reads as follows:

7.2.7.3.1 An Active Zone is one for which a workably competitive Generation market exists on both sides of the relevant Inter-Zonal Interface for a substantial portion of the year so that Congestion Management can be effectively used to manage Congestion on the relevant Inter-Zonal Interface. ...

The use of the transmission system in the ISO Controlled Grid is such that at times significant power transfer can occur across Path 15 and Path 26 in either northbound or southbound direction. In the northbound direction, the transmission bottleneck is on Path 15. In the southbound direction, the transmission bottleneck is on Path 26. Since the proposed new congestion zone maintains the existing radial zonal network configuration, it is extremely unlikely that both interfaces will be congested simultaneously. In fact, these two paths have never been congested simultaneously since the ISO's commencement of operations. When the power flow is northbound, congestion on Path 15 is more severe, and its mitigation will prevent congestion on Path 26. Similarly, when the power flow is southbound, congestion on Path 26 is more severe, and its mitigation will also normally prevent congestion on Path 15.

There is a small possibility of congestion north to south on Path 15 and north to south on Path 26 at the same time. This could lead to three zonal prices. For example, there could be \$5 in NP 15, \$8 in ZP26 and \$10 in SP26. This would not be a frequent occurrence and is not expected to pose problems. As a result, even though the ISO Controlled Grid may have three congestion zones (with the addition of the new zone), normally only one inter-zonal interface (either Path 15 or Path 26) may be congested at any time, and therefore, there usually will be no more than two different zonal market clearing prices (MCPs) for energy and ancillary services.

The proposed new congestion zone will not materially change the competitiveness of the Ancillary Services markets. If there is congestion either on Path 15 or on Path 26, the ISO may procure Ancillary Services regionally, within two large regions, as shown in the following table:

Table 4. Ancillary Services region definition

| Congested Interface | None | Path 15 | Path 26 |
|----------------------------|-------------|----------------|----------------|
| Region Definition | NP15 | NP15 | NP15 |
| | ZP26 | ZP26 | ZP26 |
| | SP26 | SP26 | SP26 |

ZP26 is the proposed new zone between Path 15 and Path 26 (the PGE-4 demand zone), and SP26 is the portion of SP15 south of Path 26. In those instances where the ISO procures ancillary services regionally, the resources located in the new ZP26 zone will be subject to competition with all other resources located either north of Path 26 or south of Path 15. Both NP15 and SP26 are large zones with many resources. By comparison, ZP26 has over 3000 MW of nuclear and QFs must-take generation with little generating capacity that can be bid into the Ancillary Services markets. Therefore, its inclusion in the northern region (NP15 + ZP26) under Path 26 congestion, as opposed to the status quo where it is in the southern region (ZP26 + SP26, the current SP15), will not have a big impact on the ancillary services markets.

From the analysis above, the second criterion for creating the new congestion zone is also satisfied.

The creation of the new zone must be coordinated with the release of FTRs. Given that the physical market for FTRs is scheduled for February 1, 2000, the new zone should become active on or before that trading day. The WSCC transmission capacity rating for Path 26 is 3000 MW. Presently, it is assumed that about 50 percent of the available transmission capacity will be reserved for Existing Transmission Contracts. The remaining capacity will be available for New Firm Uses. The exact number of 100 percent FTR release for ZP26 will be determined from an analysis of 99.5 percent historical availability.

OPTIONS TO SOLVE THE PROBLEM

Option 1: **Do nothing.** Maintain the status quo. Path 26 remains an intra-zonal interface within the SP15 congestion zone. Resolve congestion on Path 26 in the forward markets according to the intra-zonal congestion management protocol, when the required software becomes available in early 2000. Resolve real-time congestion according to the provisions in Tariff Amendment 18.

Option 2: **Create the new zone now.** Promote Path 26 to an inter-zonal interface. Resolve Path 26 congestion in the forward markets according to the inter-zonal congestion management protocols, and in real time using the Imbalance Energy market.

