

**QUARTERLY MARKET MONITORING REPORT
ON THE
PUBLIC SERVICE COMPANY OF NEW MEXICO**

**POTOMAC ECONOMICS, LTD.
INDEPENDENT MARKET MONITOR**

First Quarter of 2006

CONFIDENTIAL MATERIAL REDACTED

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I. OVERVIEW

This is the market monitoring report for the first quarter of 2006 on the Public Service Company of New Mexico (“PNM” or “the Company”). In connection with PNM’s acquisition of Texas-New Mexico Power Company¹ in FERC Docket No. EC05-29-000, the Federal Energy Regulatory Commission accepted PNM’s market monitoring plan and PNM retained Potomac Economics as its independent market monitor.

The market monitoring plan is designed to detect any anticompetitive conduct by PNM from operation of the company’s transmission system, including any transmission impacts from PNM’s generation dispatch. As stated in the plan:

The Market Monitor shall provide independent and impartial monitoring and reporting on: (i) generation dispatch of PNM ... , and scheduled loadings on constrained transmission facilities in relevant areas (the “Relevant Areas”); (ii) details on binding transmission constraints in the Relevant Areas, such as transmission refusals, or other relevant information; (iii) operating guides and other procedures designed to relieve transmission constraints in the Relevant Areas and the effectiveness of these guides or procedures in relieving constraints; (iv) information concerning the volume of transactions and prices charged by PNM ... in the electricity markets affected by these companies before and after the companies implement redispatch or other congestion management actions; (v) the calculation of Available Transmission Capability (“ATC”) and Total Transfer Capability (“TTC”) over transmission lines owned or controlled, in whole or in part, by PNM ..., and PNM’s ... communication of data regarding such calculations to westTTrans.net; and (vi) plans for the construction ... [or] expansions to [its] non-ERCOT transmission facilities.

To execute the monitoring plan, Potomac Economics routinely receives data from PNM that allows us to monitor generation dispatch, transmission system congestion, and the Company’s response to transmission congestion (both its operational response and its business activities). We also collect certain key data, including OASIS data and market pricing data.

The purpose of this report is to provide an account of our monitoring activities and significant events on the PNM system during the first quarter of 2006.

¹ Herein, PNM refers to the merged entity, which includes Texas-New Mexico Power.

A. Market Monitoring

Potomac Economics performs the market monitoring function on a regular basis, as well as performing periodic reviews and special investigations. Our market monitoring is conducted primarily by way of regular analysis of market data relating to transmission outages and access, and wholesale market outcomes. This involves data on transmission outages, the disposition of transmission reservation requests, and other wholesale activities of the Company that aid in detecting anticompetitive conduct and evaluating whether market participants have full access to available transmission capability.

In addition to the regular monitoring of outages and reservations, we also remain alert to other significant events, such as price spikes, major generation outages, and extreme weather events that could adversely affect transmission system capability and give rise to anticompetitive conduct.

Our periodic review of market conditions and PNM operations is based on confidential operating data PNM provides us, as well as other public data that we collect on a routine basis. Our review is contained in this quarterly report, which is comprised of four parts. First, we evaluate regional prices and PNM transactions to provide an assessment of overall market conditions. Second, we summarize transmission congestion in order to detect potential competitive problems.

Congestion is identified by loadings on the lines that flow into the Northern New Mexico Transmission System. The third area of analysis relates to transmission system access. For this analysis, we evaluate ATC issues and the disposition of transmission service requests to detect issues on the PNM system that may require closer analysis. Our final area of analysis is our monitoring for anticompetitive conduct. In this analysis, we examine periods of congestion and evaluate whether PNM operating activities raise concerns that PNM may be engaging in anticompetitive conduct. The operating activities that we evaluate are: generation dispatch, wholesale purchases and sales, and hourly power flows coincident with instances of congestion.

In addition to our periodic reviews, we may from time-to-time be asked or judge it necessary to undertake a special investigation in response to specific circumstances or events. No such events occurred this quarter.

B. Summary of Quarterly Report

1. Wholesale Prices and Transactions

Prices. We evaluate regional wholesale electricity prices in order to provide an overview of general market conditions. The highest prices occurred in early January when fuel prices were the highest. The lowest prices occurred in late March when demand and fuel prices were relatively low. Over the last four years, prices in January through March have generally moved in tandem with natural gas prices.

Sales and Purchases. PNM engages in wholesale purchases and sales of power on both a short-term and long-term basis. PNM short-term wholesale purchase volumes initiated in the first quarter of 2006 exceeded short-term wholesale sales volumes by six percent. There is less concern with market power with PNM being a net short-term purchaser as compared to if they were a net short-term seller. Although PNM engages in long-term transactions, these have less relevance to market power concerns.

2. Transmission Congestion

Curtailments. PNM manages congestion in northern New Mexico as laid out in the New Mexico Transmission Operating Procedures. Through these procedures, PNM can take action to curtail or reduce schedules in the event transmission limits are exceeded. Outside of these procedures, PNM can also operate load-side generation to manage congestion. There was one event during the quarter that caused these procedures to be invoked. The event was caused by the forced outage of the Four Corners 345 kV to San Juan 345 kV, and the San Juan 345 kV to BA 345 kV lines on January 16th. The outage involved de-energizing the Four Corners 345 kV to San Juan 345 kV segment at the request of the fire department due to ground fires in the area. The event lasted 40 minutes. The congestion was managed by curtailments, the operation of the Delta-Person generation, and the availability of the under voltage load shedding scheme. The event did not result in the refusal of Transmission Services Requests (TSR). Outside of the 40-minute period, transmission capacity limits were not exceeded, schedules were not curtailed or reduced, and load-side generation was not run specifically for managing transmission congestion during the quarter.

3. Transmission Access

We evaluated the ATC values across Path 48, the primary path into northern New Mexico. Our analysis of the ATC across the path indicates that PNM's practices for posting ATC are effective in utilizing the capability of the transmission system for this path.

We evaluate transmission requests and their disposition to determine whether market participants have had difficulty accessing the PNM transmission network. If requests for transmission service are frequently denied, this may indicate an attempt to restrict competition. Driven by yearly requests, the volume of requests was higher in 2006 than in 2005. Within 2005, the rates of approvals generally increased through the course of the year. During the period of study for this report, the approval rate was close to 100 percent. We do not find a pattern in the disposition of transmission requests that indicates restrictive access to transmission.

PNM is active in regional organizations that coordinate transmission planning and wholesale market enhancements. These activities improve transmission access.

4. Potential Anticompetitive Conduct

Wholesale Sales. We examined the sales by PNM initiated in the first quarter of 2006 using PNM sales records. We focus on short-term bilateral sales contracts because these best represent the spot price of electricity and will most closely reflect power prices that might arise on the PNM system under conditions most conducive to market power. Under a hypothesis of market power, we would expect high sales prices during times when short-term transmission service is unavailable. Daily average sales prices vary between \$■/MWh and \$■/MWh. On days when transmission service is refused, the prices being charged by PNM were comparable to the other days, which does not support a hypothesis of market power.

