

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

PJM Up-To Congestion Transactions

)

Docket No. IN10-5-000

*WRITTEN SUBMISSION TO COMMISSION INVESTIGATION STAFF
ON BEHALF OF DR. HOULIAN CHEN*

The Division of Investigations Staff, and ultimately the Commission, soon will face a fork in the road. Taking one course, the Commission could (1) decide that our client, Dr. Houlian Chen and his funds (HEEP Fund and CU Fund), did *not* engage in market manipulation, (2) issue a public report explaining that decision, and (3) terminate the investigation. Taking the other course, the Commission could (a) tentatively decide that our client *did* engage in market manipulation, (b) seek to negotiate a settlement and, failing that, (c) issue a show cause order explaining the Commission's basis for prosecuting the case and directing a response.

We advocate the first course. In support, we offer this submission and an accompanying affidavit from Professor Craig Pirrong, probably the world's leading economist specializing in the analysis of alleged commodity market manipulation. A public report agreeing with our position will fit comfortably within the governing legal and economic principles, and logically flow from prior decisions not to prosecute similarly flawed cases. Such a report will enhance regulatory certainty and help the regulated community comply with the Commission's critical prohibition against market manipulation.

In contrast, the second course—a decision to proceed with market manipulation allegations—is, we respectfully submit, unfounded and unlikely to result in a position that can be rationally articulated in a show cause order or survive *de novo* review in federal district court. Such an unwarranted decision would conflict with prior public enforcement determinations, create regulatory confusion, and—most importantly—be wrong on the merits.

INTRODUCTION

One core question that will drive the Commission's choice here involves the propriety of a trader engaging in up-to congestion transactions with the intent of collecting transmission loss credits. As we explain below, Dr. Chen's trades had a legitimate business purpose *beyond* collecting transmission loss credits. For simplicity's sake, however, let us set that aside. Even if we assume *arguendo* that collecting transmission loss credits was the sole objective of Dr. Chen's trading, there would be *nothing wrong* with that course of conduct. Trading to collect transmission loss credits, under the then-existing regulatory regime, was a legitimate business objective. It follows inescapably that there is nothing wrong with Dr. Chen designing trades where this was one, but not the only, objective.

The main reason is that it is rational—and certainly not market manipulation—for a trader to view transmission loss credits as part of the price signal guiding whether and how to transact. After all, no one ever would contend that transmission *charges* are *not* part of the price signal guiding traders. The Commission would never expect a trader to intentionally and repeatedly buy power for \$40/MWh, then sell it for \$45/MWh, while paying \$10/MWh in transmission charges. In fact, because these trades would lose money on a net basis, the Commission might well be concerned about whether they were part of a downward price manipulation strategy. It would, in a nutshell, be absurd to argue that the trader must disregard transmission charges in deciding whether to transact. Transmission charges necessarily and unambiguously form part of the overall price signal.

The same is true about transmission loss credits. They are directionally different from transmission charges: one adds to revenue, while the other subtracts from it. But both affect the ultimate price signal in equivalent ways. Professor Pirrong explains this point at length in his

affidavit, grounding his opinion in decades of examples spanning a wide range of commodities markets **CITE AFF.**¹

The Commission, in fact, recognized the incentive properties of transmission loss credits when it first addressed their allocation within PJM. The credits themselves arise because the Commission has specified that transmission customers should pay transmission rates that charge for losses on a marginal, not average, basis. These marginal loss charges send a more efficient price signal for supply to locate closer to load, but they also create an over-recovery of costs system-wide. When deciding how to allocate this surplus, the Commission avoided allocating the credits to transmission customers in a way that would offset the marginal price signal created by paying marginal loss charges.² And when the Commission decided to allocate transmission loss credits to financial traders engaging in up-to congestion transactions, it did so, in part, because that outcome would *not* undercut the price signal sent by paying marginal loss charges.³ This reasoning necessarily recognizes the obvious fact that *receiving* transmission loss *credits*

¹ A credit in the power-market context might, or might not, be part of the RTO settlement system. One non-RTO example is “Renewable Electric Certificates,” or “RECs,” which can be made available to renewable generation under certain state programs to incentivize renewable energy. These payments necessarily supplement revenues available in wholesale power markets, and they do so for the *precise purpose* of affecting commercial decisions. Depending on the circumstances, a renewable generator can sell energy and earn two payment streams: LMP and a per-MWh payment from selling RECs. In that circumstance, the profitability of the transaction can be determined by totaling the two payment streams and comparing them to production costs. The undersigned actually was consulted several years ago about just such a case. LMPs were higher in New York than in New England, so one would not expect anyone to sell power from New York to New England. But REC revenue could be earned by engaging in such a transaction, and that revenue was enough to make the transaction profitable on an overall basis. Given the sensitivity at the time about alleged selling below cost (in the wake of the *Energy Transfer Partners* case), the client ran the scenario by the Division of Investigations Staff. Staff’s answer, quite correctly, was that it was fine to engage in such transactions.

² See *Black Oak Energy, LLC v. PJM Interconnection, L.L.C.*, 128 FERC ¶ 61,262 at P 31 (2009).

³ See *Black Oak Energy, L.L.C. v. PJM Interconnection, L.L.C.*, 131 FERC ¶ 61,024 at P 33 (2010).

will affect commercial decision-making, just like *paying* transmission loss *charges*. They each are the flip side of the same coin.

As long as the size of these credits is small, the effect on the overall price signal also is small, and any resulting changes in commercial decisions probably will be minor. But as we now know, that was not the case here. Here the size of the credits sometimes was very large—large enough not only to *equal* but to *substantially exceed* the total transmission and administrative charges that PJM levied on up-to congestion trades. We strongly suspect that the Commission never envisioned this counterintuitive outcome. It makes no sense, from a policy perspective, to pay people, on a net basis, to take transmission service from PJM, rather than have people pay PJM for that service. But that is exactly what happened here.

Viewed from this perspective, it was inevitable that transmission loss credits would change incentives, and thus change decisions made by market participants. As noted below, Dr. Chen did not seek out the transmission loss credits; when he first received them he was not sure what they were. But over time, he reacted to them just like other components of the price signals sent by the market. Dr. Chen thus did seek to make money from transmission loss credits. But that is precisely the type of trader conduct the Commission found to be entirely legitimate in the *Lake Erie Loop Flow* investigation.⁴

Recalling our prior discussions, it is as if cab drivers in Washington D.C. started giving rebates, in varying amounts, to each of their customers. If the rebate for a \$5 ride typically fluctuated between \$1 and \$3, people would take cabs more and use the Metro less. If customers sometimes got back \$10 when they took a cab ride costing \$5, they would take cabs even more.

⁴ See *New York Indep. Sys. Operator, Inc.*, 128 FERC ¶ 61,049 (2009) (“*Lake Erie Loop Flow*”), *order granting clarification*, 128 FERC ¶ 61,239, *order on compliance*, 132 FERC ¶ 61,031 (2010).

And if some customers began seeing ways to forecast, albeit imperfectly, when the rebates would be greater than the fares—such as when temperatures were high—they would take cabs in all sorts of situations, even going in a circle. Other customers might not materially change their cab-riding practices in any outwardly discernable way, but they still obviously would take this new rebate scheme into account when deciding whether and when to take a cab. The rebates would become integral to the economics of taking cabs.

Stepping back from it, such a system would make no sense. But one could scarcely blame the customers taking the cabs. The answer, instead, as Professor Pirrong explains, Affidavit of Dr. Craig Pirrong at ¶ 45 (Dec. 8, 2010) (“Pirrong Aff.”), attached hereto as Appendix A, is to change the system itself. We are, as the Office of Enforcement perceptively put things in the *Blumenthal* case, dealing with “the unintended consequences of an imperfect market design.”⁵ Now that these unintended consequences have surfaced, the market design should be changed. And that is exactly what the Commission has done here. It already has approved changes to PJM’s tariff, so that virtual up-to congestion transactions neither (1) pay for transmission service nor (2) receive transmission loss credits. *PJM Interconnection, L.L.C.*, 132 FERC ¶ 61,244 at PP 44-45 (2010). For its part, PJM is revisiting the transmission loss credit scheme to reduce the overall level of over-collections. *See id.* at P 49; *PJM Interconnection, L.L.C.*, Tariff Filing, Docket No. ER10-2280-000 at 13 (Aug. 18, 2010) (“August 18, 2010 Tariff Filing”). And that, we submit, should be the end of the matter.

Any contrary conclusion would require traders to look behind each component of the overall price signal to determine whether policy considerations somehow might counsel in favor

⁵ *Blumenthal v. ISO New England Inc.*, Docket Nos. EL09-47-000 and EL09-48-000, Initial Post-Hearing Brief of Enforcement Staff at 1 (June 17, 2010) (“*Blumenthal*, Staff Initial Brief”).

of *excluding* that particular component from the analysis of whether and how to transact. As Professor Pirrong explains, that would be an unwise and inefficient regulatory approach, fraught with baroque compliance and enforcement complications. Pirrong Aff. at ¶ 45. But if the Commission nevertheless were to adopt such a counterintuitive rule, certainly it would need to do so *expressly* and *in advance*.

That never happened here. No express tariff provision, PJM pronouncement, or Commission order ever alerted Dr. Chen that it was unlawful to trade with the intent of profiting from transmission loss credits. To the contrary, the relevant tariff language provided for transmission loss credits to be paid to anyone who incurred transmission charges. There was no indication whatsoever that traders were forbidden from developing trading strategies seeking to collect these credits. And in the absence of any such express rule, the obvious default position for a trader is that payments, of whatever type, *can* and *should* be considered as part of the profit motive for engaging in transactions. Reflecting this, the underlying Commission orders are, as explained above, based on the plainly correct assumption that the payment of loss credits *will* affect commercial decision-making.

This means that, just as in *Blumenthal*—a case we discuss in detail below—any allegation of market manipulation against Dr. Chen necessarily requires us to assume the existence of some sort of unwritten rule against trading to profit from transmission loss credits. And as both the Presiding Judge and Enforcement did in *Blumenthal*, here we should categorically reject any effort to claim violations of “unwritten” rules. The tariff language on allocation of transmission loss credits is express. Nothing in that language—or anywhere else—prohibited traders from seeking to profit from transmission loss credits. And the filed rate

doctrine precludes the Commission from imposing a contrary rule after the fact. So does the Due Process Clause of the United States Constitution, as reflected in the venerable fair notice doctrine.

We are not advocating an analytical approach where the Commission must specifically prohibit a particular course of conduct, in advance, in order for that conduct to constitute market manipulation. The rule against market manipulation obviously can be violated by a course of conduct that is not expressly anticipated and prohibited. That is why the relevant rules are written rather broadly. But as relevant here, they irreducibly require the Commission to identify fraudulent conduct in order to find market manipulation.

Here there was no fraud, and no market manipulation. Dr. Chen's trades did not violate any law, rule, or tariff. They were made openly. There was no fraud, artifice or deceit, no hidden agenda. The trades had economic substance on a stand-alone basis; they did not depend on other trading positions for their profitability. They did not create artificial pricing, either through the exercise of market power (which was non-existent here) or otherwise. None of the recognized hallmarks of a fraudulent or manipulative scheme is present.

In particular, the trades were not wash trades. Wash trades by definition make no money. They may make related positions, such as derivatives positions, profitable, but on a stand-alone basis they are a nullity—an empty act. Because they have no reason to exist on a stand-alone basis, they typically are part of some artifice to make money in some other fashion.

The particular "paired" trades at issue sometimes made money and other times lost money; they were never, however, a wash. It is true that, as things turned out during the brief time period at issue, Dr. Chen's aggregate profits came from PJM's aggregate transmission loss credits. But there still were profits. And it is *per se* wrong to contend that paired trades that are profitable on their face somehow are wash trades. Wash trades cannot make money on their own

bottom. The fact that Dr. Chen’s “paired” trades made money thus is proof positive that they are not wash trades.

To argue otherwise is to advocate a wash trade analysis that requires traders to parse the particular elements of cost and revenue involved in each specific set of transactions and to decide which ones “count” as a legitimate price signal. We are not aware of any case, in any forum, adopting this framework for defining a wash trade. As noted above, perhaps if PJM’s tariff expressly precluded traders from trading in order to earn transmission loss credits, cautioning that they somehow were not part of the “fundamentals” and could not be considered when deciding whether and how to transact, there might be a way to get past the “profitability” hurdle in any wash trade analysis. But this brings us back to the fallacy of asserting “unwritten” rules, because the tariff did not contain any such fair warning.

Even if we set the profit point aside, however, the paired trades were not wash trades because they did not offset each other. When Dr. Chen engaged in up-to congestion transactions going back and forth between two trading points, he took directionally different congestion positions that do not offset. If congestion exceeded the \$50/MWh “cap” in one direction, it mathematically could *not* exceed the cap going in the other direction. For this reason, this strategy posed a risk of loss. Not only might the transmission loss credits fail to outweigh the PJM transmission and administrative overhead charges, but one leg of a paired trade might not clear, because congestion exceeded the (typically \$50/MWh) cap.

Also for this reason, this strategy created the possibility of reward—not just through the credits, but also independent of them. As Dr. Chen explained in his deposition, and as Professor Pirrong explains in his affidavit, the paired trades essentially created an “out of the money” call option that could prove highly profitable. *See Pirrong Aff. at ¶ 31.* If, for example, the “inbound

to PJM” leg failed to clear, that would mean that day-ahead LMPs at the PJM point were more than \$50/MWh higher than day-ahead LMPs at the relevant MISO point. This would mean that moving into real time, the trade was more than \$50/MWh in the black, with the potential for high profits if the price spread were to narrow in real time (a very real prospect, as system operators bring additional resources on line and arbitragers come to the fray). While not likely, Dr. Chen had seen congestion patterns play out this way in the past. And if they were to recur when Dr. Chen had a paired trade in place, the results could be extremely profitable. Similar “out of the money” financial trades are, as Professor Pirrong explains, common in financial and commodity markets, and are entirely legitimate. *See id.* at ¶ 22.