ATTRIBUTES FOR COMPARING OPTIONS

Management recommends evaluating these options in view of the following attributes:

Promote Market Efficiency

The selected solution should promote market efficiency by sending correct pricing signals to market participants. Those pricing signals should provide incentives for efficient and effective economic and operational decisions.

Reduce Opportunities to Exercise Market Power

In order for the market to operate efficiently and fairly, the ISO should select market solutions that reduce the opportunity for any market participant to exercise market power.

Allocate Costs Fairly

To support market efficiency, the market should work toward allocating congestion management costs to those who create the congestion.

The options compare to these proposed attributes as follows:

| | Promote Market Efficiency | Reduce Opportunities to Exercise Market Power | Allocate Costs Fairly |
|---|----------------------------------|--|------------------------------|
| Option 1 – Do Nothing | No | ? | No |
| Option 2 – Create a New Zone Now | Yes | Yes | Yes |

Promote Market Efficiency

Option 1 does not provide the Market with any signal about the use of transmission and the possible need to expand. Option 2 explicitly provides the market with information on the use of the path and promotes possible future investments.

Reduce Opportunities to Exercise Market Power

To the extent that opportunities to exert market power may exist today, Option 1 retains the status quo. By introducing a new zone through Option 2, Path 26 becomes an inter-zonal interface subject to inter-zonal congestion protocols. These protocols allow all adjustment bids in the forward market on either side of the path to be utilized to solve congestion using marginal cost pricing. This provides the ISO with a large number of resources with adjustment bids to resolve congestion, thereby, minimizing market power concerns.

Allocate Costs Fairly

Under Option 1 the cost of intra-zonal congestion is based on the individual bid used to solve congestion and is allocated to the demand in that zone. This does not provide the proper incentive for efficient use of the path and does not allocate the cost to the users of the path. Since intra-zonal congestion on Path 26 has been frequent and expensive, proper cost signals need to be in place.

Option 2 prices congestion on Path 26 at marginal cost. Those who use it pay for it, thus promoting efficient use of the path. This is consistent with the ISO's existing congestion management design and practices. The ISO tariff assumes that Intra-Zonal Congestion is rare and infrequent. When the cost of Intra-Zonal congestion becomes large and frequent, cost spreading occurs which could lead to unfair allocation of costs. Furthermore, Option 2 will provide the market with strong economic signals about the insufficient transmission capacity of Path 26 and the need for market-driven solutions. These economic signals are lost in Option 1.

PROS AND CONS OF EACH OPTION

| Option | Description | Pros | Cons |
|--------|-------------------------------|--|---|
| 1. | Do nothing. | <ul style="list-style-type: none"> No system changes. | <ul style="list-style-type: none"> Inefficiency. Potential market power problems. |
| 2. | Create a new congestion zone. | <ul style="list-style-type: none"> Promotes efficient use of Path 26 transmission capacity. Provides strong economic signals. Resolves potential market power problems. | <ul style="list-style-type: none"> Requires some changes to the network model, the SI validation, the Master File, and the Settlement system. Must be in place on 2/1/2000. |

POSITIONS OF THE PARTIES

The concept of creating a third zone between Path 15 and Path 26 was discussed with Market Participants at the Market Issues Forum on August 11, 1999. Market Participants were generally supportive and had several questions:

- Would creating a third zone create a loop within California that would hamper the calculation of zonal prices?** The ISO confirmed that the zone would be created such that it would alleviate this concern. The new zone would extend entirely from eastern to western California so that electricity flows from northern to southern California and within California would have to flow through the new zone.
- Participants asked for more back-up information on the ISO analysis of intra-zonal costs.** That information is contained in this memo.
- One stakeholder asked whether the costs of intra-zonal congestion management have changed since the change in ownership of the PG&E units.** Since the costs depend on so many factors, the change in ownership is not a factor in this analysis.

