STATE OF ILLINOIS
ILLINOIS COMMERCE COMMISSION

Commonwealth Edison	)	
	)	
Approval of Initial Procurement Plan	)	
	)	
	)	
COUNTY OF MULTNOMAH	)	Docket No. 07-0528
	)	
STATE OF OREGON	)	
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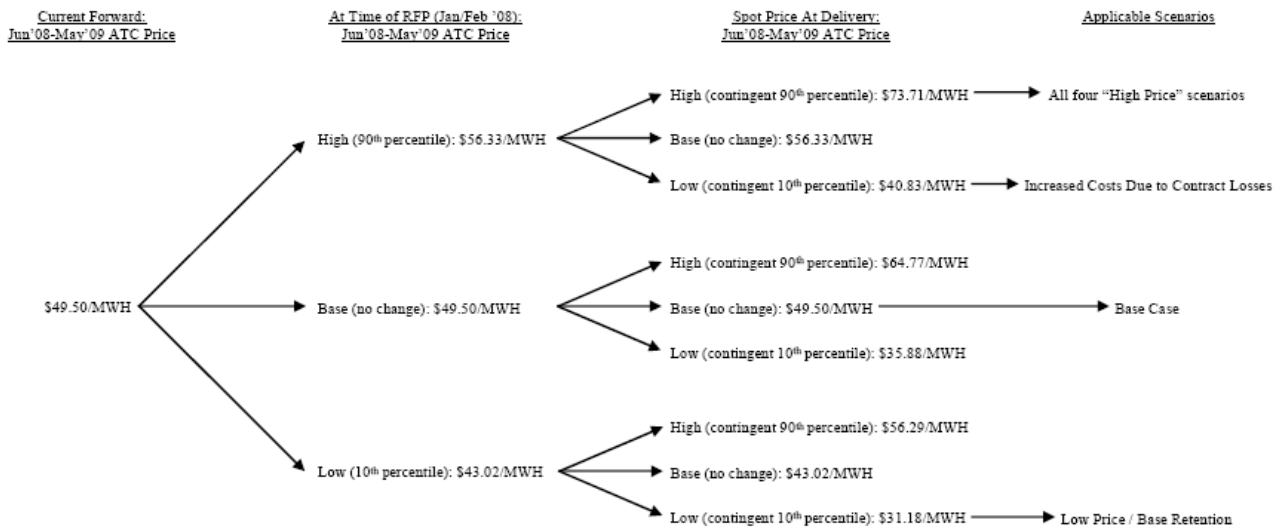
AFFIDAVIT OF
ROBERT F. MCCULLOUGH

1. On October 26, 2007 Commonwealth Edison filed its Procurement Plan for the Period June 2008 - May 2009 ("Plan"). The Plan is based in large part on technical analysis of cost and risk, and that analysis is described in the Plan, though not in enough detail to allow auditing by interested parties.
2. On November 5, 2007, Commonwealth Edison initially responded to data requests from various parties, including the Illinois Attorney General, regarding the Plan and the analytical procedures and data on which the plan was based.
3. Substantive responses of a technical nature were received from Commonwealth Edison late on November 9, 2007.
4. A review of the plan and the data provided thus far indicates that Commonwealth Edison has not conducted a complete analysis of price risk and load uncertainty.
5. Commonwealth Edison's analysis of risk faced by its customers under the proposed plan is minimal, being constituted by nothing more than a small collection of seven example circumstances. In addition to a base case, Commonwealth Edison addressed six other cases, as shown in a chart from its plan:

Chart III-1

Risk Analysis Price Driver Tree



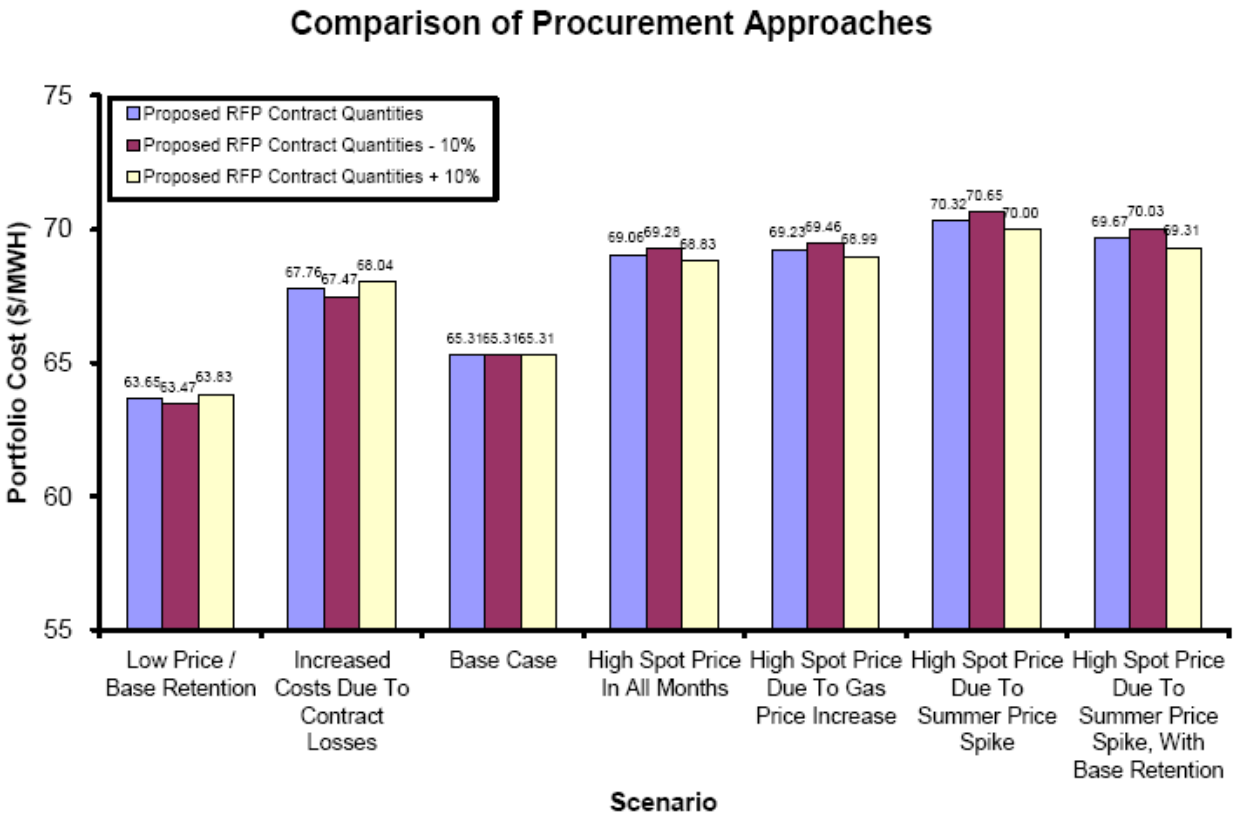
6. The top path in this Risk Analysis Price Driver Tree is the most significant since it represents cases where consumers will be exposed to costly price swings in the market. In order to get a more complete picture as to how the four high price scenarios fit into the total analysis, the Office of the Attorney General sent a data request (AG 1.10) to ComEd asking how the seven scenarios (base plus six alternatives) should be weighted. ComEd's response to this data request, which is appended to this filing as AG Ex. 1.1, states:

> These scenarios provide a good illustration and understanding of portfolio cost risk. While there is truly an infinite number of possible future scenarios, the selected scenarios were chosen because they are plausible, internally consistent, and represent fairly extreme market conditions. Other scenarios could have been analyzed, such as a scenario in which market prices spiked in just one summer month, but such scenarios would represent less risk and hence would not be informative.
>
> No probabilities have been associated with the seven scenarios analyzed. Pages 43-46 of the Plan describe how the price levels associated with the scenarios relate to price volatility calculations.

7. ComEd's risk-analysis-by-seven-examples is inadequate because it fails to provide any reliable objective guidance regarding an appropriate level of hedges to acquire in ComEd's resource portfolio used to serve its customers. Better alternative courses of action are suggested by Chart III-3 (which appears on page 55 of the Plan and is reproduced below). This chart indicates that slightly higher hedges would lower costs in all four high cost scenarios and roughly break even in

the remaining three cases, thus hinting at the possibility that carrying some length in the resource portfolio could lower the rate risk to which customers are exposed.