Dispatch. To further evaluate potential market power or manipulation issues, we examine PNM's generation dispatch to determine the extent to which high transmission loading may be caused or exacerbated by uneconomic dispatch. Congestion can result naturally when PNM or any utility dispatches its units in a least-cost manner. Such congestion does not raise competitive concerns. If a departure from least-cost dispatch ("out-of-merit" dispatch) occurs and causes congestion and this departure is not justified, this raises potential competitive concerns. As

reported above, there were 40 minutes of congestion managed by curtailments and the operation of load-side generation, but there were no other actions that may have limited access to or across the PNM system in the first quarter.

Using an estimated supply curve, we analyze PNM's actual dispatch to determine whether the actual dispatch departed significantly from what we estimate to be the most economic dispatch. In instances when dispatch departed substantially from the estimated optimal dispatch, we evaluate the circumstances more carefully to determine if the loadings impacted access to or across the PNM system.

The daily peak in out-of-merit quantities (which for our purposes include units on unplanned outage) averaged 26 MW. The level of daily peak out-of-merit quantities fluctuated considerably during the quarter. However, out-of-merit dispatch did not lead to increased transmission service refusals or reduced ATC into or across the PNM system. Hence, we conclude that out-of-merit dispatch by PNM does not raise concerns of reduced market access or anticompetitive conduct and that further investigation of unplanned generation outages is unnecessary.

Transmission Outages. We evaluated PNM's transmission outage data and conclude that these outages did not contribute to high transmission loadings.

Power Flows. We analyze PNM power flows to determine whether congestion events are being managed properly. PNM manages congestion with curtailment of schedules and the operation of load-side generation. During the period of study, curtailments were taken and load-side generation was operated during a 40-minute line outage. Otherwise, load-side generation was operated three percent of the time, but running load-side generation when not needed for transmission purposes does no harm. Our evaluation of power flows does not provide evidence of anticompetitive conduct.

C. Complaints and Special Investigations

We have not been contacted by the Commission or other entities regarding any special investigation into PNM market behavior, nor have we detected any conduct or market conditions that would warrant a special investigation.

II. WHOLESALE PRICES AND TRANSACTIONS

A. Prices

We evaluate wholesale electricity prices in the PNM region in order to provide an overview of general market conditions. Examining price movements can provide insight into specific time periods that may merit further investigation, although they are not definitive indicators of the presence or absence of anticompetitive conduct.

PNM is not part of a centralized wholesale market with transparent spot prices. Wholesale trading in New Mexico is conducted under bilateral contracts. Prices for bilateral contract transactions are compiled for certain locations proximate to the PNM service territory. These are collected and published by commercial pricing surveys. One such survey is published by Platts and provides prices for a number of locations across the U.S. The location most proximate to the PNM system is Four Corners. The bilateral contract prices for Four Corners in the first quarter of 2006 are shown in Figure 1. Because power prices should be highly correlated with fuel cost and loads, the figure also shows daily peak load and the daily cost of natural gas in the region, translated to a power cost with an 8,000 btu/kWh conversion.

Figure 1: Wholesale Power Prices and Peak Load

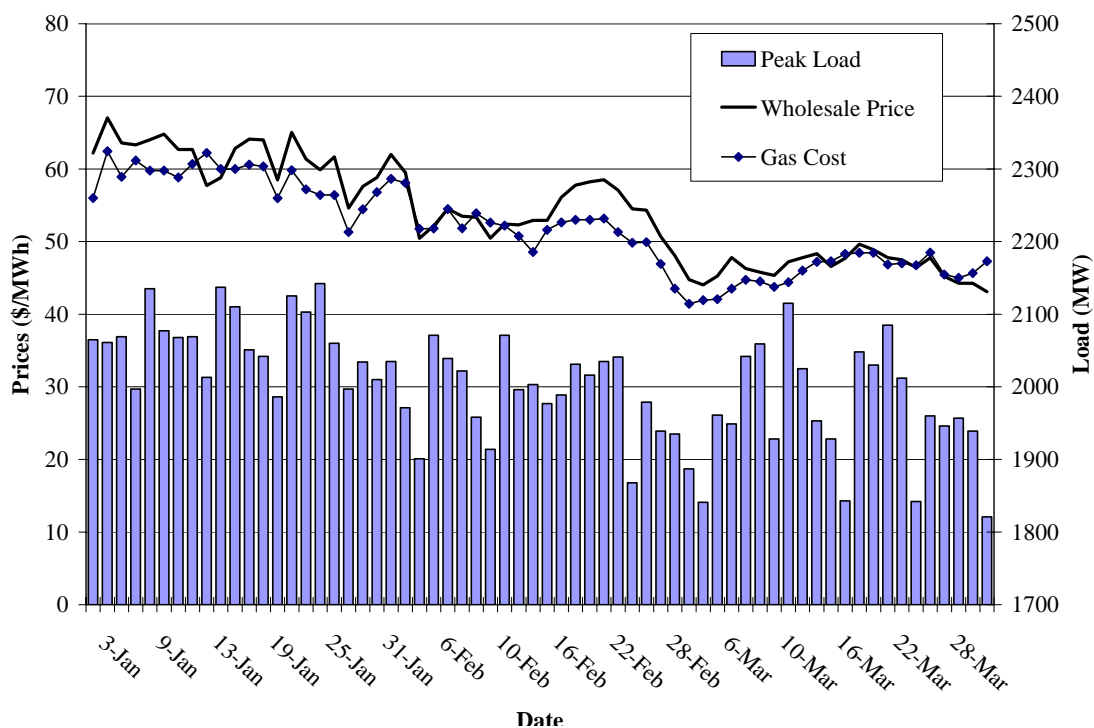
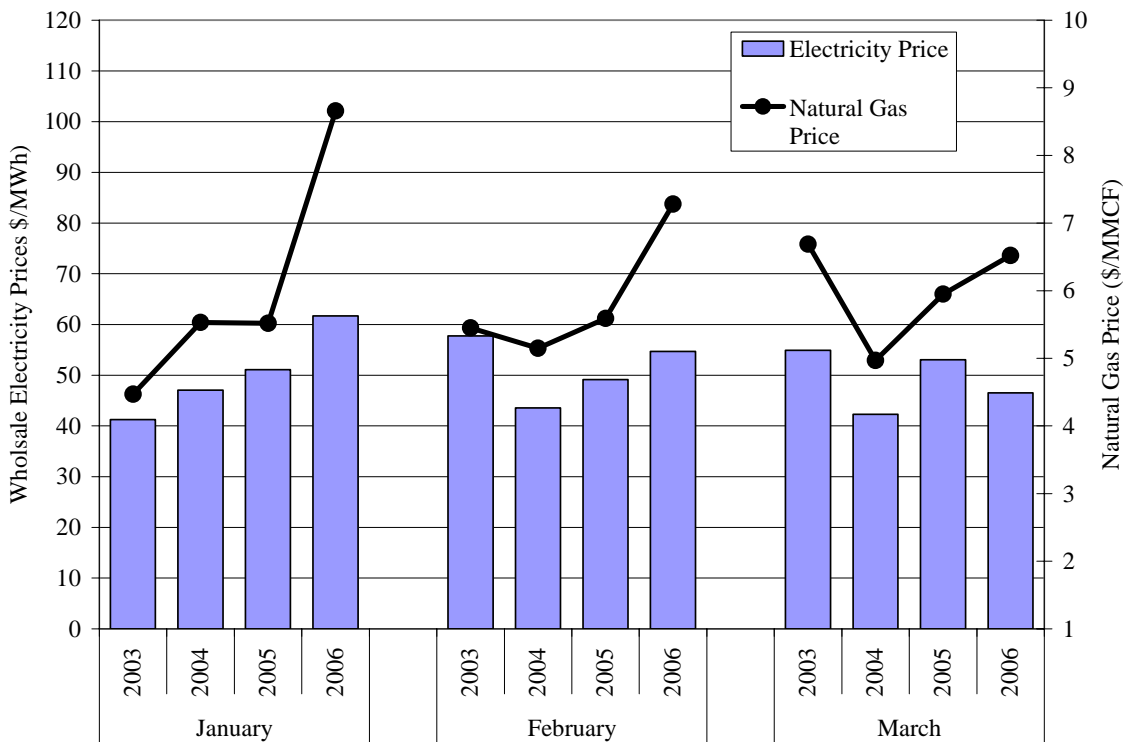