At the end of the day, concerns about Dr. Chen’s trading rest solely on the unwarranted claim that he violated some unwritten rule against trading to earn transmission loss credits. But unwritten rules do not govern this case, and alleged violations of unwritten rules cannot constitute market manipulation. The Commission therefore should terminate this investigation.

FACTUAL BACKGROUND

In this background section, we begin with an overview of up-to congestion trading and transmission loss credits. We then move to a discussion of Dr. Chen’s trading activities.

I. UP-TO CONGESTION TRADING

In Appendix B to this submission, we provide a brief overview of up-to congestion trading. In sum, these transactions are a particular form of financial trading that involves the relative spreads between two price points, measured on a (1) day-ahead and then (2) real-time basis. The trader proposes to take a position in the day-ahead market at two price points, one in MISO and one in PJM. There is, however, a condition to the transaction: day-ahead congestion between these two points must be less than a chosen dollar level—”up to” a maximum of

\$50/MWh. When that pricing condition holds, the trade is accepted. The value of the trade then depends on whether the spread between these same two price points widens or narrows in the real-time market. For an up-to congestion trade moving from MISO to PJM, or vice-versa, the trade makes money if the spread widens as we move from the day-ahead market to the real-time market, and loses money if the spread narrows.

II. TRANSMISSION MARGINAL LINE LOSS CREDITS

Although the origins of PJM's two-settlement scheduling system, the computation of marginal transmission line losses, and the allocation of surplus line loss charges go back many years, the features of the PJM transmission line loss credits at issue here were established in 2008 and 2009.⁶ In a complaint filed against PJM on December 3, 2007, several virtual energy traders asked the Commission to find that, since they did not flow any actual power on PJM's system, they should not be required to pay for transmission marginal line losses. Alternatively, these parties argued that, if the Commission declined to relieve virtual marketers of that burden, it should find that virtual traders were entitled to a share of transmission line loss credits.⁷

The Commission originally dismissed the complaint in its entirety, but then granted rehearing in part and denied rehearing in part.⁸ The Commission affirmed its prior ruling that virtual traders (which it also referred to as "arbitrageurs") in the PJM market should be required to pay marginal line losses. It determined, however, that PJM had not satisfactorily explained why its tariff, which limited the payment of the surplus to network service users only, was just

⁶ See August 18, 2010 Tariff Filing at 2-5.

⁷ See *Black Oak Energy, LLC v. PJM Interconnection, Inc.*, Docket No. EL08-14-000 (Dec. 3, 2007). The complainants were Black Oak Energy, LLC, EPIC Merchant Energy, LP, and SESCO Enterprises, LLC.

⁸ *Black Oak Energy, LLC v. PJM Interconnection, L.L.C.*, Order Denying Complaint, 122 FERC ¶ 61,208, Order Denying Rehearing in Part and Granting Rehearing in Part, 125 FERC ¶ 61,042 (2008).

and reasonable and not unduly discriminatory, since other PJM services also support the fixed costs of the transmission grid. It directed PJM to either propose a revision to its tariff to include a credit to others who pay for the fixed costs of the transmission system, in proportion to the load represented by their transmission usage, or to show cause why its existing tariff provision was just and reasonable. *Black Oak Energy*, 125 FERC ¶ 61,042 at P 49. The Commission later clarified its order at PJM's request⁹ and PJM made its tariff filing on March 26, 2009, requesting an effective date of June 1, 2009.

On September 17, 2009, the Commission accepted PJM's compliance filing, stating in part:

PJM proposes to establish the just and reasonable replacement rate by allocating the marginal line loss surplus to Network Service Users and Transmission Customers (including virtual traders). Each user or customer would receive its proportionate share of the surplus based on the total MWhs of energy (a) delivered to load in PJM, (b) exported from PJM, or (c) related to cleared Up-To Congestion transactions (where the user or customer paid for transmission service). *The Commission finds that PJM's proposal is a just and reasonable method of allocating the surplus*, subject to the condition that PJM clarify that its tariff complies with our finding that payments be made only to those who pay for the costs of the transmission grid.

Black Oak Energy, LLC v. PJM Interconnection, L.L.C., 128 FERC ¶ 61,262 at P 23 (2009) (emphasis added).¹⁰ As filed, Section 5.5 of PJM's tariff stated:

The total Transmission Loss Charges accumulated by the Office of Interconnection in any hour shall be distributed pro-rata to each Network Service User and Transmission Customer in proportion to its ratio shares of the total

⁹ *Black Oak Energy, LLC v. PJM Interconnection, L.L.C.*, Order On Request For Clarification, 126 FERC ¶ 61,164 (2009).

¹⁰ The Commission reasoned in part that the transmission access charges related to up-to-congestion transactions paid by arbitrageurs or virtual traders "contribute to the fixed costs of the transmission system, and . . . should be included in the allocation process for disbursement of any surplus resulting from the over-collection of transmission line loss charges." *Black Oak Energy*, 128 FERC ¶ 61,262 at P 26.

MWhs of energy delivered to load (net of operating Behind The Meter Generation, but not to be less than zero) in the PJM Region, or the total exports of MWh of energy from the PJM Region . . . , or the total MWh of cleared Up-To Congestion transactions (that paid for transmission service during such hour).

PJM Open Access Transmission Tariff § 5.5 (Third Revised Sheet No. 399C).

In approving section 5.5, the Commission required that the PJM tariff make clear that (1) arbitrageurs or virtual traders that only pay for ancillary services that do not support the fixed costs of the entire transmission system would not be eligible to receive a share of the marginal line loss surplus, and (2) credits to exporters were dependent on them paying for transmission service for a time period that includes the hour, as is required for up-to congestion charges. *Black Oak Energy*, 128 FERC ¶ 61,262 at PP 26-27. PJM made these tariff revisions and the Commission accepted that filing and denied rehearing of its September 17, 2009 order. *Black Oak Energy, LLC v. PJM Interconnection, L.L.C.*, 131 FERC ¶ 61,024 (2010).

III. THE TRADING AT ISSUE

A. Dr. Chen's Background

Dr. Alan Chen was born and educated in China, receiving his doctorate degree in power engineering from Tsinghua University in Beijing in 1995. He came to the United States on a student visa later that year and has resided in the United States ever since. His current immigration status is as a permanent resident alien, but he is in the process of obtaining United States citizenship. Dr. Chen and his wife currently live in The Woodlands, Texas.

From 1997 to 2007, Dr. Chen was employed by various firms as a power analyst. He generally was responsible for creating and using models to forecast power prices, mainly in the Eastern Interconnection.¹¹

B. Dr. Chen's PJM Trading

In August 2007, Dr. Chen established Heep Fund, Inc. as a Texas corporation and applied for and received PJM membership. He invested about \$200,000 of his own money in Heep Fund, which started trading mainly up-to congestion trades in September 2007. He was and remains the sole owner and sole employee of Heep Fund.

In the spring of 2008, Dr. Chen entered into an advisory agreement with TFS Capital, LLC. Under the terms of this agreement, he traded for Heep Fund and for TFS (later through a separate TFS fund known as Huntrise). The megawatt volumes of trades that he put on for TFS/Huntrise were determined by the volume of his own trading for Heep Fund and by ratios that varied over time. For example, if Dr. Chen reserved 1 MW of transmission for Heep Fund, he might reserve (depending on the instructions he received from TFS) 4 MW of transmission for TFS/Huntrise (a 1 to 4 ratio). The TFS/Huntrise transactions were put on the same transmission paths Dr. Chen was using for Heep Fund.

From the time he started trading for Heep Fund in September 2007, Dr. Chen's up-to congestion trades took various forms, although, per PJM's requirements, the trades had to

¹¹ Dr. Chen worked for Entergy Corporation in The Woodlands, Texas from June 1997 to November 1999 as a power resource planner. He worked for Power Costs, Inc. from December 1999 to March 2000 to expand the computer model for power pricing that he had used at Entergy. He returned to Houston in April 2000 to work at Enron NetWorks, LLC, working on Enron's energy management system. When UBS Energy acquired certain Enron trading operations, he went to work for UBS in Stamford, Connecticut, where he was involved in developing power trading and marketing strategies. He left this position in November 2005 and returned to Houston to work for Merrill Lynch Commodities, Inc., where he was responsible for developing power price forecast models. He left Merrill Lynch in August 2007.

include an interface. In some instances, he would reserve transmission from a point inside of PJM to an interface with the NYISO, MISO, or SOUTHEXP (or vice-versa from an interface with NYISO, MISO, or SOUTHIMP to PJM). These were stand-alone trades. In such cases, Dr. Chen was hoping he could make more money in real-time spreads than he paid for day-ahead spreads (to reserve transmission in the day-ahead market). In other instances, he would reserve transmission from an interface, such as MISO, to Point A in PJM and then reserve transmission from Point B in PJM back to the MISO interface. Here Point A fell into the pocket of nodes where the real-time price tends to be higher than the day-ahead price, whereas Point B fell into the pocket of nodes where the real-time price tends to be lower than the day-ahead price. Dr. Chen was hoping that the combination of day-ahead and real-time spreads would allow him to make money on both legs.¹²

In October 2009, Dr. Chen began to receive transmission loss credits for his allocated share of marginal line losses, and later was credited for refunds for certain past periods—all precisely as the Commission intended and required, and in conformance with the PJM tariff. The pattern of Dr. Chen's trading (types of trades and buses) did not change in any material way at that time. In fact, Dr. Chen's trading volumes in both November and December 2009 were about equal to the average volumes he traded during January through October 2009. Dr. Chen increased the megawatt volume of his trades in February 2010, after he had seen the transmission loss credits amounts he received for October through December 2009, and had received certain

¹² For example, for the February 27, 2010 flow day, Heep Fund reserved a total of 600 MW of transmission from MISO to COOK in PJM and the same volume of transmission from ROCKPORT in PJM to MISO. Over the entire day of February 27, 2010, Dr. Chen estimated that he made \$305.34 on the MISO to COOK leg and \$251.41 on the ROCKPORT to MISO leg, excluding PJM's charges and refunds. For the entire month of February 2010, Heep Fund's total up-to congestion trades (all trades, all days, and all hours) made a net profit of \$62,869.22, including Heep Fund's allocated share of transmission loss credits.

refunds going back to December 2007, and felt he could better gauge the possible amounts of transmission loss credits.

In the spring of 2010, TFS established a new fund called the Powhatan Energy Fund LLC. In May 2010, Heep Fund and Powhatan Fund entered into a new agreement which, among other things, established a 1 to 20 trading ratio, meaning that for each MWh of up-to congestion transmission Dr. Chen reserved for Heep Fund, he would reserve 20 MWh for Powhatan. Dr. Chen started trading for Powhatan on May 28, 2010 (for May 29, 2010). As he testified in his deposition, Dr. Chen's trades for May 29 and May 30, 2010, lost a substantial amount of money. According to PJM's records, Dr. Chen lost \$19,153 for Heep Fund and \$383,057 for Powhatan on those two trading days combined. These amounts include transmission loss credits.

In reviewing his trades after this experience, Dr. Chen saw that wide spreads between certain points in the day ahead market caused him to pay sufficiently high congestion charges in certain hours that wiped out all profits from other hours and from other points, resulting in net losses. Such wide spreads were not new, but he felt he should find ways of reducing that risk going forward. He decided that, while he would continue to trade as he had in the past, using stand-alone trades and trades involving separate points within PJM, he would supplement those trades by putting on what he called paired trades. For example, he might reserve 20 MW per hour of transmission going from a MISO interface to Dayton (the PJM import leg) and then reserve 20 MW per hour of transmission going from Dayton to MISO (the PJM export leg). We understand that it is these paired trades, which Dr. Chen used from June 1, 2010 through August 3, 2010, that are at issue here.

In fact, not all such trades involved equal MWh volumes. This volume difference exposed Dr. Chen to the possible risk of loss and the possible benefit of profit. In addition, these

trades were not risk free because one leg, typically the PJM import leg, might get rejected (the MISO to Greenland Gap Day Ahead leg for May 30, 2010 was close to being rejected for hours 1400, 1500, and 2000), in which case Dr. Chen bore the risk of losing money in the real-time market, but also had the potential of making money.¹³ See Pirrong Aff. at ¶¶ 28, 29, 49. Either way, the potential profits or losses could far exceed the amounts of transmission loss credits. The charges that Dr. Chen paid to PJM also varied. For each MW of transmission cleared on the PJM import leg, Dr. Chen would pay PJM \$0.67, as well as additional charges (such as reactive supply and voltage control, and scheduling, system control and dispatch service) that approximated \$0.25 per MW in the aggregate. PJM did not charge for transmission on the PJM export leg, but it did impose the additional charges of some \$0.25 per MW. If the PJM import leg were accepted, Heep Fund and Powhatan Fund would be entitled to a share of transmission loss credits. The amount of the credits could be estimated but was not known in advance; it ultimately might be less than, or greater than, the transmission and administrative charges.¹⁴

In June 2010, Dr. Chen established a second fund called the CU Fund. As he explained in his deposition, he had noticed in PJM's State of the Market Report for 2009, which was published in March 2010, that the Independent Market Monitor (IMM) had proposed limits on

¹³ According to Dr. Chen's records, Heep Fund had legs rejected for various hours at least on January 22 and July 13, 2008, January 1, 2009, and January 5 and March 24, 2010. Heep Fund also had legs rejected during the June - August 2010 period: on June 24, 2010, and on July 6-8, July 12, and July 16, 2010.

