UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Market Based Rates for Public Utilities **Docket No. RM04-7-000**

WRITTEN STATEMENT OF JULIA FRAYER FOR THE JANUARY 27, 2005 TECHNICAL CONFERENCE

First, I would like to commend the Commission for striving to improve its regulatory framework for evaluating market power in generation, as it is undoubtedly one of the cornerstones of a well functioning deregulated electricity industry. I would also like to thank you for the opportunity to be here today. My name is Julia Frayer and I am a Managing Director at London Economics International LLC, an international energy consulting firm, where I direct many of the company's engagements involving market power analysis, strategic bidding and simulation modeling, and market design with respect to market power issues and regulation.

Given my background as an economist and consultant for energy companies, market institutions, and regulators worldwide, I would like to speak today about my experiences applying and working with the horizontal market power test required under Section 203 of the Federal Power Act[1] and the interim generation market power screens adopted by the Commission in their April 14th 2004 Order[2] for market-based rate

[1] *Inquiry Concerning the Commission's Merger Policy Under the Federal Power Act: Policy Statement*, Order No. 592, FERC Stats. and Regs. 31,044 (1996), *reh'g denied*, Order No. 592-A, 79 FERC 61,321 (1997) (*Merger Policy Statement*"); *Revised Filing Requirements Under Part 33 of the Commission's Regulations*, Order No. 642, FERC Stats. & Regs. 31,111 (2000), *order on reh'g*, Order No. 642-A, 94 FERC 61,289 (2001) (collectively Order No. 642).

[2] *See AEP Power Marketing, Inc., et al., Order on Rehearing and Modifying Interim Generation Market Power Analysis and Mitigation policy*, 107 FERC ¶ 61,018 (April 14, 2004) (April 14, 2004 Order), *order on rehearing*, 108 FERC ¶ 61,026 (July 8, 2004) (July 8, 2004 Order).

authorizations. I would also like to speak about possible avenues for further refinement of these market power tests, given best practices from energy sectors abroad and the experiences of other industries.

Before I begin, however, I would like to note that the opinions I express here today are based on my own personal views and are not necessarily reflective of the corporate policies at London Economics or the views of our clients.

I strongly believe that the successful evolution of U.S. power markets requires a stable, well-accepted, and adaptable platform for market power monitoring – not only as a safeguard for our citizens – the consumers of electricity - but also for market participants – suppliers, generators, and marketers who need a clear set of commercially reasonable guidelines surrounding market power, which they can use to make business decisions. In order for market participants to be able to react sensibly to policies, they need to know in advance what is expected of them. Moreover, they should not be forced to cope with inconsistent policies. Inconsistency, between federal institutions or between federal and state regulators, will deter industry evolution and hamper investment.

I think this brings us to an initial, fundamental question: What is market power? The U.S. Department of Justice and Federal Trade Commission Horizontal Merger Guidelines describe market power as *"the ability to profitably maintain prices above competitive levels for a significant period of time".*[3]

As a practitioner of conducting market power analyses, I find that this definition presents two very important elements for market power policy. First, I note that the ability to exercise market power is expressed in terms of price. I will come back to this

[3] U.S. Department of Justice and Federal Trade Commission, Horizontal Merger Guidelines § 0.1 (April 2, 1992) (Horizontal Merger Guidelines).

shortly. The second element that I would like to note is the notion of "a significant period of time."

This idea of a significant period of time permeates throughout market power analysis, starting with the market definition stage. The market power tests that we apply must be based on a robust definition of the market. That definition has four key dimensions – function, geography, product, and time. I understand that the question of market definition - and specifically the geographical dimension - will be covered in this afternoon's panel, so in keeping with the focus of this session, I will limit my comments on market definition. Many of my personal views on this topic can be found in a recent article I co-wrote for the November 2004 issue of the *Electricity Journal*. However, I would be remiss not to address quickly the product dimension, as that is relevant to item (e) on the agenda for this panel.

Item (e) asks: "Should the generation market power screens be extended to cover capacity and generation based ancillary services, such as reserves and regulation?" I would like to suggest the following hypothesis: all these services – energy, capacity, ancillary services – are in fact part of a single market for wholesale electricity. Based on direct observations from markets, there is substantial evidence that such markets are treated as substitutes by suppliers[4], and to some degree as substitutes on the demand

[4] Wholesale electricity comprises a bundle of different services and instruments, which together are necessary to ensure that wholesale power can be both generated and delivered to customers. Generators can often choose to sell their products and services through several different trading instruments including, for example, the bilateral contract market (which can have long-term and short-term contracts), and the exchange-based spot market (to which a generator may offer day ahead and/or real time, depending on the market design). They will arbitrage opportunities across these different trading platforms, depending on relative opportunities in each. In addition, they can arbitrage opportunities across different classes of services: for example, suppliers that are generating to provide energy or power could divert capacity from energy production to operating reserve provision, and vice versa, depending on market opportunities.

side.[5] The hypothesis can and should be further tested using a range of well-accepted, rigorous techniques for market definition. If the hypothesis is proved on the basis of such analysis, then the market power test – by definition - will encompass market power across all these services. In other words, separate market power tests for different segments of a single, unified market are not warranted.