Figure 1 shows a strong correlation (94 percent correlation coefficient) between power prices and gas prices, and a moderate correlation between power prices and load (63 percent correlation coefficient). The gas cost is presented as the power price required for a gas fire generator with a heat-rate of 8,000 btu/kWh (nominal heat rate for combined cycle (CC) technology) to recover the daily cost of gas in the region. This high correlation suggests that gas fired CC power plants are typically the marginal units during this period of study.

The next analysis compares the average prices for the first quarter of 2006 with average prices during the same period over the past three years. These results are shown in Figure 2 together with the average natural gas prices.

**Figure 2: Trends in Monthly Electricity and Natural Gas Prices
First Quarter, 2003– 2006**



Note: Natural gas data from Energy Information Administration representing average well-head prices.

As the figure shows, electricity prices have generally moved with natural gas prices over time. The average price in January was 21 percent higher than in January 2005 and the average price in February was 11 percent than in February 2005. The average price in March declined by 12 percent compared to last March.

B. Short-Term Sales and Purchases

PNM engages in wholesale purchases and wholesale sales of power. These transactions are both firm and non-firm in nature. Figure 3 summarizes PNM's sales and purchase activity for trades that were initiated during the first quarter of 2006. We consider only short-term trades (trades of less than one month in duration) because we are interested in transactions made by PNM that could have allowed PNM to benefit from any potential market abuse during this time period. Longer-term transactions generally occur at predetermined prices that would not be affected by transitory periods of congestion. These transactions depend more on the availability of ATC. Additionally, short-term transaction prices are the best indicators of market conditions during periods of congestion.

Figure 3: Summary of PNM Sales and Purchases

Redacted

As the figure shows, PNM is a short-term net buyer since short-term purchase volumes exceed short-term sales volumes by 6 percent. Short-term sales most closely represent the spot market transactions in the PNM region. At a broad level, the fact that PNM's short-term purchases exceed its short-term sales suggests a disincentive to exercise market power. In general, a utility exercising market power would be a net seller, taking advantage of short-term fluctuations in transmission congestion to make short-term sales at high prices. In Section V, we evaluate the prices at which these sales are executed to detect any significant correlation between prices and congestion.

III. TRANSMISSION CONGESTION

PNM is a member of the Western Electric Coordinating Counsel (WECC). In WECC, regional congestion is primarily managed by ensuring that the scheduled flows do not exceed flow limits on specified paths.² However, because actual flows sometimes exceed scheduled flows due to loop flow (or parallel path flow), additional congestion management procedures are employed.

Power flows in the WECC follow a relatively predictable pattern. The network is most capable of transmitting flows on the high-voltage facilities that roughly corresponds to the geographic perimeter of the WECC. The transmission system in the interior of the WECC boundaries operates at a lower voltage and carries less power. This causes power to circulate around the perimeter of the system. Typically, power transfers from the Pacific Northwest are scheduled south to California. However, this sometimes results in unscheduled increases in flow around the perimeter of the WECC system in the clockwise direction, arriving in California from the west through Arizona.

The transmission system serving New Mexico is connected in a radial manner from the high-voltage facilities that carry the main flow of WECC. Accordingly, the PNM system does not experience significant loop flows from other regional entities. There are two main transmission paths that connect New Mexico to the high-voltage facilities in the rest of WECC: Path 47 and Path 48. Path 48 facilitates power transfers into the northern portion of New Mexico and Path 47 facilitates transfers into the southern portion of New Mexico. PNM manages congestion on Path 48 in accordance with the New Mexico Transmission Operating Procedures. Path 47 is managed by El Paso Electric using the same procedures. Neither Path 47 nor Path 48 is a “qualified path” under the Unscheduled Flow Reduction Procedures used by WECC.³

² This is in contrast to how congestion is managed in the Eastern Interconnect where congestion management is focused on actual flows on flowgates as opposed to scheduled flows on contract paths.

³ WECC uses Unscheduled Flow Reduction Procedures (“UFRP”) when actual flow exceeds scheduled flow on a “qualified path”. There are only a limited number of qualified paths. These paths are identified based on certain qualification criteria that include, among other things, the path having a history of unscheduled flow. The UFRP consist of a series of nine steps that are intended to relieve the congestion through the operation of equipment and, ultimately, the curtailment of schedules.

The New Mexico Transmission Operating Procedures (“NMTOP”) comprise an agreement among PNM (including TNMP), El Paso Electric, and Tri-State Generation and Transmission Association. A primary objective of the procedures is to determine the responsibility for operation of the facilities that transmit power into New Mexico from the Western Interconnect. As described above, these facilities form a radial path into New Mexico from the high-voltage network in WECC. According to the NMTOP, PNM and El Paso are responsible for managing congestion caused by imports into New Mexico. The procedures require PNM to monitor actual flows at specified buses that comprise the Northern New Mexico Transmission System and take action when imports exceed available transmission capacity. These actions include curtailments and reduction of schedules.

As a result of this responsibility and the location of generation and voltage control devices controlled by PNM, PNM could be in the position to limit transfers on Path 48 through artificial congestion and then profit by making sales to wholesale buyers in New Mexico at above-market prices. Accordingly, we monitor the management of this responsibility to detect instances of manipulation.