¹⁴ To take a hypothetical example, if the Day Ahead price spread from MISO to Dayton exceeded \$50 per MW, that leg would be rejected. At the same time, given the math, he would stand to make \$50 per MW on the leg from Dayton to MISO. Whether he made a profit or loss, however, depended on the Real Time price spread between Dayton and MISO. If the Real Time spread was -\$20 per MW, Dr. Chen would make \$30 per MW—an amount much more than possible transmission loss credits. But if the Real Time spread was \$60 per MW, he would lose \$10 per MW—again an amount much more than such credits. (This hypothetical does not take into account the PJM charges associated with the MISO to Dayton leg and the Dayton to MISO leg.)

up-to congestion trading in the form of imposing operating reserve charges and eliminating all internal PJM buses for use in up-to congestion trading.¹⁵ Dr. Chen expected to use the CU Fund to engage in other types of trading, possibly including firm transmission rights (FTRs).¹⁶ Dr. Chen first put on trades for the CU Fund on July 16, 2010 for July 17, 2010.

At that time, Dr. Chen was making money on his up-to congestion trades for Heep Fund, and PJM had not yet acted on the IMM's recommendation to substantially change the terms applicable to such trades. Dr. Chen thus began engaging in up-to congestion trades for CU Fund. Upon receiving a telephone call from Dr. Bowring on August 2, 2010, he decided to cease trading for the CU Fund.¹⁷ He also ceased all paired up-to congestion trades.

ANALYSIS

DR. CHEN DID NOT ENGAGE IN ANY FORM OF MARKET MANIPULATION

Neither Dr. Chen nor either of his funds engaged in any behavior that would constitute market manipulation. *First*, Dr. Chen did not employ a fraudulent device, scheme or artifice, and did not have the requisite intent to manipulate any market or prices. To the contrary, he was merely responding to the economic incentives regarding transmission loss credits directed and approved by the Commission. *Second*, none of Dr. Chen's trades constituted wash trades

¹⁵ See Monitoring Analytics, LLC, 2009 State of the Market Report for PJM, Volume 1 at 4 (Mar. 11, 2010). Available at www.pjm.com/documents/reports/state-of-market-reports/~media/documents/reports/state-of-market/2009/2009-som-pjm-volume1.ashx.

¹⁶ The agreement between Heep Fund and Powhatan Fund expressly prohibited Heep Fund from trading FTRs. CU Fund was not a party to that agreement and hence could trade other products.

¹⁷ On August 2, 2010, Dr. Chen received a call from Dr. Bowring about his large volume, paired trades. Dr. Bowring told Dr. Chen that he did not have the authority to direct Dr. Chen to stop making such trades, but Dr. Bowring indicated that he would not refer the matter to FERC if Dr. Chen stopped making these trades. Dr. Chen told Dr. Bowring that he had already put in his trades for August 3 and that he would not engage in such trades in the future. Thus, starting with the August 4 flow day, Dr. Chen ceased putting on paired trades, ceased all trading for the CU Fund, and reduced the volumes that he reserved for Heep and Powhatan.

because they were of economic substance and had economic risk. *Third*, Dr. Chen did not violate any PJM tariff provision or rule.

A. *The Commission's Anti-Manipulation Rule*

1. *The Rule*

The Commission's anti-manipulation rules for utilities, codified at 18 C.F.R. § 1c.2(a), provide in pertinent part:

- (a) It shall be unlawful for any entity, directly or indirectly, in connection with the purchase or sale of electric energy . . . subject to the jurisdiction of the Commission,
 - (1) To use or employ any device, scheme or artifice to defraud,
 - (2) To make any untrue statement of a material fact or to omit to state a material fact necessary in order to make the statements made, in the light of the circumstances under which they were made, not misleading, or
 - (3) To engage in any act, practice, or course of business that operates or would operate as a fraud or deceit upon any entity.

In Order No. 670, the Commission set forth the elements necessary for application of section 1c.2. The Commission stated that it would act in cases where the complainant proved that an entity:

- (1) used a fraudulent device, scheme or artifice, or made a material misrepresentation or a material omission as to which there was a duty to speak under a Commission-filed tariff, Commission order, rule or regulation, or engaged in any act, practice, or course of business that operated or would operate as a fraud or deceit upon any entity;
- (2) with the requisite scienter; and

- (3) in connection with the purchase or sale of natural gas or electric energy or transportation of natural gas or transmission of electric energy subject to the jurisdiction of the Commission.¹⁸

In analyzing Part 1c.2 and the elements necessary to sustain a claim of manipulation, the Commission has analogized to SEC rule 10b-5.¹⁹

2. *A fraudulent device, scheme or artifice or material misrepresentation or material omission*

The first element of the anti-manipulation rules requires the Commission to demonstrate, by a preponderance of the evidence, that the market participant either employed a fraudulent device, scheme or artifice or made a material misrepresentation or material omission when it had a duty to disclose. The Commission considers two aspects when determining whether the participant used a fraudulent device, scheme or artifice: (i) whether the market participant was deceptive, and (ii) whether the market participant acted fraudulently or employed a fraudulent device, scheme, or artifice. *Lake Erie Loop Flow*, Docket Nos. ER08-1281-000, Enforcement Staff Report at 21 (June 10, 2009) (“*Lake Erie Loop Flow*, Staff Report”).²⁰ With regard to

¹⁸ *Prohibition of Energy Mkt. Manipulation*, Order No. 670, FERC Stats. & Regs. ¶ 31,202 at P 49, 52-53 (“Order No. 670”), *reh’g denied*, Order No. 670-A, 114 FERC ¶ 61,300 (2006).

¹⁹ *Id.* at P 32.

²⁰ The *Lake Erie Loop Flow* Staff Report was adopted by the Commission. *See Lake Erie Loop Flow*, 128 FERC ¶ 61,049 at P 1. In the *Lake Erie Loop Flow* case (“loop flow” means the difference between scheduled and actual flow on a path or interface), NYISO alleged that certain market participants were engaging in inter-control area transactions that allegedly exploited a seam in the pricing methods used by NYISO, PJM, MISO, and Ontario’s Independent Electricity System Operator. NYISO claimed that these market participants were disguising the true source or sink of the schedules at issue, and that the schedules resulted in physical flows substantially at variance from scheduled flows. It contended that the pricing seam it identified could result in market inefficiencies, and stated its belief that the scheduling transactions might violate the Commission’s rule against market manipulation. In response, the Commission directed that its Office of Enforcement (“OE”) conduct a non-public investigation into these allegations. *Id.* at P 2.

In its report, which the Commission adopted in full, OE concluded that the uplift (an additional NYISO payment to compensate entities whose revenues from locational marginal prices did not fully cover their as-bid costs) experienced by NYISO’s customers between January 1, 2008 and July 22, 2008,

(cont'd)

deception, the Commission noted in *Lake Erie Loop Flow* that a participant might engage in market manipulation by concealing an aspect of its trade. *Lake Erie Loop Flow*, Staff Report at 21. However, the Commission found that where transactions are openly placed and system operators can see accurate, identifying information regarding the transaction, a market participant cannot be found to have concealed the transaction. *See id.* at 22 (finding “there was no deception or misstatement involved” where transactions “were openly placed on the [] system and scheduled on a [NERC] tag” clearly “show[ing] the source, sink and intervening transmission.”); *Blumenthal v. ISO New England*, 132 FERC ¶ 63,017 at P 77 (2010) (citing *Lake Erie Loop Flow*).²¹ “[A]bsent deception or concealment, there is no fraud,” and thus, no manipulation. *See Blumenthal*, Staff Initial Brief at 18, 35.

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was due, in substantial part, to: (i) the lack of seams coordination among the NYISO and neighboring RTOs; (ii) the incentives created by certain proxy bus pricing changes that the NYISO put into effect in 2007; and (iii) NYISO’s methodology for incorporating loop flow in its day-ahead modeling. *See id.* at P 3; *Lake Erie Loop Flow*, Staff Report at 6-11. OE further concluded that “the circuitous schedules . . . were openly placed as an economic response to price signals and did not constitute a fraudulent device, scheme or artifice,” and that market participants are not well situated to predict or otherwise identify loop flow effects in real time. *Lake Erie Loop Flow*, 128 FERC ¶ 61,049 at P 3. The OE Report concluded “that the market participants responsible for these scheduling practices did not commit any tariff violations or violate the Commission’s anti-manipulation rule.” *Id.*

²¹ *Blumenthal* arose out of what the OE referred to as “an imperfect market design.” *Blumenthal*, Staff Initial Brief at 1. At the time, ISO-NE paid external capacity importers a premium over the prices paid by NYISO for installed capacity. These premiums made it economically attractive for NYISO suppliers to offer their fixed capacity to ISO-NE (as opposed to NYISO) at prices nearing ISO-NE’s tariff cap of \$1,000/MWh. Simultaneously, the suppliers placed export bids in NYISO at the lowest possible price. These price offerings meant that the suppliers virtually would never be called upon to provide New England with any energy and, even if they were, they would likely be unable to provide the required energy due to the fact their NYISO export bids would likely not clear NYISO’s markets. Regardless, the suppliers still received capacity payments from ISO-NE during this time for being theoretically available to provide energy to the ISO. Based on these circumstances, Connecticut alleged that the suppliers’ offers were fraudulent under section 1c.2, asserting that the suppliers had the specific intent to manipulate the market because they failed to disclose to ISO-NE that their NYISO export bids would likely not clear the NYISO market, and thus, if called upon in the ISO-NE market, they would likely be unable to meet their obligations. The OE and Judge Young disagreed. Instead, both found that the suppliers were merely rationally responding to the market conditions created by ISO-NE. *Blumenthal*, 132 FERC ¶ 63,017 at PP 111-12; *Blumenthal*, Staff Initial Brief at 35-36.

Determining whether the market participant acted fraudulently or employed a fraudulent device, scheme, or artifice is a question of fact to be determined by considering all of the circumstances. Order No. 670 at P 50. The Commission has defined fraud as “any action, transaction, or conspiracy for the purpose of impairing, obstructing or defeating a well-functioning market.”²² *Id.* In considering whether an entity has engaged in such conduct, the Commission considers whether a participant is responding to existing conditions in a market that presents pricing incentives or whether the participant is acting against his economic interests or attempting to artificially affect prices. *See Lake Erie Loop Flow*, Staff Report at 21.²³

Accordingly, market manipulation cannot be found simply on the basis of a market participant having the motive and opportunity to limit risk and maximize profit.²⁴ On the contrary, the Office of Enforcement (“OE”) recently argued—and Judge Young agreed—that a market participant does not employ a fraudulent device, scheme or artifice when it rationally responds to economic incentives and risks created by the market, even when that market may have a flawed design. *See Blumenthal*, 132 FERC ¶ 63,017 at P 111; *Blumenthal*, Staff Initial Brief at 3; *see also Lake Erie Loop Flow*, Staff Report at 20 (stating that a market participant’s

²² Fraud is “[a] knowing misrepresentation of the truth or concealment of a material fact to induce another to act to his or her detriment . . . [or] [a] misrepresentation made recklessly without belief in its truth to induce another person to act.” *Black’s Law Dictionary* 731 (9th ed. 2009).

²³ *See also DC Energy, LLC v. H.Q. Energy Services (U.S.), Inc.*, 124 FERC ¶ 61,295 at 62,658 (2008) (legitimate transactions designed to hedge risk do not constitute fraud); *SEC v. Masri*, 523 F. Supp. 2d 361, 367 (S.D.N.Y. 2007) (citing *GFL Advantage Fund, Ltd. v. Colkitt*, 272 F.3d 189, 205 (3d Cir. 2001) (When reviewing a party’s conduct, one must distinguish between legitimate trading strategies intended to anticipate and respond to prevailing market forces and trading strategies designed to manipulate prices and deceive purchasers and sellers.)).

²⁴ *See Burman v. Phoenix Worldwide Indus., Inc.*, 384 F. Supp. 2d 316, 332-33 (D.D.C.) (In a § 10(b) case, the court found that allegations of profit motive based on a defendant’s attempt to minimize risk and maximize profit are insufficient to show manipulative intent.); *In re Interbank Funding Corp. Sec. Litig.*, 329 F. Supp. 2d 84, (D.D.C. 2004) (“[C]ourts have rejected motive-and-opportunity allegations of scienter anchored merely in a defendant’s profit motive . . .”) (subsequent history omitted).

ability to pinpoint and capitalize on price incentives “simply *exposed* rather than *created* a market inefficiency”) (emphasis in original). OE thus concluded that the market participants placing the schedules at issue did not commit any tariff violations; instead these participants were openly responding to price signals, were not artificially affecting those signals, were not deliberately affecting congestion in order to raise prices, and did not commit market manipulation. *Blumenthal*, Staff Initial Brief at 34. OE aptly relied upon and quoted the Commission’s decision in the *Lake Erie Loop Flow* case, stating that “the existence of a pricing incentive is suggestive of the *lack* of a fraudulent device, scheme or artifice, and is indicative instead of market participants responding to existing prices, rather than artificially affecting them.” *Blumenthal*, Staff Initial Brief at 20 n.94 (emphasis in *Lake Erie Loop Flow*). *See also* Pirrong Aff. at ¶¶ 37-44.

In the absence (as here) of any fraudulent device, scheme or artifice, the first element of the anti-manipulation rules requires the Commission to show that the market participant made a material misrepresentation or a material omission of fact that he had the duty to disclose (an allegation that, to our knowledge, is *not* being made here). A material omission is made when the participant “omit[s] to state a material fact necessary in order to make the statements made, in the light of the circumstances under which they were made, not misleading,” and the participant has a duty to disclose. 18 C.F.R. § 1c.2. In Order No. 670, the Commission carefully specified how a duty to disclose arises in the context of an anti-manipulation claim, stating that this duty must be provided in a Commission-filed tariff, Commission order, rule or regulation. Order No. 670 at P 49. As the Commission further emphasized:

Well-settled case law interpreting Section 10(b) and Rule 10b-5 makes clear that Section 10(b) and Rule 10b-5 do not, by themselves, create an affirmative duty to disclose absent a relationship of trust and confidence (i.e., a fiduciary relationship) or some other duty imposed elsewhere in the securities laws.