In certain definitions of market power, significant period of time is replaced with the word, "non-transitory." Economists have long held that instances of high prices as a result of temporary market power-like conditions are not harmful and may even be beneficial for the development of an industry; for example, transitory market power has long been associated with research and development and the rewarding of innovation (i.e., granting of patents). The ability to raise price above competitive levels for a short period of time is not something which we should seek to regulate. In fact, we should try to preserve such abilities. In the context of power markets, transitory price increases can represent scarcity rents. Scarcity rents are above marginal cost profits that generators garner during periods of tight supply-demand. They are legitimate because they signal the need for new investment and demand response, and allow existing generators to recoup fixed costs that they would not be able to fully capture under competitive pricing. They are transitory because they dissipate as soon as conditions leading to the shortage are removed or reduced.

Scarcity rents are a direct contrast to more long-lived and persisting price increases that are a hallmark of real, durable market power. However, the current set of

[5] ISOs, as buyers of ancillary services, may arbitrage between different classes of ancillary services (i.e., spinning and non-spinning reserves) subject to meeting their overall reliability requirements, and in some markets, system operators are permitted to arbitrage and substitute between purchases of energy and certain classes of operating reserves.

market power tests do not differentiate between scarcity rents and market power. In fact, we can imagine a set of conditions where scarcity may be misinterpreted for market power in the interim screens for market power. As an example, let us look at the pivotal supplier test. Let us assume a simplified hypothetical situation where historical peak demand is only slightly below total supply in a defined market. Even if that market is composed of numerous relatively small suppliers, all those suppliers with capacity greater than the difference between total supply and peak demand will be deemed to be pivotal. This is a classic example of a Type I error in economics – those who do not have market power, nevertheless fail the test. Regulating scarcity rents out of this market would be disastrous for investment and the long-term sustainability of this industry.

How should we cope with this shortcoming? I suggest three possible avenues. First, and this is by far the simplest, we can add context to the pivotal supplier test by also describing the market conditions around the test – does the supply-demand balance suggest scarcity conditions? At least that could provide indication of possible errors in the conclusions. An alternative – and a preferred approach in my opinion – is to consider the pivotal supplier test over a multi-year dimension – with expected changes in supply and demand. There is an abundance of data on expected demand conditions over the next few years as well as supply changes; thus, data for such an exercise would not be lacking – even for markets without RTOs or ISOs. There will be some subjectivity in the analysis, but that subjectivity can be weighed and evaluated analytically: for example, the extent of new supply that an applicant proposes to use in his analysis can be reviewed critically against published announcements on project status (e.g., siting certification, receipt of environmental permits, state of interconnection agreement, and start of construction). Moreover, a multi-year analysis corresponds to the basic forward-looking

premise of a market-based rate authorization and the three-year period for review. A third approach – and one that I will discuss further in a little bit – is to consider alternative diagnostic measures for market power which may be better suited to distinguishing between transitory price increases from market power.

Now that we have discussed the time aspect of the classic definition of market power, I would like to return to the price aspect. In my opinion, it is important that a test for market power consider price consequences, since market power is an economic activity played out through prices.

Neither of the interim generation market power screens used to evaluate market-based rate applications incorporates price or pricing behavior. What improvements can be made? Well, one possible modification is to re-cast the pivotal supplier test as a residual demand analysis, which is based on an evaluation of the demand that a target firm faces for its services in a given market after accounting for the position of its competitors. A residual demand analysis evaluates the necessity of a supplier's capacity to serve load, but also has the added benefit of relating a supplier's bidding decisions to market-clearing prices. The residual demand analysis can be done along a number of demand points in the system and thus it can be used to evaluate various system conditions. Proper formulation of a residual demand analysis requires some use of simulation models (or, at the minimum, results from such simulation models) in order to resolve the impact that a supplier's offer will have on prices in transmission constrained networks. Nevertheless, there is sufficient data in the public domain to complete such an analysis.

Section 203 of the Federal Power Act relies on a different market power test - the Delivered Price Test, which is addressed in item (c) on the agenda. The Delivered Price

Test and more generally the HHI metric are well-accepted tests for market power and they have served the Commission well in the absence of more complicated models of market behavior and diagnostics for market power. For example, the Delivered Price Test explicitly uses price thresholds to define the segments of the market which are then analyzed using market concentration ratios. Nevertheless, I think this test could benefit from some refinement, especially in how it brings in the price aspect of market power.