During the period of study for this report, PNM did not implement schedule reductions or curtailments on Path 48 as provided for in the NMTOP. However, we evaluated the system at times when transmission service was refused. These refusals are important for our analysis in Section V where we determine whether transmission service refusals are the result of anticompetitive activities.

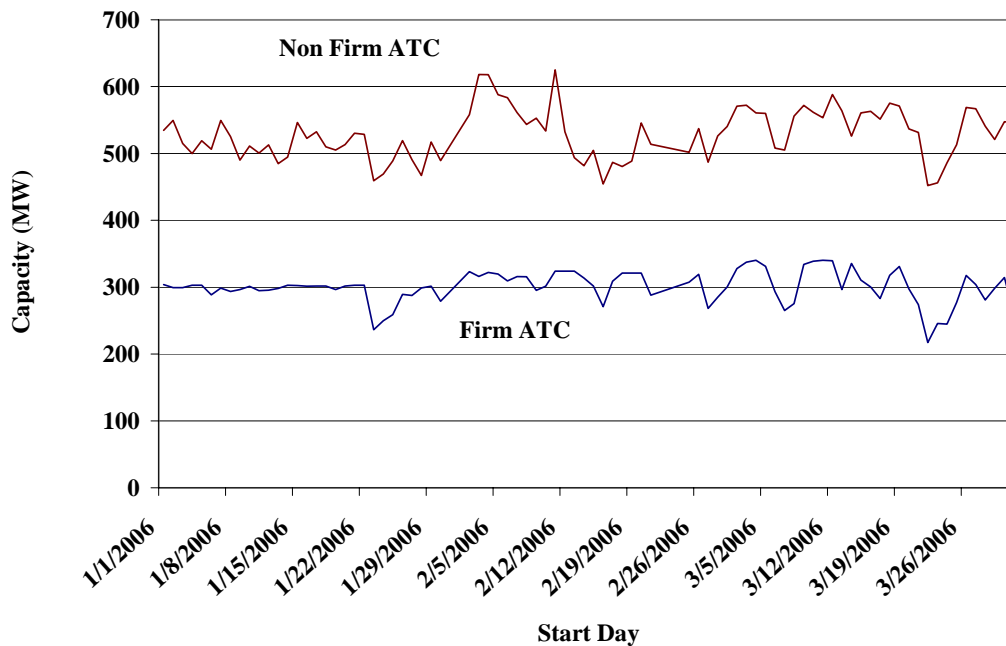
IV. TRANSMISSION ACCESS

A main component of the PNM market monitoring plan is to evaluate transmission availability on the PNM system. In this section, we evaluate access to the transmission network by analyzing Available Transmission Capability (“ATC”) and the disposition of transmission requests. The patterns of transmission requests and their disposition are helpful in determining whether market participants have had difficulty accessing the PNM transmission network.

A. Available Transmission Capability

A critical element of transmission access is determining ATC. Figure 4 shows the hourly firm and non-firm ATC postings for Four Corners 345 kV to West Mesa 345 kV transmission path, the main path into New Mexico.

**Figure 4: Daily Average of Hourly Firm and Non-Firm ATC
Four Corners to West Mesa, First Quarter of 2006**

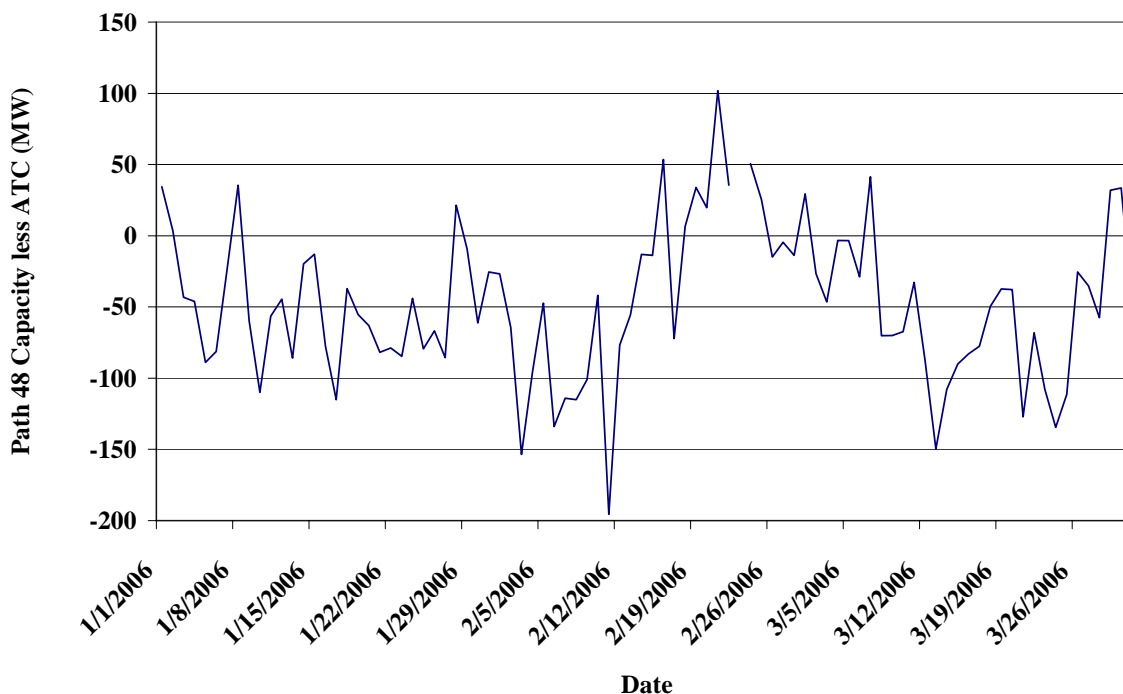


We analyze this path because the ATC on this path is directly correlated with the ATC on Path 48, which is one of the key paths in the WECC reliability management system. The Four Corners to West Mesa path is also a building block for virtual paths, such as the Four Corners to Blackwater path, which extends further east into SPP. Demand for service on the Four Corners to West Mesa path is not particularly high, but there has been occasional high demand on paths that depend on it, such as the Four Corners to Blackwater path. The figure shows the firm ATC

averaged around 300 MW for all hours and the non-firm averaged around 500 MW. Non-firm ATC on this path was always available through the period of study. Firm ATC was posted as available for 97 percent of the hours in the study period. During the lowest hour, 173 MW of non-firm ATC was still available during 8 PM hour on February 18th. There was 93 MW of hourly firm ATC was available during this same hour.

As a further analysis, we assess the accuracy of ATC postings by examining the non-firm ATC compared to physical transmission capacity and flows. For each hour, we calculate the physical transmission capacity and subtract both physical flows and ATC. Hence, a value close to zero will indicate accurate posting of ATC. Our analysis is shown in Figure 5.