Therefore, in the arm's-length, bilateral negotiations that are typical in wholesale energy markets, absent some tariff requirement or Commission directive mandating disclosure, the Final Rule imposes no new affirmative duty of disclosure.

Id. at P 35 (footnote omitted).

Under SEC Rule 10b-5, for a statement or omission to be actionable, it must be misleading. *Basic Inc. v. Levinson*, 485 U.S. 224, 239 (1988). Silence, absent a duty to disclose, is not misleading, and therefore not actionable. *Chiarella v. U.S.*, 445 U.S. 222, 228 (1980) (holding that petitioner had not violated § 10(b) where he was under no affirmative duty to disclose the information before trading).²⁵ Like the Commission, courts have found that a duty to disclose under Rule 10b-5 arises from a fiduciary relationship of trust and confidence between the parties to the transaction. *SEC v. Zandford*, 535 U.S. 813, 822 (2002); *United States v. O'Hagan*, 521 U.S. 642, 653 (1997); *Chiarella v. U.S.*, 445 U.S. at 230. Judge Young, analogizing to Rule 10b-5, similarly found that under section 1c.2, silence alone does not create a material omission; there must be a duty to disclose. *Blumenthal*, 132 FERC ¶ 63,017 at P 78.

3. *Scienter*

Even if one or both of the requirements discussed above has been met, a market manipulation complainant also must demonstrate that the participant had “scienter.” The term scienter, for purposes of the Securities Exchange Act of 1934, refers to “knowing or intentional misconduct . . . conduct designed to deceive or defraud investors by controlling or artificially

²⁵ See also *Desai v. Deutsche Bank Sec. Ltd.*, 573 F.3d 931, 939 (9th Cir. 2009) (In a suit alleging violations of § 10(b), the court found that a party cannot be held to have omitted material information unless he had a duty to disclose this information to the party supposedly harmed by the omission.); *In re Goodyear Tire & Rubber Co. Secs. Litig.*, No. 88-8633, 1993 U.S. Dist. LEXIS 5333, at *16 (E.D. Pa. April 22, 1993) (In determining liability under section 10(b), court held “[a]s a matter of law, silence is not misleading in the absence of a duty to disclose information.”).

affecting the price of securities.” Order No. 670 at P 52 & n.106 (quoting *Ernst & Ernst v. Hochfelder*, 425 U.S. 185, 197 (1976)); *see also Blumenthal*, 132 FERC ¶ 63,017 at P 108.

In *Hochfelder*, the Supreme Court specified that scienter *cannot* be established without demonstrating an “intent to deceive, manipulate, or defraud.” 425 U.S. at 193.²⁶ The Commission has observed that, like the securities laws on which it is based, the scienter requirement of section 1c.2 is “intended to proscribe knowing or intentional misconduct.”²⁷ In other words, to have specific intent to manipulate the market, the participant must design his actions to deceive or defraud the market. *Blumenthal*, 132 FERC ¶ 63,017 at P 108.²⁸ The requisite intent—for purposes of scienter—cannot merely be to increase earnings and decrease risk by responding to market incentives, for such behavior demonstrates an intent to respond as a rational economic player, not an intent to manipulate the market. *See id.* at P 111. Scienter also may be established by proving recklessness, which the Commission defines as “an extreme departure from the standards of ordinary care . . . which presents a danger . . . that is either known to the [actor] or is so obvious that the actor must have been aware of it.”²⁹

²⁶ *See also Aaron v. SEC*, 446 U.S. 680, 686 (1980) (“The term ‘scienter’ is used throughout this opinion, as it was in *Ernst & Ernst v. Hochfelder* . . . to refer to ‘a mental state embracing intent to deceive, manipulate, or defraud.’”). This principle arises from the 1934 Act itself and its legislative history. *See* H.R. Rep. No. 73-1383 at 20 (1934) (stating that under the Exchange Act, “if a person is merely trying to acquire a large block of stock for investment, or desires to dispose of a big holding, his knowledge that in doing so he will affect the market price does not make his action unlawful. His transactions become unlawful only when they are *made for the purpose* of raising or depressing the market price.”) (emphasis added).

²⁷ Order No. 670 at P 52 & nn.106-07 (quoting *Ernst & Ernst v. Hochfelder*, 425 U.S. at 197, and *Aaron v. SEC*, 446 U.S. at 690).

²⁸ In *Blumenthal*, Judge Young defined the scienter required for a market manipulation claim as “specific deceitful or fraudulent intent or recklessness.” *Blumenthal*, 132 FERC ¶ 63,017 at P 113.

²⁹ *Lake Erie Loop Flow*, Staff Report at 26 (quoting *SEC v. Steadman*, 967 F.2d 636, 641-42 (D.C. Cir. 1992) (other citations omitted)). *See also* Order No. 670 at P 53 & n.109 (describing the recklessness standard and stating that the First, Fifth, Sixth, Tenth, and Eleventh Circuits require a showing of “severely reckless,” while the Ninth Circuit requires a showing of “deliberately reckless”).

In the recent *Blumenthal* case, OE argued that a market participant's rational business decision to maximize profits and minimize risks was not evidence of an intent to manipulate the market. *Blumenthal*, Staff Initial Brief at 58. In his initial decision, Judge Young examined the scienter requirement and agreed with OE:

I accept the proposition that motive and opportunity can lend support to an inference of scienter. I also accept the suggestion that the circumstances here provided [the respondents] with a *possible* motive and opportunity to violate section 1c.2, as well as the potential to reap concrete benefits. I observe, however, that the same circumstances provided *at least an equally possible* motive and opportunity for [the respondents] simply to take rational economic advantage of the prevailing ISO-New England market surplus conditions, market design and rules, thereby reaping identical concrete benefits through legitimate means. I also observe the circumstances that [the respondents] may have “consciously” “intended” to formulate and pursue offer/bid “schemes” that satisfied their Tariff capacity obligations and earned them capacity payments while minimizing the attending economic risks simply constitute a pattern of rational economic behavior if the “scare quote” descriptors are construed in accordance with their non-pejorative meanings. In the absence of misconduct, deceit, fraud or extreme recklessness, the market manipulation defined at 18 C.F.R. § 1c.2 cannot rightfully be inferred merely from knowing or intentional behavior or from a purposeful scheme or strategy evidencing otherwise legitimate objectives.

Blumenthal, 132 FERC ¶ 63,017 at P 111 (emphasis in original; footnote omitted). Judge Young thus found that a specific intent to manipulate the market could not be found when the respondents had even the possible motive of responding rationally to market conditions and misconduct, deceit, fraud or extreme recklessness did not exist.

B. There Is No Evidence that Dr. Chen Committed Any Kind of Fraud or Had the Requisite Scienter

With these principles in mind, we submit that there is no evidence that Dr. Chen engaged in any fraudulent activity. His trades were carried out openly, and hence he did not engage in any form of fraud or deceit. *Supra* Part I.A.1; *see Blumenthal*, 132 FERC ¶ 63,017 at P 77; *Lake Erie Loop Flow*, 128 FERC at 61,256; *Blumenthal*, Staff Initial Brief at 35; *Lake Erie Loop Flow*, Staff Report at 21; Pirrong Affidavit at ¶ 35. He engaged in conduct that was expressly

permitted under PJM’s tariff, as directed and approved by this Commission. *See* August 18, 2010 Tariff Filing at 5. The fact that PJM has now changed its tariffs—with the Commission’s approval—is powerful evidence that Dr. Chen’s conduct was consistent with the tariffs in effect when Dr. Chen was involved in up-to congestion trading in PJM. All Dr. Chen did was respond to the economic incentives in effect at the time. And this conduct cannot be viewed as fraud. *See Blumenthal*, Staff Initial Brief at 3; *Lake Erie Loop Flow*, Staff Report at 20; Pirrong Affidavit at ¶ 37.

Similarly, there is no evidence that Dr. Chen had the requisite scienter to prove market manipulation. His objective was to lower his risks and increase his gains by utilizing the transmission loss credits available to him, a desire that the Commission and OE have previously found does not prove scienter. *Supra* Part I.A.2; *see Blumenthal*, 132 FERC ¶ 63,017 at P 111. There thus is no evidence Dr. Chen had any desire to deceive the market or that he engaged in reckless trading.

C. PJM’s Allegations of Market Manipulation Are Either Irrelevant, Lack Evidentiary Support, or Both

Absent evidence of fraud or scienter, there is no basis for any claim of market manipulation by Dr. Chen. We thus could end this submission here. In order to remove any possible grounds for concern, however, we will complete the analysis by rebutting PJM’s misplaced and unsupported contentions.

In an August 5, 2010 presentation to the PJM Markets and Reliability Committee, the IMM asserted that, in July 2010, so-called “wheel” transactions—which Dr. Chen never engaged in—cost PJM about \$9 million in transmission loss credits, and so-called “equal and opposite”

transactions cost PJM about \$8 million in transmission loss credits.³⁰ PJM alleged in its subsequent tariff filing that these alleged wash trades, combined with wheeling transactions, accounted for losses of almost \$19 million over an unspecified period of time. August 18, 2010 Tariff Filing at 6. Subsequently, in a presentation made to PJM's Transaction Issues Task Force on October 26, 2010, the IMM estimated that between May 15 and August 31, 2010, "wheeling transactions" at the same interface profited by about \$3.5 million in loss surplus allocations, and "equal and opposite" transactions profited by about \$2.4 million.³¹ At the same time, the IMM added a new category of so-called "but for" transactions, which it claimed profited by about \$1.9 million during the same period. We do not know if all of these varying amounts are intended to be the same and, in any event, we cannot replicate them.³²

³⁰ See Monitoring Analytics, LLC, Virtual Transactions and Marginal Loss Surplus Allocations at 5-9 (Aug. 5, 2010) ("August 5, 2010 IMM Presentation"). Available at www.pjm.com/~media/committees-groups/committees/mrc/20100805/20100805-item-11-marginal-loss-allocation-issue-monitoring-analytics-presentation.ashx.

The total figures the IMM presented in August 2010 apparently were based on a figure of \$1.85 per MWh, which the IMM said was the on-peak rate of the transmission loss credit for July 2010. (The July 2010 off-peak and average transmission loss credits rates supposedly were \$0.67 and \$1.32, respectively.) *Id.* at 4. The IMM's September 2, 2010 motion to intervene, however, stated that "[t]he loss surplus allocation has, on average during the period from July 1 through July 31, 2010, been \$1.28 per MWh (\$0.66 for the off-peak hours and \$1.59 for the on-peak hours)." See *PJM Interconnection, L.L.C.*, Docket No. ER10-2280-000, Motion to Intervene and Comments of the Independent Market Monitor For PJM at 13 (Sept. 2, 2010). No where does the IMM state the reason for these changes, which presumably would reduce the alleged costs to PJM. We are not in a position to calculate the effect of this change. We note, however, that based on PJM's and Dr. Chen's data, it appears that the average transmission loss credit was in the range of \$1.20-\$1.25 per MW during the period from June 1 through August 19, 2010.

³¹ See Monitoring Analytics, LLC, IMM Marginal Loss Allocation Methodology Recommendation at 9, 12 (Oct. 26, 2010) ("October 26, 2010 IMM Presentation"). Available at www.pjm.com/~media/committees-groups/task-forces/titf/20101026/20101026-item-02b-monitoring-analytics-presentation.ashx.

³² PJM also asserted in its August 18, 2010 Tariff Filing that "in some cases . . . the source and sink chosen for submission of the Up-To Congestion transaction bore no relationship to the Point-of-Receipt ('POR') and/or Point-of-Delivery ('POD') on the transmission reservation to which it was linked." August 18, 2010 Tariff Filing at 5-6. To the best of Dr. Chen's knowledge, this allegation does not apply to his trades, because the sources and sinks he chose did match the actual PORs and PODs.

As noted above, Dr. Chen never engaged in so-called “wheel” transactions,³³ by which PJM apparently means transactions that, for example, were sourced from outside PJM (e.g., TVA), flowed through PJM, and had a sink outside PJM (e.g., NYISO).³⁴ And according to PJM’s billing statements, Heep Fund and CU Fund received, net of all charges and credits (including transmission loss credits) about \$1.4 million during the June-August 2010 period for all trades—for a weighted average profit per MW of about \$0.29.

In its August 5, 2010 Presentation, the IMM also claimed that there were three effects of the alleged manipulation that took place during June and July 2010: (1) distorting market outcomes; (2) reducing marginal loss surplus available to other entities; and (3) making it more difficult for other market participants to acquire transmission. These unsubstantiated claims miss the mark and, in any event, cannot convert legitimate business conduct into unlawful market manipulation.

First, there is no evidence of which we are aware that Dr. Chen’s up-to congestion trades resulted in any form of market distortion, such as adverse price effects or increased congestion. Certainly there is no evidence that Dr. Chen himself knew of such effects or intended to cause such effects. Without factual support, the IMM’s assertion has no evidentiary value.

³³ In an internal IMM presentation made to PJM’s Transactions Issues Task Force, the IMM claimed that “[s]ubmitting a set of equal and opposite up to congestion transactions (one import, one export) at buses close enough to each other creates the same effect as a wheeling up to congestion transaction.” October 26, 2010 IMM Presentation at 16. Because Dr. Chen did not engage in what the IMM describes as “wheeling,” we do not know what to make of this allegation. Similarly, we do not understand how the trades put on by Dr. Chen involving different PJM sources and sinks are supposed to create the same effect as a “wheel” transaction.