Currently, the Delivered Price Test measures the market concentration of available capacity at or below a specific threshold price. In doing so, the test measures the concentration of infra-marginal capacity vis-à-vis the selected price threshold. All of today's centralized power markets in the U.S. operate on the basis of a single market-clearing price based on the most expensive bid necessary to clear the market. As an example, let us assume we are studying market power during off-peak hours – assuming that off-peak has been defined to be a relevant, distinct product market - and we have selected a price threshold of $30 a megawatt-hour. Then the Delivered Price Test will estimate the HHI for all capacity whose marginal costs are less than or equal to 105% of $30 per megawatt-hour in the defined geographical market. Though this result is instructive in describing the concentration of the generation dispatched to meet load at this selected price level, it does not shed any light on the competition for the next increment of demand. In other words, it does not really describe the market concentration of the capacity that would be 'price-setting.'

The Delivered Price Test could easily be modified or a secondary test created that would look at the market concentration of the capacity competing to serve the next MW of demand.

I would also like to offer a number of other options for further improving the horizontal market power test used by FERC. For example, I have already mentioned the residual demand analysis and the use of simulation models. The residual demand analysis has precedent in anti-trust case law and has strong theoretical underpinnings. Simulation models are also commonly used in the energy industry for a variety of other purposes, and in fact, have supported various expert testimonies in front of regulators and in litigation. Given the level of data currently collected from market participants on demand, transmission network topology, supply and cost characteristics, simulation modeling can realistically be applied to both ISO and non-ISO market areas. In my experiences, the difference arises really in model validation (since non-ISO markets lack price information which is a useful benchmark for model accuracy) rather than in the actual performance of the tests. However, other sources of data, such as generation patterns and transmission flow patterns could be used to validate the models in non-ISO areas.

Another possible avenue for market power analysis would involve an adaptation of the well-known hypothetical monopolist or "SSNIP" test. The SSNIP test has traditionally been used to evaluate the boundaries of a market by answering the following question: what is the smallest market area that a hypothetical monopolist can be expected to profitably monopolize? In other words, over what area can a hypothetical monopolist sustain a **s**mall but **s**ignificant **n**on-transitory **i**ncrease in **p**rice. Using the concepts of the SSNIP test, we can analyze whether an actual supplier can sustain increased prices over a significant period of time. In other words, if the supplier in question does not increase his profits with higher bids over the relevant geographic, product, and time dimension in a

market, we can conclude that there are no market power concerns for that supplier in the tested market.

Indeed, in the last few years we have witnessed substantial research and development of game theoretic and empirical models for analyzing market power and its possible impact on prices. Research and development has definitely come far – we now have models that can produce meaningful results representative of the complexity of actual power systems, and replicate patterns of behavior and prices actually observed in markets. In my experiences, some of these models can credibly predict the potential for market power because they more fully reflect both the supply and demand side of the market. One of HHI's well-know weaknesses is that it does not reflect the demand-side of the market. Since scarcity is a function of supply and demand, simulation models can be structured to explicitly consider scarcity, while HHIs lack that level of detail. In addition, some of these models can present a much more precise picture of the supply side than a market concentration analysis or a pivotal supplier test.

Given the diversity in costs, technical characteristics, and commercial arrangements among suppliers and even for a single supplier across his portfolio of assets, it may be difficult to assess the potential for market power purely based on size. Indeed, we may have a market where there is a dominant supplier whose only capacity is inflexible baseload generation which is so low in the merit order that it is never price setting. In contrast, we could have another supplier, who may be relatively small vis-à-vis the dominant player, but well situated on the supply curve to take advantage of pricing strategies. Simulation models with game theoretic components are more likely to acknowledge this possibility than the current tests employed by FERC.

In my opinion, there are a number of well-accepted and quantitatively rigorous approaches that can be brought to bear on the issue of market power in the generation sector, both from the perspective of market definition and market power diagnosis.

Rather than prescribing default market definitions, the Commission could recommend a set of guidelines and prescribe analytical techniques for establishing a relevant market definition. Such an approach would be adaptable across time as market rules change and the industry evolves. More importantly, it would transcend the key issue of non-ISO versus ISO territories.

On market power testing, FERC needs to address some of the well-documented shortcomings of the current tests in light of scarcity and pricing behavior. Even if the interim screens and methodologies for market power analysis are refined and then retained, I believe that FERC should allow applicants to present the results from simulation models and other market power diagnostic measures for review and validation as a supplement to the set of tests required by the Commission.

Along the way, we must also keep in mind that some mistakes are inevitable. If we need to err, we should err on the side of markets - over-intervention may be even more dangerous than under-intervention in the long run.

Thank you for inviting me to participate in today's conference. I welcome your questions and look forward to the discussion.

Respectfully submitted on this 27th day of January 2005.