**Figure 5: Path 48 Capacity less Non-Firm ATC on Four Corners-West Mesa
First Quarter 2006**



A value close to zero indicates a close correspondence between posted non-firm ATC and the capability actually available on the path.⁴ In practice, however, the posted ATC should be

⁴ We did not evaluate firm ATC. Firm ATC is much more difficult to evaluate because TRM (Transmission Reliability Margin) is included in the calculation, and counter-flows are not included. Also, as with non-firm ATC, for service past the operating horizon, reservations are used instead of schedules. This causes committed uses to not equate to physical flows. However, the benefits of regular network and native load forecasts with hourly granularity discussed above for non-firm ATC also apply to firm-ATC.

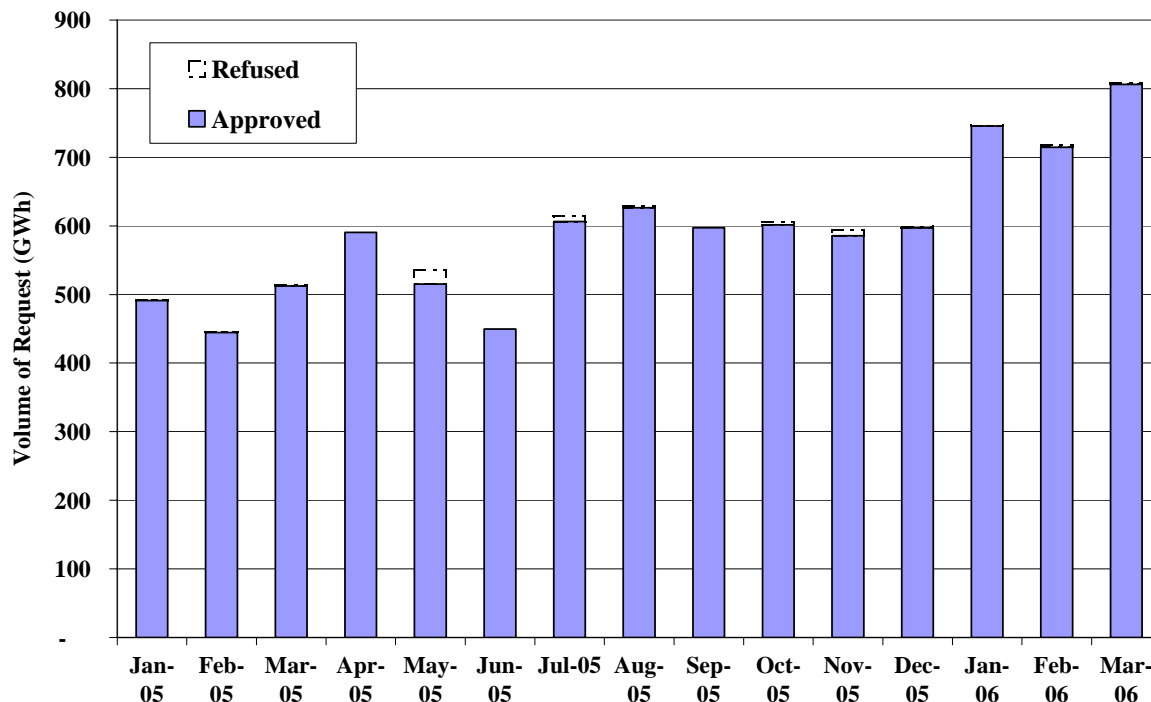
greater than the real-time capacity available on the path because the posted ATC is based on the maximum capability of the voltage control devices (capacitors and shunt reactors) where as the real-time capacity available is based on the actual use of the voltage control devices at the time (in real-time the devices are used as needed). For this reason, it is not surprising there are numerous negative values in Figure 5. A value exceeding zero means the posted ATC was lower than the actual available transmission capability. On average, non-firm ATC exceeds the actual physical capability by 60 MW. Fifteen percent of the hours were above zero, and averaged 31 MW, which is two percent of the TTC on this path. These results indicate that PNM's practices for posting ATC are effective in making the full capability of this transmission path available.⁵

B. Disposition of Transmission Requests

Our next analysis of transmission access is an evaluation of the disposition of transmission requests. This analysis determines whether market participants have had difficulty accessing the PNM transmission system. In order to make this evaluation, we calculate the volume of requested capacity that spanned the time period under study. For example, if a request was approved in June for service in October, we categorize that as an approval for October. Because requests vary in magnitude and duration, we assign a total monthly volume (GWh) associated with a request, which provides a common measure for all types of requests. Hence, a yearly request for 100 MW has rights for every hour of the month for which the request spans, just like a monthly request. A request covering less than the entire month is assigned the hours between its stop and start date. Figure 6 shows the breakdown of transmission service requests in each month from January 2005 to March 2006 and summarizes the disposition of the requests.

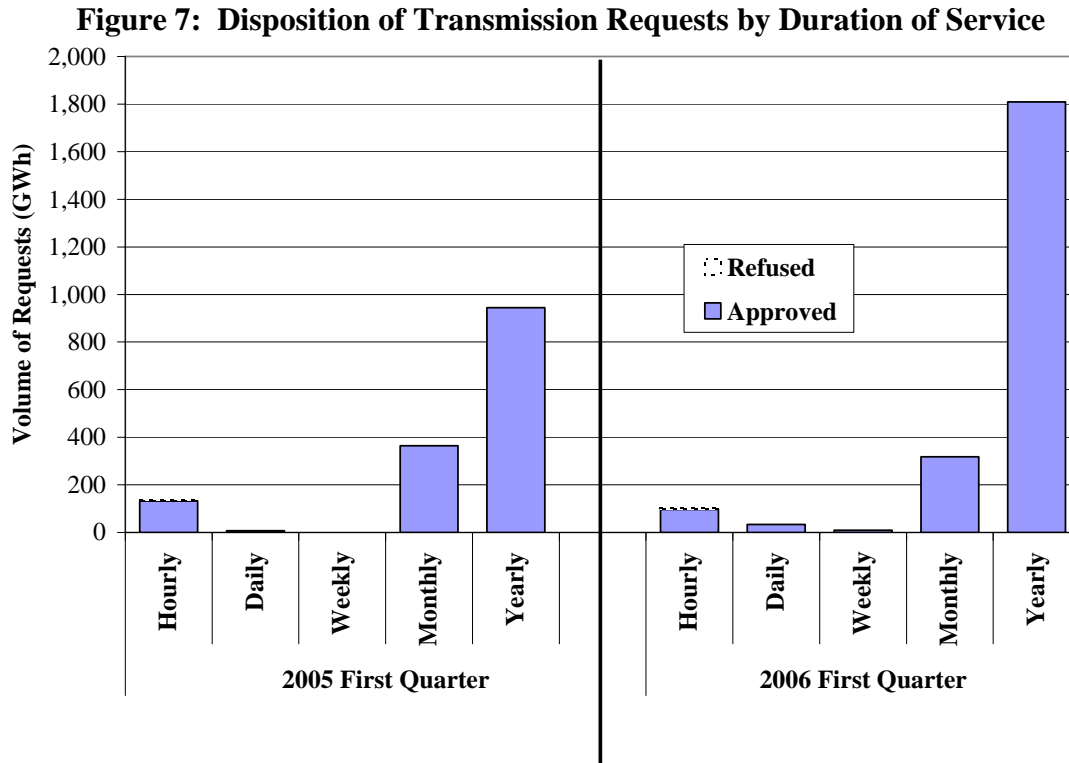
⁵ A further look into individual hours that exceeded zero revealed that OATI was experiencing problems importing committed use generation data files for the first hour of the each day, which resulted in the ATC for that hour being calculated based on the monthly committed use value instead of the proper hourly value. The problem was reported to be resolved on April 21, 2006. The data in Figure 5 excludes the errant hours.