³⁴ See August 5, 2010 IMM Presentation at 6. Elaborating on this point, the IMM stated: “Designating an up to congestion wheeling transaction with an import pricing point of SouthIMP and an export pricing point of SouthEXP creates a net zero settlement result as SouthIMP and SouthEXP are modeled the same. Such a transaction has no fundamental economic rationale.” *Id.* at 7. We do not understand this supposed transaction, but we can state that Dr. Chen never used SouthIMP as a source and SouthEXP as a sink as part of one or more transactions.

In *Lake Erie Loop Flow*, Staff Report at 36, Enforcement Staff concluded that “market participants that placed the circuitous schedules of concern here did not intend to impair, obstruct or defeat a well-functioning market” *Id.* at 5. The Staff pointedly noted that “market participants are not well situated to try and predict loop flow effects in real time, which are dependent on a complex interaction of ever-changing system configurations and schedules.” *Id.* Dr. Chen similarly was not in a position to determine—either before or after the fact—the overall market impact of his virtual trades.

Second, there is no evidence that Dr. Chen intended to limit the amount of virtual transmission available to other traders at the points where he traded. No PJM member, including Dr. Chen, has any legal entitlement to up-to-congestion transmission service. If on one day Dr. Chen was able to reserve transmission service and another participant was not, or vice-versa, that would not provide any basis for contending that markets or prices somehow were distorted. And the fact that Dr. Chen might have been reserving service with an eye toward collecting transmission loss credits does not change the analysis, because, as we already have shown, there was nothing wrong with pursuing that specific business objective.

OE’s report in *PJM Interconnection, L.L.C. v. Accord Energy, LLC*, 127 FERC ¶ 61,007 (“*Tower*”), *order on reh’g and clarification*, 129 FERC ¶ 61,010 (2009), is on all fours here. There OE addressed an issue involving the purchase of FTRs, concluding as follows:

Since Power Edge was unable to purchase FTR positions that might have hedged the risk of its counterflow heavy portfolio, its failure to purchase such positions (even if they were ultimately purchased by an affiliate) cannot constitute evidence of any particular intent on Power Edge’s part. Similarly, no nefarious intent can be imputed to the acquisition of such FTRs by affiliated companies, even if they were acquired by the same trader who performed Power Edge’s FTR trading. Under the circumstances, the purchase of such FTRs represented a perfectly rational response to new information and opportunities.

Tower, Docket No. EL-08-44-00, Enforcement Staff Report at 37 (“*Tower Staff Report*”).

Likewise, in its *Lake Erie Loop Flow* Report, Staff concluded as follows:

As the actual pricing incentives for [the relevant] transactions suggest (confirmed by the statements of market participants and NYISO’s own conclusions), the purpose for placing the transactions in question was not to obstruct a well-functioning market, but simply to capture price spreads. The market participants did not act against their economic interests or attempt to artificially affect price, which are hallmarks of market manipulation. And the market inefficiencies NYISO complains of were not created by the market participants, but by the price signals themselves (and ultimately by the RTOs designing the price signals).

Lake Erie Loop Flow Staff Report at 25 (footnote omitted).

Finally, there is no evidence that Dr. Chen ever intended to take transmission loss credits away from any other PJM member. He did not know how transmission loss credits allocations were made. The Commission itself has found that no entity was entitled to receive any particular amount of transmission loss credits. See *Black Oak Energy*, 125 FERC ¶ 61,042 at P 12 (“[T]he Commission reiterated that no party is entitled to receive any particular amounts through disbursement [of the credit that inevitably results from using the marginal line loss methodology], since the price each is paying (based on marginal line losses) is the correct marginal cost for the energy each is purchasing.”) (citing *Black Oak Energy*, 122 FERC ¶ 61,208 at P 46). In fact, although PJM has now changed its tariff with respect to up-to congestion transactions, the appropriate allocation of transmission loss credits has been litigated at the Commission for years and has yet to be fully resolved.³⁵

In its August 18, 2010 Tariff Filing, PJM alleged that the transactions at issue “were inappropriate because they were wash trades that cancelled each other out, and therefore provided no economic benefit to the market, and provided no economic benefit or risk to the

³⁵ When the question of what kind of tariff changes should be presented to the Commission, Dr. Chen voted in favor of the PJM position stated in its subsequent August 18 Tariff Filing.

participants involved beyond improperly inflating these participants' share of the loss surplus allocation." August 18, 2010 Tariff Filing at 6. The Commission did not refer to these specific allegations in its August 25, 2010 Investigation Order, but its prior precedent contradicts PJM's allegations.

The Commission has defined the term "wash trades" to mean "pre-arranged offsetting trades of the same product among the same parties, which trades involve no economic risk, and no net change in beneficial ownership." *See Investigation of Terms & Conditions of Pub. Util. Mkt-Based Rate Authorizations*, 103 FERC ¶ 61,349 at P 19, *amended by* 105 FERC ¶ 61,218 (2003), *order on reh'g*, 107 FERC ¶ 61,175 (2004); *accord Enron Power Marketing, Inc.*, 103 FERC ¶ 61,343 at P 61 (2003). *See also SEC v. Colonial Inv. Mgmt. LLC*, 659 F. Supp. 2d 467, 473 (S.D.N.Y. 2009) ("Where the transaction is structured such that there is no legitimate economic purpose or substance to the contemporaneous purchase and sale, no genuine change in beneficial ownership, and/or little or no market risk, that transaction may be a sham transaction . . ."), *aff'd*, No. 09-3503-CV, 2010 WL 2500386 (2d Cir. June 17, 2010).³⁶ *See also Pirrong Aff.* at ¶ 25 ("A wash trade involves a (near) simultaneous purchase and sale of the same asset or commodity. Wash trades create no exposure to risk of price changes."). The transactions at issue here do not fall within this definition.

Here, although the megawatt volumes involved in Dr. Chen's paired trades might cancel out, that does not, as he testified in his deposition, mean that the trades had no economic substance or risk. *See Pirrong Aff.* at ¶ 33 ("Mr. Chen was engaging in a speculative transaction

³⁶ *See also Sala v. United States*, 613 F.3d 1249, 1253-54 (10th Cir. 2010) (analyzing whether a transaction had "economic substance" to determine if it was a sham transaction); *Katz v. Comm'r*, 90 T.C. 1130, 1141 (1988) (describing wash sales as "risk-free transactions devoid of any true economic substance").

that involved taking on risk in exchange for an expected profit.”) If both the import and export legs of paired trades were approved,³⁷ Dr. Chen bore the risk associated with how the various charges and credits would net out. If one of the legs was rejected, typically the import leg, he bore the spread risk and the risk associated with various charges and credits, but he also was guaranteed to be paid the bid price (the floor) in the day-ahead market on the remaining leg—typically the export leg. *See id.* at P 14. Dr. Chen believed that the paired trades would generally bear minimum risk associated with the netting of the various charges and credits when

³⁷ For his up-to-congestion trades, Dr. Chen had to specify the maximum price he was willing to pay for congestion in the day-ahead market. For an export trade, this provided the ceiling he was going to be paid, which in turn created a ceiling of profit for him in the day-ahead market. There was no mechanism in a stand-alone export trade that provided a floor he would be paid in the day-ahead market to hold the position, and take on the associated risk, in the real-time market (which in turn placed a floor of profit for him in the day-ahead market). This meant that, as a trader, Dr. Chen could not use a stand-alone export trade to specify the minimum amount (the floor) he was going to be paid in the day-ahead market to take on the position, and also the associated risk, in the real-time market. In addition, when payments were below the minimum amount, he only wanted to take on minimal risk associated with various charges and credits. The combination of an export leg and an equal-volume import leg provided such a mechanism.

For example, viewing an export trade, Dayton to MISO, by itself, Dr. Chen could only specify the maximum congestion price (limited by PJM at \$50) he was willing to pay in the day-ahead market. Assume the bid price is \$45. If the day-ahead spread is \$10 (day-ahead price of Dayton minus day-ahead price of MISO), he would have the trade approved by PJM, and he would take on the associated risk in the real-time market. If the day-ahead spread is \$35 (day-ahead price of Dayton minus day-ahead price of MISO), he would also have the trade approved by PJM. But since he now is being paid \$35 per MW in the day-ahead market, he would be more willing to take on the associated risk in real-time market. Thus, with an export leg alone, the PJM models would decide how much Dr. Chen would be paid in the day-ahead market. With a stand-alone export trade, there is a ceiling but no floor. If, however, Dr. Chen paired an equal-volume import trade, MISO to Dayton, with the existing export trade, Dayton to MISO, he would automatically create a floor. Assuming the same bid price of \$45, if the day-ahead spread (day-ahead price of Dayton minus day-ahead price of MISO) is not over \$45, both the export and import legs would be approved and he would only take on the risk associated with how the various charges and credits would net out. If the day-ahead spread is over \$45, then the import leg would be rejected and only the export leg would be approved. Now Dr. Chen would be paid \$45 per MW in the day-ahead market, though he would also be carrying the real-time spread risk, and possibility of reward, along with the risk associated with how the various charges and credits would net out. Similarly, with the bid price of \$35, he would take on the real-time spread risk, and possibility of reward, when the day-ahead spread is over \$35. The bid price (of \$45 and \$35) would now become a floor—the minimum profit available in the day-ahead market.

both legs were approved, but would, at times, provide significant upside profit when only one of the legs was approved.³⁸ As Professor Pirrong explains:

There is another way of seeing this. UTC contracts are a combination of (a) standard “vanilla” spreads in forward contracts and (b) an embedded option. Crucially, the option embedded in the MISO to PJM UTC trade is different than the option embedded in the PJM to MISO trade. Alan Chen’s trading strategy was therefore an option spread transaction. Although the forward contract portions of the two UTC legs of his trades cancelled out, the option portions did not. This left Alan Chen with a contingent price exposure. In contrast, in a wash trade there is no contingent price exposure.

Pirrong Aff. at ¶ 31.

Based on his experience, Dr. Chen knew that price spreads between interfaces (including but not limited to MISO) and various points within PJM could and did exceed the \$50 per MW PJM limit.³⁹ When that happened, the PJM import leg would be rejected and Dr. Chen could either make or lose money on the day-ahead versus real-time spread on the remaining leg. Dr. Chen expected that the chances of having a leg rejected were small, but they were not zero.

³⁸ For example, assume a paired trade, MISO to Dayton and Dayton to MISO, with the bid price of \$45, when the day-ahead prices are \$35 for MISO and \$40 for Dayton. In that scenario, both legs would get approved. This would result in zero spread risk, but Dr. Chen still would bear the risk of how the various charges and credits would net out. If we now assume day-ahead prices are \$35 for MISO and \$90 for Dayton, then the import leg, MISO to Dayton, would get rejected. Dr. Chen then would be left with the export leg alone, and he would be paid \$55 per MW in the day-ahead market for assuming the risk/reward position of this export leg in the real-time market. In Dr. Chen’s view, when day-ahead prices separated by substantial amounts, then the forces of supply and demand, the PJM system, and traders seeking arbitrage opportunities, would respond to the price differential, which then would tend to converge in the real-time market. If the real-time spread in our example turned out to be \$25, with real-time prices of \$45 for MISO and \$70 for Dayton—converging from a day-ahead spread of \$55—Dr. Chen then would make \$30 per MW in the spreads alone. This would be a highly profitable trading position to hold.

³⁹ As noted *supra*, Heep Fund had legs rejected for various hours in 2008–2010, including during the June 1 through August 19, 2010 period. In addition, Dr. Chen frequently put in up-to-congestion bids at prices below \$50 per MW (e.g., \$25 or \$35 per MW) so that he could limit the day-ahead premium paid to hold his position. For example, for August 3, 2010, Dr. Chen put in 16 trades for Heep Fund, 12 of which were bid below \$50. In other words, Dr. Chen did not simply bid the PJM limit to try to maximize the chances that both legs would be cleared to maximize transmission loss credits. This was consistent with his overall risk profile: look for low-risk, low-reward trades with a high reward potential; avoid high-risk trades even if they had the potential for high-reward.

Moreover, these paired trades had value to Dr. Chen, who received transmission loss credits to reduce his losses or make money, and to PJM, which received transmission charges and other revenues. Also, to the extent Dr. Chen's up-to congestion trades caused prices to move closer together in the day-ahead and real-time markets, they promoted market efficiency.⁴⁰ Finally, Dr. Chen made money on these trades. And the fact that, during the period June 1 through August 19, 2010, his profits from paired trades depended on receipt of transmission loss credits does not change the analysis, because, as we established above, there is nothing wrong with that business objective.

In addition, Dr. Chen frequently put in up-to-congestion bids at prices below \$50 per MW (such as \$25 or \$35 per MW), so that he could limit the day-ahead premium paid to hold his position. For example, for August 3, 2010, Dr. Chen put in 16 trades for Heep Fund, 12 of which were bid below \$50. This shows that Dr. Chen was not simply trying to maximize the chances that both legs would be cleared to maximize transmission loss credits. The way to do that would be to bid the maximum \$50 amount all the time. This conduct is consistent with Dr. Chen's overall risk profile: to look for low-risk, low-reward trades with a high reward potential, and to avoid high-risk trades even if they had the potential for high-reward.