DEPARTMENT OF MARKET ANALYSIS OPINION

The Department of Market Analysis (DMA) is concerned that increasing the number of active zones may increase the potential for market power. We believe measures that would encourage removing transmission bottlenecks are the best way to provide for effective competition in the generation market. We encourage using a balanced grid planning process to achieve this goal which hopefully emphasizes transmission reinforcement rather than creation of new congestion zones.

In the case of Path 26, the DMA believes that the costs and benefits of new zone creation need to be assessed before making a decision. The DMA believes that creating a new zone would mitigate intrazonal congestion gaming, provide proper locational price signals for new generation, and ensure efficient use of the transmission grid through a usage charge on the transmission path. These benefits, however, should be weighed against the additional market power risks detailed below.

Additional factors to consider with new zone creation

1) Current Intra-zonal congestion costs for Path 26 are overstated and may be dramatically lowered by short-term changes in the design on intra-zonal congestion management. Intra-zonal congestion costs on Path 26 have already been substantially reduced following the filing of Amendment 18 in June 1999, which corrected several basic flaws in the real-time intra-zonal congestion management market. The DMA believes further reductions in intra-zonal congestion can be achieved by implementing additional short-term design and operational changes, such as expediting the implementation of forward market (day-ahead and hour-ahead) intra-zonal congestion management software. Other possible design changes include:

- tariff modifications to settle all decremental bids used for intra-zonal congestion at the zonal energy MCP for the corresponding market (day-ahead, hour-ahead, or real-time), and
- allowing the use of system-wide adjustment bids for forward market intra-zonal congestion as long as this does not create or exacerbate inter-zonal congestion (i.e. extension of Amendment 18 to the forward market).

The DMA believes that the basic approach used to assess intra-zonal congestion costs *overestimates* these costs, since incremental and decremental bids dispatched in real time to resolve intra-zonal congestion typically alleviate intra-zonal congestion and reduce system-wide energy imbalances simultaneously. In such cases, assignment of these cost solely to intra-zonal congestion overstates these costs. Over the longer term, charging intra-zonal congestion costs to TOs would send a direct price signal that the TOs could use to assess the cost-effectiveness of investment in transmission upgrades to alleviate intra-zonal congestion.

2) Creation of a new zone could amplify rather than reduce the effects of market power during hours when workable competition does not exist in the energy markets south of Path 26. The high costs of mitigating intra-zonal congestion on Path 26 are due in large part to the need to rely on uncompetitively high incremental energy bids south of

Path 26 in real time. Although the ISO tariff does not define a standard that could be used to determine if markets are "workably competitive," analysis by the DMA indicates that the frequency of congestion on Path 26 and the lack of competition on in the energy markets during many of these hours raises concern about the ISO's ability to resolve

congestion on Path 26 through a competitive congestion management market.¹ Mitigating Path 26 congestion through inter-zonal congestion management in either the Day Ahead or real time markets may do little to increase the supply of available bids, and could instead merely amplify the effect of this lack of workably competition by allowing market clearing prices for the entire zone south of Path 26 to be set at these relatively high uncompetitive levels.

After evaluating these additional factors, we cautiously support creating a new zone at the Path 26 interface

MANAGEMENT RECOMMENDATION

ISO Management recommends Option 2, which would create a new congestion zone, ZP26, at the same time FTRs become active, on February 1, 2000. This recommendation is based on:

- The high costs associated with mitigating congestion on Path 26, which are currently allocated *pro rata* to the demand in the SP15 congestion zone;
- The efficiency that can be gained in using Path 26 if the associated congestion is priced at marginal cost and charged to the path users;
- The value of economic signals to the marketplace about the insufficient transmission capacity of Path 26.

¹ Analysis of the historical data indicates that , with Path 26 as an inter-zonal interface, the real-time market Residual Supply Index (RSI) in SP26 would have been less than 100% between 30 to 212 hours during the last 6 months (corresponding to about 99% and 95% of total hours, respectively) During these hours, any one market participant could have set the real-time price at any desired level (up to the current \$20/MWh cap.