**Figure 6: Disposition of Requests for Transmission Service on the PNM System
January 2005 – March 2006**



As the figure shows, refusals are rare and small relative to approved requests, which generally does not raise competitive concerns. The figure also shows that approvals for this quarter are up 57 percent over what they were during the first quarter of 2005.

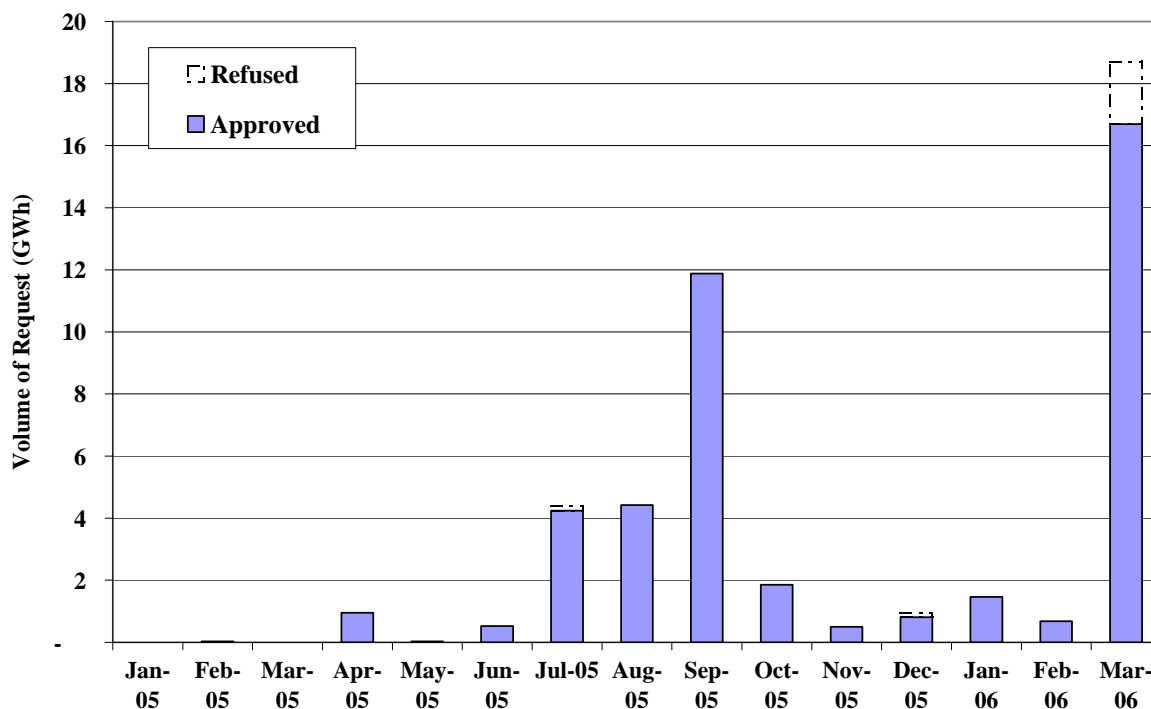
To evaluate the disposition of transmission requests further, we examine the volume of transmission service over the entire study period by increment of service and compare it to the corresponding period of the previous year. This is shown in Figure 7 which reports the volume of requests for transmission service of varying service increments, comparing the first quarter of 2005 with the first quarter of 2006.



The figure shows an increase in approvals in is driven by yearly service. In aggregate, the total GWh of approved requests increased from 944 GWh in 2005 to 1809 GWh in 2006. Aside from the yearly service, there was a 9 percent drop in approved requests from the first quarter 2005 to the first quarter 2006.

The rate of refusals is very low and is almost all for hourly firm, but the volume of refusals has doubled compared to the first quarter of 2005 (from 2.5 GWh to 5.3 GWh) and the patterns of refusals have shifted. In the first quarter of 2005, 86 percent of the refusals (2.1 GWh) were for San Juan to Four Corners. In the first quarter of 2006, there were 2.9 GWh of requests refused to Black Water and only 0.4 GWh of refusals for San Juan to Four Corners. Figure 8 shows that there has been a significant increase in demand for service to Black Water in March of 2006, which accounts for shift in refusals. The level of approvals on this path indicates that access to the paths has not been withheld. The increased refusals, therefore, can be attributed to the increased demand for the path. Based on our analysis of requests and their disposition, we do not find evidence of attempts to restrict access to transmission by PNM.

**Figure 8: Disposition of Requests for Transmission Service to Black Water 230
January 2005 – March 2006**



C. Regional Transmission Planning and Coordination

PNM has been active in the Southwest Area Transmission (“SWAT”) group that coordinates transmission planning and expansion. SWAT activities include performing studies on the impact of generation additions, including large amounts of wind generation in eastern New Mexico. Also studied are transmission constraints such as WECC Path 47 which limits imports from eastern Arizona and northern New Mexico into southern New Mexico. PNM supports SWAT becoming more formalized by arranging sponsorship for it as a planning organization under WestConnect.

PNM is also active in WestConnect which addresses wholesale market enhancements. An example is a two-year experiment with a non-pancaked rate structure for hourly and daily transmission service products.

V. MONITORING FOR ANTICOMPETITIVE CONDUCT

In this section, we evaluate market and operating data to identify any evidence of anticompetitive conduct or market manipulation. The market monitoring plan calls for the market monitor to identify anticompetitive conduct, which includes the operation of either PNM's transmission assets or its generation assets to create transmission congestion and erect barriers to rival suppliers, which ultimately result in higher electricity prices. To identify potential concerns, we analyze PNM's wholesale sales in the first subsection below, its dispatch of its generation assets in the second subsection, and PNM's transmission flows and congestion in the third subsection.

A. Wholesale Sales

In this subsection, we examine sales data to determine whether the prices at which PNM sold power may raise concerns regarding anticompetitive conduct that would warrant further investigation. We are interested in periods when requests for short-term transmission service were refused. It is during these periods of reduced transmission access that PNM could benefit by making sales at higher prices.