In sum, based on all of the facts and circumstances, Dr. Chen did not engage wash trades, or any other form of market manipulation. Just as in the *Lake Erie Loop Flow* case, "[t]he fact that a market inefficiency exists is not, in itself, proof that market participants engaged in market

⁴⁰ See, e.g., *PJM Interconnection, L.L.C.*, 116 FERC ¶ 61,088 at P 18 & n.9 (2006) ("We have found, for example, that virtual trading activities help promote price convergence between the Day Ahead and Real Time Markets and provide other system benefits.") (citing and quoting *ISO New England, Inc.*, 113 FERC ¶ 61,055 at P 30 (2005) ("Arbitrageurs provide important benefits to bid-based markets by helping to ensure that Day-Ahead and Real-Time prices do not diverge significantly, as well as by providing price discovery and liquidity to the market.")).

manipulation.” *Lake Erie Loop Flow*, Staff Report at 20. Dr. Chen did “capitaliz[e] on . . . incentives” created by PJM’s system for allocating transmission loss credits. *Id.* But he “simply *exposed* rather than *created*” whatever market inefficiency existed here. *Id.* (italics in original). He played by the rules that were in place, with no deception or fraud, seeking to maximize his trading profits. And that is lawful conduct.

D. There Appears to Be No Assertion that Dr. Chen Violated Any PJM Tariff, and in Fact He Did Not Do So

The Commission’s August 25, 2010 Order initiating this investigation properly does not allege that any entity violated PJM’s tariffs. Nor does PJM claim, in its August 18 filing, that the tariff was subject to any implied conditions not expressly stated in the tariff. There were no violations of PJM’s tariff as written and approved by the Commission. Out of an abundance of caution, however, we note that, as we stated at the outset, Dr. Chen’s conduct cannot be judged by any post hoc, unwritten construction of section 5.5 of PJM’s tariff. Tariffs must be strictly construed, *Blumenthal*, 132 FERC ¶ 63,017 at P 84, and the Commission may not look beyond the plain meaning of the tariff unless its terms are ambiguous. *Nicole Gas Prod., Ltd.*, 105 FERC ¶ 61,371 at P 10 (2003), *vacated on other grounds sub nom. Columbia Gas Transmission Corp.*, 404 F.3d 459 (D.C. Cir. 2005).

In this case, both the Commission and PJM have acknowledged that, under the tariff, “some virtual traders (financial marketers) pay transmission access charges related to Up-To Congestion transactions, which contribute to the fixed costs of the transmission system, and which should be included in the allocation process for disbursement of any surplus resulting from the over-collection of transmission line loss charges.” *PJM Interconnection*, 132 FERC ¶ 61,244 at P 10. Because virtual traders were eligible to acquire transmission loss credits, such traders were “able to clear large volumes of megawatt hours of Up-To Congestion transactions”

and receive “a sizeable allocation of the marginal loss surplus based on the large megawatt hour quantity of cleared transactions.” August 18, 2010 Tariff Filing at 5 (emphasis added).⁴¹ Thus, under the plain language of the tariff, virtual traders who rationally responded to their eligibility for transmission loss credits did not commit any tariff violations. Moreover, even if some form of tariff violation could be established, “tariff violations do not form a sufficient basis for the fraud or scienter necessary for a 1c.2 violation.” *Blumenthal*, Staff Initial Brief at 2.

If the Commission wanted to adopt a counterintuitive rule prohibiting traders from trading to maximize certain parts of the overall price signal shown by the markets, it would need to expressly state that rule in advance. “Where the imposition of penal sanctions is at issue . . . the due process clause prevents . . . validating the application of a regulation that fails to give fair warning of the conduct it prohibits or requires.” *Gates & Fox Co. v. Occupational Safety & Health Review Comm’n*, 790 F.2d 154, 156 (D.C. 1986) (Scalia, J.).⁴² Federal courts do not permit an agency to impose civil sanctions unless the regulations at issue are “sufficiently specific that a reasonably prudent person, familiar with the conditions the regulations are meant to address and the objectives the regulations are meant to achieve, would have fair warning of

⁴¹ In a September 2, 2010 filing, the PJM market monitor observed that “[t]he [2009] revisions to the loss surplus allocation *allowed* market participants to submit virtual transactions for the sole purpose of benefiting from the difference in transmission costs and the per MWh loss surplus allocation.” *PJM Interconnection, L.L.C.*, Docket No. ER10-2280-000, Motion to Intervene and Comments of the Independent Market Monitor for PJM at 13 (Sept. 2, 2010) (emphasis added).

⁴² See also, e.g., *Gen. Elec. Co. v. EPA*, 53 F.3d 1324, 1328-29 (D.C. Cir. 1995) (“In the absence of notice—for example, where the regulation is not sufficiently clear to warn a party about what is expected of it—an agency may not deprive a party of property by imposing civil or criminal liability.”); *Phelps Dodge Corp. v. Federal Mine Safety & Health Review Comm’n*, 681 F.2d 1189, 1193 (9th Cir. 1982); *Kropp Forge Co. v. Sec’y of Labor*, 657 F.2d 119, 122-24 (7th Cir. 1981); *Diebold, Inc. v. Marshall*, 585 F.2d 1327, 1335-39 (6th Cir. 1978); *Diamond Roofing Co. v. Occupational Safety & Health Review Comm.*, 528 F.2d 645, 649 (5th Cir. 1976). See generally Jason Nichols, Note, “Sorry! What the Regulation Really Means is . . .”: *Administrative Agencies’ Ability to Alter an Existing Regulatory Landscape Through Reinterpretation of Rules*, 80 Tex. L. Rev. 951, 969-70 (2002).

what the regulations require.” *Freeman United Coal Mining Co. v. Federal Mine Safety & Health Review Comm’n*, 108 F.3d 358, 362 (D.C. Cir. 1997).⁴³ That was not the case here. There was no express rule against trading to earn transmission loss credits. And it would be unlawful for the Commission to impose such a rule after the fact in this case.

CONCLUSION

For all of these reasons, we respectfully submit that the Division of Investigations, and ultimately the Commission, should conclude that Dr. Chen and his funds did not engage in market manipulation. This decision will stand squarely in line with other decisions not to prosecute trading behavior that others claimed was somehow objectionable. Taken together, these decisions increasingly will present a body of work with tangible logic that accurately tracks the law and reflects sound economic thought. This is an important accomplishment. It offers the regulated community consistent and understandable guidance. It provides a road map for the Division of Investigations to use in future cases. And in a world where other agencies are increasingly falling under the same fraud-based anti-market manipulation regime, it offers valuable precedent cutting across different areas of the law.

In contrast, a decision to prosecute here would, we respectfully submit, create an outlier data point that would confuse both the state of the law and the regulated community. To be sure, given the availability of *de novo* review, that confusion would, in our view, have a defined point of expiration—reversal in federal district court. But even during this locked-in period, the Commission’s growing, and growingly consistent, record of discerning market manipulation

⁴³ *Accord, e.g., Stillwater Mining Co. v. Federal Mine Safety & Health Review Comm’n*, 142 F.3d 1179, 1182 (9th Cir. 1998); *Walker Stone Co. v. Sec’y of Labor*, 156 F.3d 1076, 1083-84 (10th Cir. 1998) (quoting *Freeman*, 108 F.3d at 362). *See also Gen. Elec. Co.*, 53 F.3d at 1329 (quoting *Satellite Broad. Co. v. FCC*, 824 F.2d 1, 3 (D.C. Cir. 1987)) (incorporating this requirement into regulatory law).

enforcement would suffer needless damage. The regulated community would receive conflicting guidance from that now conflicting record. And Dr. Chen would unfairly and unlawfully suffer as the target of an unfounded enforcement action.

The better course, as we stated at the outset, is the first.

Respectfully submitted,



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APPENDIX A
PIRRONG AFFIDAVIT

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

PJM Up-To Congestion Transactions

Docket No. IN10-5-000

Affidavit of Dr. Craig Pirrong

Introduction

1. I have been retained by Skadden, Arps, Slate, Meagher and Flom, to evaluate the trading activity of Houlian (Alan) Chen in PJM during the April-August, 2010 period. Based on my review of Mr. Chen's trading records, I conclude that his trades were legitimate, and not manipulative in either intent or effect. In particular, his trades were not wash trades.

Background and Qualifications

2. I am Professor of Finance, and Director of the Global Energy Management Institute at the Bauer College of Business of the University of Houston. Prior to joining the faculty of the University of Houston in January, 2003, I was the Watson Family Professor of Commodity and Financial Risk Management at Oklahoma State University. I assumed this endowed professorship in 2001 after holding research and teaching positions at the University of Michigan, the University of Chicago, and Washington University. My *curriculum vitae* is attached. It lists all of the publications that I have authored in the last ten years. It also lists cases in which I have testified as an expert at trial or by deposition within the preceding four years.

3. I have researched the economics of financial, futures, and securities markets for most of my academic career. I have published scholarly articles concerning financial, securities and futures markets. I have written articles on the behavior of futures prices, the organization and governance of futures exchanges, and various aspects of futures market regulation, including the regulation of market manipulation.

4. As an academic and consultant, I have been deeply involved for about 20 years in issues relating to commodity futures markets, commodity prices, and the economics of commodity market manipulation. My research has been published in a wide variety of scholarly journals. I have been a peer reviewer for many journals, including the American Economic Review, the Journal of Finance, the Journal of Law and Economics, the Journal of Futures Markets, Economic Inquiry, the Journal of Economic Behavior and Organization, the Journal of Business, and the Journal of Business and Economics Statistics.

5. Much of my research has focused specifically on issues of market manipulation. I have published a book (titled *The Economics, Law, and Public Policy of Market Power Manipulation*), as well as nine economics, finance, and law review articles on this subject.

6. I was the primary author of a study commissioned by the Chicago Board of Trade ("CBOT"), later published as a book titled *Grain Futures Markets: An Economic Appraisal*. That study analyzed the economics of the delivery system for CBOT corn, wheat, and soybean futures contracts, specifically focusing on how to revise that system to make it less vulnerable to manipulation. I recommended the

adoption of a multiple delivery point system, and specifically analyzed the pricing and hedging implications of such a system. A part of this research on multiple deliverable contracts was published in a peer-reviewed journal.

7. In 1992 I was a member of the MidAmerica Institute for Public Policy Research Treasury Securities Market Task Force. This Task Force was formed in the aftermath of the Salomon Brothers squeeze of the two year Treasury note. As a member of the Task Force, I investigated issues relating to microstructure and market power in the market for Treasury Notes and Bonds.

8. I have consulted with commodity exchanges in Sweden and Germany regarding the design of futures contracts, including the design of the delivery mechanisms for wood pulp, European wheat and European pigs. A main objective was to design contracts that were not vulnerable to manipulation.

9. In 1997 and 1998 I served as a member of the CBOT's Grain Delivery Task Force ("GDTF"). This body was charged by the exchange with the responsibility of designing new delivery terms for CBOT corn and soybean futures contracts. Such a redesign was mandated by the United States Commodity Trading Futures Commission ("CFTC") because the old delivery mechanism had become unduly susceptible to manipulation. Among the Task Force's objectives was to design a contract that would tend to prevent and diminish the likelihood of price manipulation. The terms recommended by the GDTF were adopted by a large majority of the CBOT membership, and approved by the CFTC (with some modifications for soybeans) in May, 1998.

10. I provided expert testimony in a case related to market manipulation, *In re Soybean Futures Litigation*, Nos. 89 C 7009, 90 C 11th 8 (N.D. Ill. 1995). I have also been retained by the CFTC as an economic expert in a commodity manipulation case and also as an expert in manipulation matters by the Winnipeg Commodity Exchange, pursuant to enforcement actions undertaken by the WCE. In addition, I have provided expert testimony in other manipulation cases, *American Agric. Movement v. Board of Trade*, 848 F. Supp. 814 (N.D. Ill. 1994), *aff'd in part, rev'd in part sub nom. Sanner v. Board of Trade*, 62 F.3d 918 (7th Cir. 1995), and *Kohen v. Pac. Inv. Mgmt. Co.*, 2007 U.S. Dist. LEXIS 56389 (N.D. Ill. 2007). I provided expert testimony in *Energy Transfer Partners, L.P.*, a FERC case. My research has also been cited in a 7th Circuit Court of Appeals decision on manipulation. *Board of Trade v. SEC*, 187 F.3d 713, 724 (7th Cir. 1999) (Easterbrook, J.).

11. In June 2005, I was retained by FERC to make a one-day presentation on the economics, law, and regulation of market manipulation to economists, analysts, and attorneys in the agency's Office of Market Oversight and Investigation. I made this presentation in June 2005.

12. I have testified before the House Agriculture Committee (which has jurisdiction over futures markets and exchanges) on matters relating to an energy market manipulation.

13. I was an invited participant in the Federal Trade Commission's workshop on its proposed oil market manipulation rule.

14. I have taught courses on derivatives (including natural gas futures, forwards, and swaps) at the graduate and undergraduate levels for eighteen years. These

courses have covered the pricing of derivatives instruments, including natural gas derivatives, the use of derivatives for hedging and speculative purposes, and manipulation. I currently teach the PhD course in futures and options in the Bauer College of Business at the University of Houston, and an MBA course in energy derivatives.

15. I have a book on commodity pricing—including the pricing of electricity and electricity derivatives—forthcoming from the Cambridge University Press.

16. I am currently director of the Global Energy Management Institute (“GEMI”) at the Bauer College of Business of the University of Houston. GEMI is a world leader in energy finance education. Moreover, GEMI routinely hosts educational events for energy professionals, including a well-attended energy trading conference held every year.

Analysis of Mr. Chen’s Trading

17. Prior to 31 May, 2010, Mr. Chen would typically purchase day ahead power in MISO, and sell it day ahead at a point in PJM, such as Mt. Storm. He would simultaneously buy power day ahead at another, geographically proximate point in PJM, such as Greenland Gap, and sell day ahead power into MISO.

18. Mr. Chen traded “up to congestion” (“UTC”) contracts. These contracts have the feature that if based on clearing prices in the day ahead market, the spread between the PJM price and the MISO price on one of the legs exceeds \$50, that leg is rejected.

19. Since the MISO day ahead purchase and sale in the transactions described at ¶17 *supra* canceled if neither leg was rejected due to a breaching of the \$50

transmission price limit, in this case Mr. Chen would have been left with a long position at one PJM point (Greenland Gap in the foregoing example) and a short position at the other (Mt. Storm in the example). If one leg was rejected (e.g., the MISO into Mt. Storm leg), Mr. Chen was left with a long position in one control area and a short position in another. This would most likely result in a long position in day ahead PJM power, and a short position in day ahead MISO power.

20. Real time spreads between points in PJM are not constant, and in particular, they fluctuate randomly. At times, these random fluctuations can be extremely large. If neither leg was rejected, Mr. Chen was at risk to changes in this real time intra-PJM spread.

21. The differences between real time PJM and MISO prices—PJM-MISO real time spreads—are not constant, and fluctuate randomly. If one leg was rejected due to a breach of the \$50 UTC limit, Mr. Chen was at risk to this real time PJM-MISO spread.

22. Spread trading is ubiquitous in virtually every commodity market. Indeed, a very large fraction of trading of everything from aluminum to corn to oil to natural gas to power to zinc is spread trading. Spread trading performs an important price discovery function, facilitates hedging, and provides liquidity to the market. Spread trading should be encouraged as a way of facilitating the efficiency of the market.

23. Mr. Chen chose the busses that he utilized in his spread trading based on fundamental analysis. That is, he attempted to identify bus prices that were

overpriced relative to others. By carrying out such fundamental research, and trading based on it, Mr. Chen was contributing to price discovery in the market.

24. To reiterate, Mr. Chen was at risk when engaging in this trading activity. Indeed, these risks were quite large. In particular, Mr. Chen lost over \$300,000 in this strategy on 30 May, 2010 when day ahead time spreads widened dramatically to exactly \$50/MWh. This reflects the fact that the distribution of electricity prices exhibit “heavy tails.” That is, the probability of extreme changes is large, as compared to the standard “normal” (bell-shaped) distribution often used to characterize risk.

25. The facts that (a) Mr. Chen was at risk to spread changes, and (b) was buying and selling power at different PJM points, means that in no way can his trading be considered “wash trading.” A wash trade involves a (near) simultaneous purchase and sale of the same asset or commodity. Wash trades create no exposure to risk of price changes. In contrast, Mr. Chen’s positions were at risk to changes in prices. This is demonstrated by the fact that Mr. Chen’s profit margins on these transactions fluctuated, and indeed, he suffered large losses on at least one day.

26. After suffering a loss on 30 May, 2010, Mr. Chen reconsidered his trading strategy. Mr. Chen decided that, in addition to executing trades as he had in the past (i.e., either with imports from MISO to PJM node A and exports from PJM node B to MISO, or simply stand alone day ahead trades to or from an interface) he would buy day ahead power in MISO and sell it at a point in PJM under a UTC

contract, and simultaneously buy day ahead power at the same point in PJM, and sell it into MISO.

27. Under this new strategy, Mr. Chen was not at risk to intra-PJM real time spread changes, as he had bought and sold power at the same bus in PJM.

However, Mr. Chen was still at risk.

28. Specifically, Mr. Chen faced the risk that one leg of the pair he submitted would be rejected. In the event, Mr. Chen was at risk to the PJM-MISO real time spread risk on the non-rejected leg.

29. Given that it was impossible for both legs to be rejected (since MISO minus PJM cannot exceed \$50 if PJM minus MISO does, and *vice versa*), and since the probability of rejection of a leg was non-zero, Mr. Chen was at risk to PJM-MISO real time spread changes with positive probability.

30. Again, this means that these were not wash trades. There were states of the world in which Mr. Chen would have faced exposure to price risk. In contrast, in a wash trade, no such states of the world exist.

31. There is another way of seeing this. UTC contracts are a combination of (a) standard “vanilla” spreads in forward contracts and (b) an embedded option. Crucially, the option embedded in the MISO to PJM UTC trade is different than the option embedded in the PJM to MISO trade. Mr. Chen’s trading strategy was therefore an option spread transaction. Although the forward contract portions of the two UTC legs of his trades cancelled out, the option portions did not. This left Mr. Chen with a contingent price exposure. In contrast, in a wash trade there is no contingent price exposure.

32. In essence, Mr. Chen was speculating that, contingent on the MISO into PJM day ahead spread exceeding \$50, the day ahead PJM into MISO spread was downward biased. That is, on average, given this contingency, the real time difference between the PJM and MISO prices was larger than the difference between the day ahead PJM and MISO prices. This difference between the average (or “expected”) real time PJM-MISO difference and the day ahead PJM-MISO difference is referred to as a price “bias.”

33. Commodity speculation is, in essence, betting on price bias.¹ Thus, Mr. Chen was engaging in a speculative transaction that involved taking on risk in exchange for an expected profit.

34. Mr. Chen neither made nor took deliveries of physical power, as would be necessary as part of one type market manipulation: a manipulation based on the exercise of market power, e.g., a classic corner or squeeze. In such a manipulation, a trader with a large financial position buys or sells excessively large physical quantities in order to distort prices in a way that enhances the value of his financial position.² Since he did not make or take delivery of physical power, Mr. Chen could not have manipulated the market through the exercise of market power.

35. Mr. Chen did not act in a deceptive manner. He made his purchases and sales openly, and entered the information necessary to execute his trading strategy

¹ J. M. Keynes. *A Treatise on Money* (1930).

² S. C. Pirrong, *The Economics, Law, and Public Policy of Market Power Manipulation* (1996).

in an open and transparent way. Moreover, the information he entered was correct and hence could not have been fraudulent.

36. As a result of the transactions Mr. Chen executed, he was eligible for, and received, transmission loss credits (“TLC”). TLC therefore affected the profitability of the strategies that Mr. Chen employed.

37. Mr. Chen responded rationally to the economic signal that was inherent in the design of the TLC. It would be unduly burdensome and unrealistic to expect traders to decide whether or not to respond to economic signals if they can do so without engaging in deception or exercising market power. If PJM deems that the TLC is incentivizing undesirable transactions, the problem is in the incentives inherent in the TLC, rather than with traders responding rationally to these incentives.

38. Traders respond to price and value signals, regardless of whether those price and value signals are reflect only economic fundamentals, or are also affected by regulations and market design. Several examples illustrate this point.

39. For instance, the price that traders are willing to pay for corn, and the amount of corn they are willing to buy, depends on the subsidy for the production of ethanol. This subsidy is a purely legislative artifact, but affects the economics of purchasing corn. The higher the subsidy, the more corn traders purchase, and the higher the price they are willing to pay for it.

40. As another example, prior to the passage of the Staggers Rail Act in 1980, the Interstate Commerce Commission set rail rates on grain shipments. The regulated rate structure (a) equalized the rail rates on grain shipments to different

ports, even though the costs of serving these ports differed, and (b) protected the (lower) through rate from interior points to export points on shipments of grain that were shipped from a given interior point to an interior terminal, and then sent from the interior terminal to an export point. As a result of this rate structure, shipments were roughly equalized across export ports, and it was conventional for shippers to ship grain from a producing location (such as central Iowa) to an interior terminal market (such as Chicago) where it was stored for some period before being shipped to an export point. The Staggers Act eliminated these features of the regulated rate structure, and as a consequence (a) more grain was shipped to lower cost ports, and less grain to higher cost ports, and (b) grain was shipped directly from producing points to export ports without being stored at interior points like Chicago. This change in behavior makes it plain that the original patterns of shipment and storage were driven by the incentives inherent in the regulated rate structure. Again, traders responded to the economic incentives inherent in the regulated price structure, even though this regulated rate structure was not economically efficient.

41. As a final example, futures contracts often include premiums for delivery at certain locations (or of certain grades) and discounts for other locations (or grades), and these premiums and discounts do not equal market price differentials between the locations (or grades). When deciding where (or what) to deliver, market participants take into account the exchange-specified premiums and discounts. Specifically, they choose to deliver the “cheapest to deliver” location

(or grade), where the calculation of the cheapest to deliver explicitly includes the specified premium or discount.

42. In each example, traders respond to the economic signals inherent in the subsidy, or regulated rate structure, or contract design. When their responses to these signals were deemed inefficient, as in the case of rail rates, neither Congress nor regulators attempted to punish the traders. Instead, Congress changed the regulations to eliminate equalization and through rate protection. Traders responded quickly to the new price signals. Similarly, there have been cases where exchanges decided that delivery premiums and discounts were leading to inefficient delivery and trading behavior. In these cases, exchanges revised the price differential structure in these contracts in order to give traders efficient price signals.

43. Mr. Chen was acting no differently than the buyer of corn in a market where ethanol is subsidized; or the trader of wheat under regulated rail rates; or the trader of a futures contract with a particular premium or discount structure. He was responding rationally to economic signals—price signals—inherent in the market regulation and design. To the extent that his actions were inefficient, the fault is with the market design, not with his response thereto.

44. And again, it is unduly burdensome and unrealistic to charge traders with the task of determining which price signals they should respond to, and which they should not. This puts traders like Mr. Chen in the position of mind readers trying to divine the intent of regulators. Mind reading being a very imprecise art, in attempting to do so they will inevitably do some things that regulators consider

inefficient, and will inevitably fail to do some things that regulators think they should do. This places traders at the acute risk of suffering penalties for their inability to distinguish which price signals regulators intend for them to follow, and which ones they do not. Moreover, out of fear of suffering such penalties, some traders may shy away from taking actions in response to price signals that would have the effect of enhancing market efficiency.

45. In the present instance, PJM essentially demands that Mr. Chen, and other traders, decide which kinds of trades “should” receive TLC payments, and which should not. This is a truly difficult task, and one fraught with potential for error. Rather than demanding that traders like Mr. Chen read their minds, system regulators should design a TLC mechanism that provides the incentives to undertake the kinds of trades they prefer, and which does not incentivize the kinds of trades that they do not prefer.

46. It should also be noted that the TLC payments that Mr. Chen received were risky. That is, he could not know at the time at which he initiated the transactions, what the TLC payment associated with those transactions would be. Those payments were determined by conditions prevailing in the PJM system at the time that the power flowed.

47. For instance, in June, 2010, the TLC payments averaged \$.56, but had a standard deviation of \$.09; in July, 2010, they averaged \$.66 with a standard deviation of \$.16, and in August, 2010 they averaged \$.60 with a standard deviation of \$.20. The positive standard deviations indicate that the transactions that Mr. Chen undertook were risky. Since these payments were risky,

transactions that generated such payments cannot be considered as wash trades *per se* because wash trades involve simultaneous purchase and sale with no risk of loss.

48. Furthermore, scarce enforcement resources are best employed detecting and investigating conduct that distorts, or has the potential to distort the allocation of real resources, i.e., distorts or has the potential to distort the production, consumption, or transmission of power. Mr. Chen's transactions entailed no such distortions, or the potential for such distortions.

Summary and Conclusions

49. Mr. Chen engaged in transactions that put him at risk, and hence which were not wash trades. Moreover, Mr. Chen did not exercise market power or engage in misleading or deceitful acts. Furthermore, he responded rationally to economic incentives—price signals—inherent in the PJM market design. As a result, his trades were legitimate, and not manipulative. Moreover, his trades did not distort the production, consumption, or transmission of power. Thus, there is no economic basis for pursuing legal action against Mr. Chen.

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

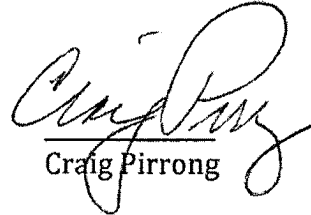
PJM Up-To Congestion Transactions

Docket No. IN10-5-000

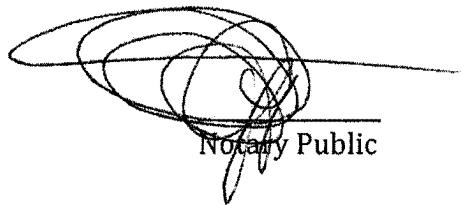
State of Missouri)
)
County of St. Louis) ss

AFFIDAVIT

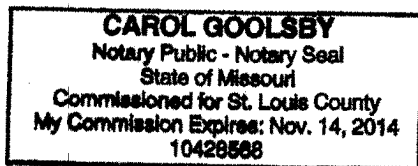
Craig Pirrong, first being duly sworn on oath, deposes and says that the foregoing is his sworn affidavit in this proceeding and that the foregoing affidavit is true, correct, and complete to the best of his information, knowledge, and belief.


Craig Pirrong

Subscribed and sworn to before me this 8th day of December, 2010


Notary Public

My Commission Expires:



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EDUCATION

Ph.D., UNIVERSITY OF CHICAGO, December, 1987.

Thesis: An Application of Core Theory to the Study of the Organization of Ocean Shipping Markets.

M.B.A., UNIVERSITY OF CHICAGO, March, 1983.

Concentrations in finance, economics and econometrics.

B.A., THE UNIVERSITY OF CHICAGO, June, 1981.

Major in economics.

THE UNITED STATES NAVAL ACADEMY, July, 1977-August, 1979.

EMPLOYMENT

BAUER COLLEGE OF BUSINESS, UNIVERSITY OF HOUSTON, Houston, TX. Professor of Finance and Director, Global Energy Management Institute, 2003-present.

OKLAHOMA STATE UNIVERSITY, Stillwater, OK. Watson Family Professor of Commodity and Financial Risk Management and Director, Center for Risk Management, 2001-2003.

WASHINGTON UNIVERSITY, OLIN SCHOOL OF BUSINESS, St. Louis, MO.

Assistant Professor of Finance, 1996-2001.

UNIVERSITY OF CHICAGO, GRADUATE SCHOOL OF BUSINESS, Chicago, IL. Visiting Assistant Professor of Finance (October, 1994-August, 1996).