We examine the sales by PNM in short-term bilateral transactions using PNM internal sales records. We focus on short-term sales because they best represent the spot price of electricity and are a primary indicator of whether PNM may have benefited during periods of congestion. We would expect high prices during time periods when short-term transmission service requests are refused if there were significant anticompetitive concerns. Figure 9 shows the daily average prices received by PNM for short-term bilateral contract sales. The figure also indicates days when requests short-term transmission services are refused.

Figure 9 indicates that the (weighted average daily) prices of PNM sales vary between \$■/MWh and \$■/MWh. The figure also shows that days with transmission service request refusals do not coincide with days when PNM charged higher prices. We find no significant difference between sales prices on days with refusals versus all other days. Accordingly, we do not find evidence of anticompetitive conduct.

**Figure 9: Prices Received for PNM Sales
First Quarter 2006**

Redacted

B. Generation Dispatch

To further evaluate whether PNM's conduct raises any anticompetitive concerns, we examine the company's generation dispatch to determine the extent to which service refusals may have been the result of uneconomic dispatch of generation by PNM. Therefore, we first evaluate PNM's dispatch during the quarter to determine whether it was consistent with the least-cost use of its resources. If a departure from least-cost dispatch ("out-of-merit" dispatch) is unjustified, then this raises potential competitive concerns. PNM's main congestion issues are associated with Path 48, which separates the base-load generation from the Albuquerque load center where the more expensive generation is located. As a result, the most extreme cases of out-of-merit dispatch tend to relieve congestion rather than cause it. We consider a unit to be out-of-merit when it is dispatched, but could have been replaced by lower-cost generation that was not dispatched.

In order to identify out-of-merit dispatch, we first estimate PNM's marginal cost curve.⁶ To estimate marginal costs, we use incremental heat rate curves, fuel cost, and other variable operations and maintenance cost data provided by PNM. This allows us to calculate marginal cost segments among all units. We ordered each of these marginal cost segments from lowest cost to highest cost to represent the cost of meeting various load levels, assuming lower-cost units are used before higher-cost units. For our analysis, the curve is re-calculated daily to account for fuel price changes, planned maintenance outages, and planned deratings. Figure 10 shows the estimated supply curve for a representative day during the time period studied.

Figure 10: PNM Supply Curve

Redacted

As the figure shows, the marginal cost of supply increases as more units are required to meet demand. The highest marginal cost is over \$█/MWh. We used each day's estimated marginal

⁶ We use the term marginal cost loosely in this context. The value we calculate is actually the *marginal running cost* and does not include opportunity costs, which may include factors such as outage risks, lost sales in other markets, and other factors not reflected in the marginal running cost.

cost curve as the basis for estimating PNM's least-cost dispatch for each hour in the quarter. In general, this will not be the exact level of least-cost dispatch because we do not consider all operating constraints that may require PNM to depart from what our method identifies as the most economic use of its resources.

This analysis does not model generator commitments, assuming instead that all available generators are online. While market monitoring resources could have been dedicated to refining the estimated generator commitment and dispatch to make it correspond more closely to actual operating parameters (i.e., start costs, run-time and down-time constraints, etc.), we judged the simple incremental-operating-cost approach as adequate to detect significant out-of-merit dispatch that would have a material effect on the market.

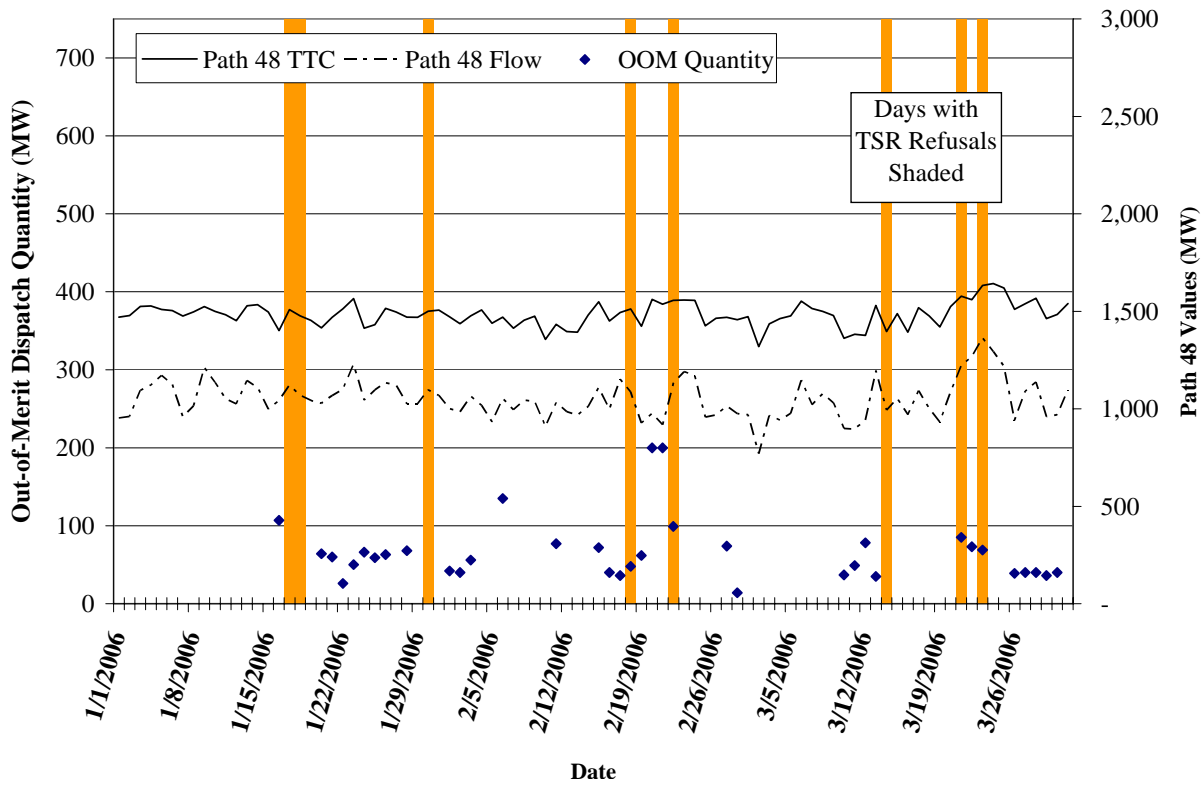
When a unit with relatively low running costs is not committed, our least-cost dispatch will overstate the out-of-merit quantities because it will identify the more expensive unit being dispatched in its place as out-of-merit. This may result in higher levels of out-of-merit dispatch during low-load periods when it is not economic to commit certain units.