UNIVERSITY OF MICHIGAN, SCHOOL OF BUSINESS ADMINISTRATION, Ann Arbor, Michigan. Assistant Professor of Business Economics and Public Policy (January, 1989-June, 1996).

LEXECON, INC., Chicago, Illinois. Economist (November 1987-December, 1988).

GNP COMMODITIES, Chicago, Illinois. Senior Investment Strategist (1986-1987).

PUBLICATIONS

Articles

- “The Clearinghouse Cure.” (Lead article.) *Regulation*, 2009.
- “Clearing Up Misconceptions on Clearing.” *Regulation*, 2008.
- “The Price of Power: The Valuation of Power and Weather Derivatives.” *Journal of Banking and Finance*, 2008.
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“The New Economy: Implications for the Organization and Structure of Securities Markets.” In D. Jones (ed.), *The New Economy Handbook*. The Academic Press, 2003.

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PAPERS PRESENTED

“Stochastic Volatility and Commodity Price Dynamics.” Texas A&M University, 31 October, 2008. Institute of Financial Mathematics Conference, Champuloc, Italy, 21 January 2008.

“The Price of Power.” Commodities 2007. University of London, 17 January, 2007.

“Modeling Issues in Commodity Markets.” Commodities 2007. University of London, 18 January, 2007.

“Momentum In Futures Markets.” 2005 European Finance Association Meetings, Moscow, Russia, 25 August, 2005. University of Illinois, September, 2006.

“Upstairs, Downstairs.” 2003 European Finance Association Meetings, Glasgow, 27 August, 2003.

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“The Price of Power.” 2002 European Finance Association Meetings, Berlin, 28 August, 2002.

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“Technological Change, For-Profit Exchanges, and the Self-Regulation of Financial Markets.” American Law and Economics Association Meetings, New York, 7 May, 2000.

“Manipulation in Power Markets.” University of California Energy Institute Restructuring Conference, Berkeley, 17 March, 2000.

“A Positive Theory of Financial Exchange Organization.” International Society of the New Institutional Economics Meetings, Paris, 18 September, 1998.

“A Positive Theory of Financial Exchange Organization.” American Law and Economics Association Meetings, Berkeley. 8 May, 1998.

“Efficient Deterrence of Manipulation in Futures Markets.” American Law and Economics Association Meetings, Chicago. 6 May, 1996.

“Raising Revenue in the Worst Way: The Economic Effects of Asymmetric Hedge Taxation.” Virginia Tech Symposium on “Hedge Taxation After *Arkansas Best*: Law, Economics, and Public Policy.” 21 July, 1993.

“Fundamentals and Volatility: Storage, Spreads, and the Dynamics of Metals Prices.” National Bureau of Economic Research Summer Institute Workshop on Asset Pricing. 20 July, 1993. American Finance Association Meetings, 3 January, 1993.

“Price Dynamics in Physical Commodity Spot and Futures Markets.” Econometric Society Meetings, 7 January, 1993. Western Finance Association Meetings, June, 1993. ORSA/TIMS Meetings, November, 1993.

“Still Nature's Metropolis?” Kalo Hineman Symposium on Grain Futures Market Delivery Issues at the Commodity Futures Trading Commission, 15 September, 1991.

“Maintaining the Integrity of the Futures Delivery Process: The Economics of Manipulation and its Deterrence.” American Bar Association/Virginia Tech Conference on Market Manipulation, 9 November, 1990.

“Multiple Delivery Points: Manipulation, Liquidity, and Basis Risk.” American Bar Association/Virginia Tech Conference on Market Manipulation, 10 November, 1990.

Seminar presentations at North Carolina State University, Vanderbilt University, Southern Methodist University, the Federal Reserve Bank of Atlanta, the University of Missouri, the University of Kansas, Arizona State University, Babson University, Yale University Law School, the Michigan Business and Law Schools, the University of Chicago, the Tuck School of Business at Dartmouth University, North Carolina State University, the University of Alberta, Virginia Tech University, Washington University, Columbia University Law School, and the Commodity Futures Trading Commission.

CURRENT RESEARCH ACTIVITY

Papers Under Review

“The Price of Power: The Valuation of Power and Weather Derivatives.” Second round, *Journal of Banking and Finance*.

“Rocket Science, Default Risk, and the Organization of Derivatives Markets.” First round,
Journal of Law and Economics.

Selected Working Papers

“The Industrial Organization of Trading, Clearing, and Settlement in Financial Markets.”

“The Valuation of Power Options in a Pirrong-Jermakyan Model.”

“Momentum in Futures Markets”

“Bund for Glory, or, It’s a Long Way to Tip a Market.”

“Upstairs, Downstairs: Electronic vs. Open Outcry Markets.”

“The Macrostructure of Electronic Financial Markets.”

“The Organization of Electronic Financial Markets.”

“Third Markets and the Second Best.”

“The Price of Power: Valuation of Power and Weather Derivatives.”

“Manipulation of Power Markets.”

“The Economic Implications of *Arkansas Best*: Asymmetric Tax Treatment of Hedge Income, Hedging Effectiveness, and Price Discovery.”

“The Effects of *Arkansas Best* on Hedge Ratios.”

“Brave New World? The Prospects for Computerized Futures Trading.”

“A Structural Model of Cross Hedging Risk.”

“Two Cheers for Follow-on Research in Pharmaceutical Markets.”

“The Asset Management Incentives Implicit in FSLIC Assisted Acquisition Agreements.”

“Futures Markets as Implicit Loan Markets: The Case of Grains.”

Research in Progress

Momentum in Futures Markets.

Storable Commodity Price Dynamics and Commodity Derivatives Pricing.

Power Price Dynamics.

Pricing Contingent Claims on Power and Weather.

Clearing Mechanisms in Derivatives Markets: Efficiency and Distributive Issues.

Rights Aspects of Commodity Exchanges

Reports

“Woodpulp Futures: Establishing the Essential Facts.” Report to OM Stockholm, 1996.

“Agricultural Futures Exchange in Germany for Europe: Feasibility-Design-Implementation.” Report to the Warentermiborse, 1995.

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“Is There a Future for Stock Branch Indices?” Catalyst Institute Report, 1994.

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“Political Rhetoric and Stock Price Volatility: A Case Study.” Catalyst Institute Report, 1993.

“The Relation Between Oil and Gasoline Futures and Spot Prices” (with Victor Ng). Report submitted to the New York Mercantile Exchange, 1992.

“An Economic Analysis of the Grain and Oilseed Delivery Mechanism at the Chicago Board of Trade.” Report submitted to the Chicago Board of Trade, 1991.

“Crisis Resolution in the Thrift Industry: Beyond the December Deals” (with Victor Bernard, Roger Kormendi, and Ted Snyder). Reported submitted to the Federal Home Loan Bank Board, 1989.

Refereeing Activities

American Economic Review; Economic Inquiry; International Journal of Law and Economics; Journal of Business; Journal of Economic Dynamics and Control; Journal of Economics and Finance; Journal of Finance; Journal of Financial Markets; Journal of Futures Markets; Journal of Industrial Organization; Journal of Law and Economics; Journal of Quantitative Financial Analysis; Journal of Risk; Review of Financial Studies; Journal of Economic Behavior and Organization; Journal of Business and Economic Statistics; Managerial and Decision Economics; Journal of Economics and Business.

FELLOWSHIPS

Oscar Mayer Fellow, University of Chicago (1983-1986)

RESEARCH GRANTS

Montreal Exchange grant to evaluate feasibility of introducing new commodity futures contracts. OM Stockholm and OMLX, London grant to study the feasibility of a pulp futures market and to design pulp futures and futures options contracts, 1996.

Winnepeg Commodity Exchange grant to study the contracts, rules, and bylaws of the WCE, with the objective of making recommendations to revise them in order to improve the performance of the Exchange's markets, 1994.

Catalyst Institute/DTB Deutsche Terminbörse grant to study the effects of attracting local traders to the DTB, 1994.

Catalyst Institute/DTB Deutsche Terminbörse grant to study the feasibility of new currency derivatives contracts, 1994.

Catalyst Institute/DTB Deutsche Terminbörse grant to study the feasibility of stock branch index derivatives, 1994.

Virginia Tech Center for Study of Futures and Options Markets grant to study the economic implications of the Internal Revenue Service policy on the taxation of hedging gains and losses 1993.

Warner Lambert Corporation grant for the study of competition in pharmaceutical markets 1990-1991.

Chicago Board of Trade grant to study grain futures market delivery issues 1990-1991.

EXECUTIVE TEACHING

Bayerische Vereinsbank, 1995

Anheuser-Busch, 1996.

Energy Power and Risk Management Courses and Conferences, March, June, September, and December, 1999, May 2000.

Peabody Coal Co., 2000.

HSM II Program, Olin School of Business, Washington University, Spring 2000.

PERSONAL

Married to Terry Lehman Pirrong. Two children: Renee Elise and Genevieve Corinne. Hobbies: history (especially U.S. Civil War), agonizing over Chicago sports teams, and exercise.

APPENDIX B

UP-TO CONGESTION TRADES IN PJM

UP-TO CONGESTION TRADES IN PJM

According to PJM,¹ up-to congestion (“UTC”) transactions were originally created as a mechanism to hedge in the Day-ahead Energy Market the exposure to price differentials from the source to the sink of their physical energy deliveries into, out of or through PJM in the Real-time Energy Market, and to allow market participants who want to wheel power through PJM to set the maximum dollar value of congestion they would be willing to pay to wheel that power.

Thus, as PJM stated in 2000:

“Up-to” congestion bids permit transmission customers to specify how much they are willing to pay for congestion by bidding a certain maximum amount for congestion between the transaction source and sink. If the congestion charges are less than the amount specified in the bid, then the transaction will be scheduled in the day-ahead schedule. These “up-to” bids protect transmission customers from paying uncertain congestion charges by guarantying that they will pay no more than the amount reflected in their bids.²

Under PJM’s rules, UTC trades require at least one interface node so that they always involve a PJM import or export (or a wheel-through, for example, from MISO to NYISO). For example, a trader can import actual or virtual megawatts from MISO to Node A within PJM, or export from Node B within PJM to MISO, but the trader cannot reserve transmission from Node A to Node B both within PJM as an up-to congestion transaction. Also, the nodes (also called

¹ *PJM Interconnection, L.L.C.*, Tariff Filing, Docket No. ER10-2280-000 at 2-3 (Aug. 18, 2010) (“August 18, 2010 Tariff Filing”).

² See *id.* at 3 (quoting PJM Compliance Filing, PJM Interconnection, L.L.C., Docket No. ER00-1849-000 (Mar. 10, 2000)).

zones, hubs, or buses) are limited to those selected by PJM. Dr. Chen estimates that, out of more than 7,000 nodes in PJM, approximately 10 percent of them are available for UTC trading.

In order to reserve transmission for a UTC transaction, the trader must first make an OASIS transmission reservation and then schedule the transaction using PJM's Enhanced Energy Scheduling ("EES") system. PJM's trading window is open from 8:00 am until 12 noon eastern time for next day's trades. During that period of time, a trader like Dr. Chen could reserve non-firm point-to-point up-to congestion transmission on OASIS, selecting a date and number of hours, a point of receipt and point of delivery, and the number of megawatts per hour. After making this transmission reservation, the trader would then go to PJM's EES system to enter a two-settlement transaction. Here the trader enters the reservation number acquired in previous step and the price the trader willing to pay for congestion. PJM sets the price range a trader is willing to pay for the congestion at +/- \$50 per MWh. Trades that fall within this range are accepted; trades that fall outside of this range the trades are rejected. A trader, however, could set a lower willing-to-pay congestion price, e.g., \$25 or \$35 per MW.

At 4:00 pm eastern time, the day-ahead prices are published and the trader will know if his trades are approved or rejected for each hour for which he sought transmission for the next day. For example, if the trader sought to reserve transmission from MISO to Dayton, and if, for one or more hours (e.g., HE14), the Day-Ahead LMP price of Dayton minus the Day-Ahead LMP price of MISO is greater than \$50, the trade is rejected for HE14, even though some other hours might be accepted. If the trader also sought transmission from either Dayton or another node in PJM back to MISO, he would not have that leg rejected in this example because the day-ahead spread from PJM to MISO would by definition be less than \$50 per MWh.

In this example (MISO to Dayton and another PJM node to MISO), the trades are settled by PJM according to the following formula:

$$\text{PROFIT \& LOSS (P\&L)} = \text{SPREADS} - \text{COSTS} + \text{REFUNDS}$$

Where “spreads” = ((Real-Time LMP of the selected PJM Node - Real-Time LMP of MISO) - (Day-Ahead LMP of the selected PJM Node - Day-Ahead LMP of MISO)).

“Costs” include an amount generally equal to \$0.67 per MWh for non-firm point to point transmission reserved from an interface, like MISO, into PJM. (This charge is not assessed on exports from PJM to MISO but is assessed on exports from PJM to other interfaces.) Additional costs (totaling around \$0.20-\$0.25/MW include: PJM Scheduling, System Control and Dispatch Service - Market Support (SCDS: \$0.04/MW), PJM Scheduling, System Control and Dispatch Service - Advanced Second Control Center (less than \$0.01/MW); Market Monitoring Unit (MMU) Funding (less than \$0.01/MW); Reactive Supply and Voltage Control from Generation and Other Sources Service (RSVC: \$0.14-\$0.23/MW); and Black Start Service (BS: \$0.01/MW). These costs are assessed on both up-to-congestion transmission from an interface to a node in PJM and on transmission from a node within PJM to the interface.³

“Refunds” include transmission line loss credits (which vary and are not known in advance) and PJM Scheduling, System Control and Dispatch Service Refund - Market Support (less than \$0.01/MW).

³ Spreads are computed on an hourly basis. The refunds are calculated on a daily basis and are not tied to individual trades.