We compare the actual PNM dispatch to the estimated supply curve to determine whether the actual dispatch departed significantly from the estimated least-cost dispatch.⁷ In instances when dispatch did depart from the estimated optimal dispatch, we evaluated these hours more carefully to determine whether congestion was created leading to denials of transmission service requests.

Figure 11 shows the daily maximum "out-of-merit" dispatch for each day in the study period and indicates the Path 48 TTC, Path 48 actual flow, and refused transmission service requests.

⁷ When comparing the actual dispatch to the estimated dispatch, we remove units that are identified as on planned outage based on PNM outage data.

**Figure 11: Out-of-Merit Dispatch
First Quarter 2006**



The maximum daily out-of-merit quantities were variable and average 26 MW. There is no indication that the out-of-merit-dispatch events limited access across Path 48 or anywhere else. Of the eight days with refusals of transmission service, only half occurred on days with out-of-merit-dispatch events. The relationship between Path 48 limits and flow is weak but instructive. Over the study period, out-of-merit dispatch had a positive twenty percent correlation with TTC and a negative nine percent correlation with Path 48 flow. This is because the extent to which out-of-merit generation is made up of load-side generators, the TTC is improved by the voltage support and counter flow provided by such units. In light of this pattern, we are satisfied that PNM’s dispatch patterns did not limit access to the PNM system.

C. Transmission Outages

We evaluate PNM transmission outages in order to determine whether the outages may have led to the congestion events experienced during the time period of our report. We have reviewed PNM transmission outage messages posted to the Westtrans Common OASIS web site, which indicate the date, duration, and nature of the system transmission outages. There were 51

transmission outage log entries during the time period of the report. We reviewed the log entries and did not find that they were related to the congestion events on the system.

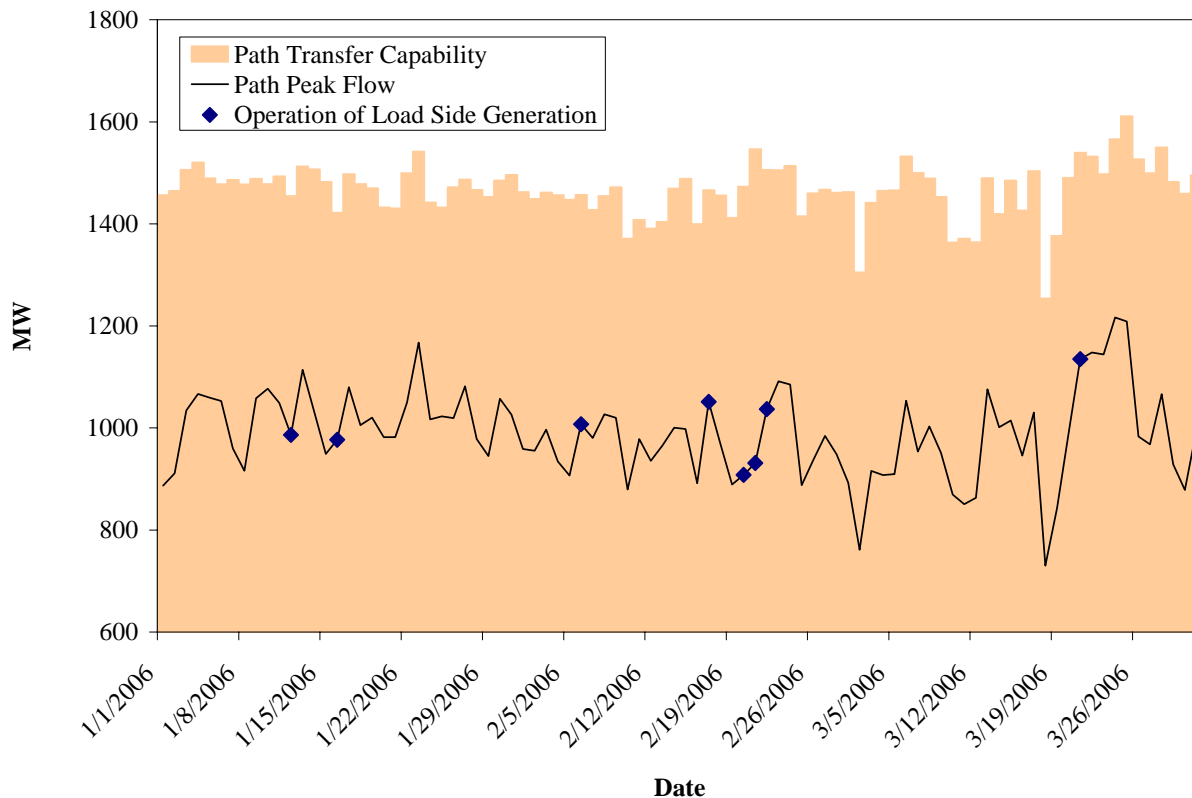
D. Analysis of Power Flows

Under the New Mexico Transmission Operating Procedures, if Path 48 flows exceed the transfer limits, PNM can issue curtailments. This can provide the opportunity for anticompetitive conduct, including initiating curtailments when they are not necessary or not initiating them when they are necessary. By selectively initiating these procedures, PNM may have the ability to benefit its own generation and influence power prices in the region.

Accordingly, we analyze PNM's power flows to determine whether curtailments are being initiated properly. In the study period, there were no curtailments. PNM can avoid curtailments by operating load side generation, which raises transfer capability, thus eliminating the need for a curtailment. PNM keeps track of when load side generation is operated for the purpose of managing transmission congestion. During the period of study, this only occurred when Delta-Person generation was operated for such purposes on January 16th from 6 pm to 8 pm. Sometimes load side generation is operated for reasons other than transmission congestion, and had it not been operating, would have been needed to avoid curtailments. We do not interpret these instances as transmission congestion.

We use hourly data on power flows over Path 48 and determine whether the operation of load-side generation coincided with periods when flows are close to the path limits. We observe the level of flows to see if flows exceeded the limit. If flows exceeded the limit, then we may conclude that load side generation should have been operated or curtailments should have been issued. Either case can give rise to potential operational concerns. Figure 12 shows the daily peak flows and transfer capability on Path 48.

Figure 12: Peak Demand, Transfer Capability, and Load-Side Generation
First Quarter 2006



The transfer capability on Path 48 is based on a dynamic “Nomogram”, which depends on over forty real-time inputs, including the operation of load-side generation. As Figure 12 shows, the flows on Path 48 never exceeded the path limit during the study period. It is evident that when load-side generation was running, it was not needed for transmission congestion purposes. This does not raise concerns regarding anticompetitive conduct because out-of-merit dispatch of load-side generation has no detrimental impact on access to transmission capability over Path 48 or into any other area that we reviewed. Moreover, the path was not overloaded, curtailments were not called, and load-side generation was not withheld when needed for transmission purposes.

In light of our analysis, we conclude that PNM has properly managed Path 48 and has not engaged in conduct that would limit transmission access to other wholesale market participants.