Chart III-3

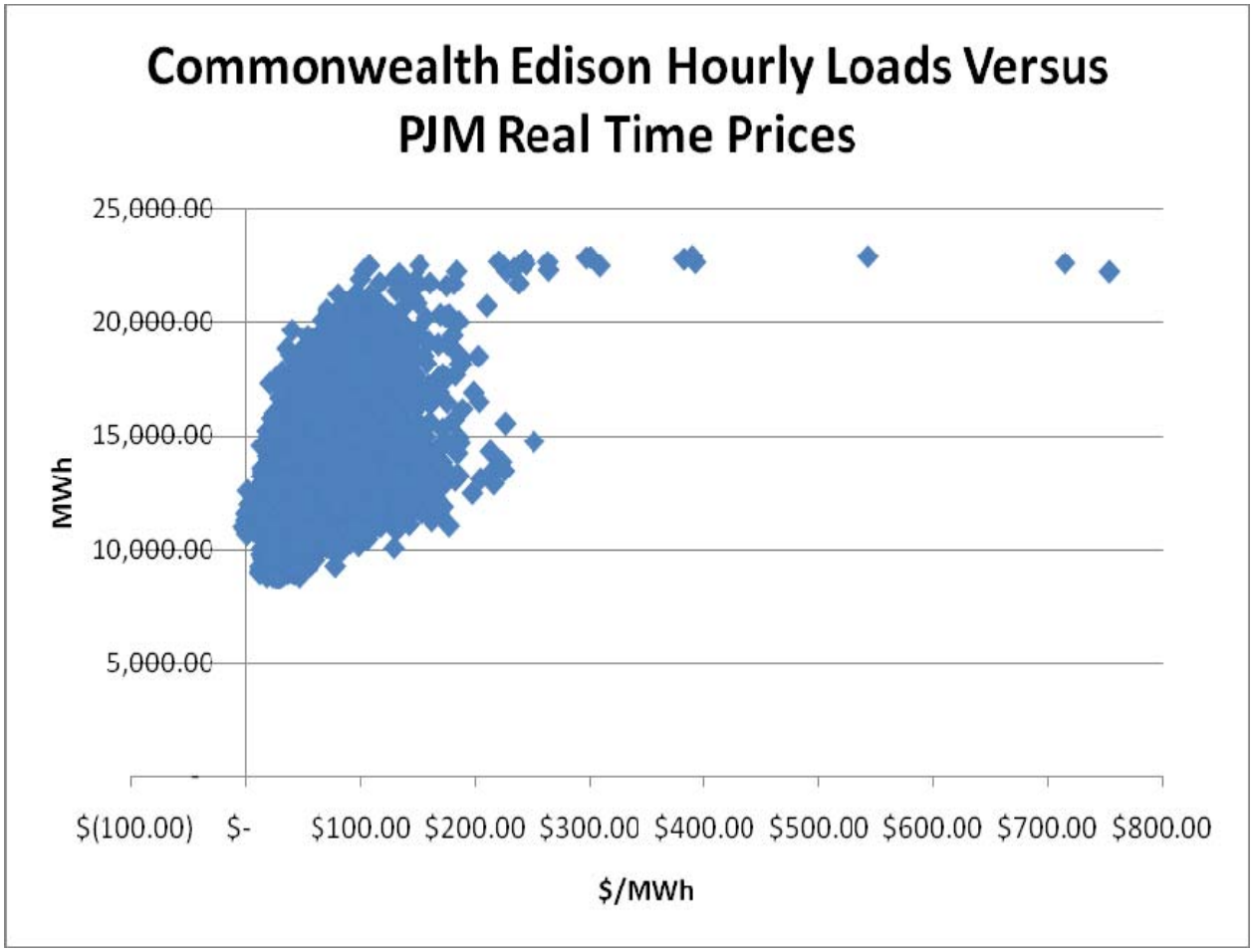


8. Market prices and customer load are usually related in a positive way, i.e., relatively high prices generally occur at the same time as relatively high loads, and relatively low prices at the same time as relatively low loads. Furthermore, the observed probability distributions of both load and price are skewed toward higher values, especially price. The practical meaning of this is that though prices can never fall below zero, they are in theory unbounded as to increases; the distribution of price has a long heavy "tail" extending far above the forecasted price, but can fall no lower than zero below the forecasted price. Thus the consequences of not purchasing enough energy ahead of time to cover occasions of high load and high price are commonly considerably more onerous than the consequences of purchasing too much energy ahead of time when prices and loads are lower than forecast. For example, the highest price during the historical period analyzed below (see paragraph 10) occurred on August 1, 2006 which was also the date of one of the highest loads.

9. Therefore, Commonwealth Edison's conclusion that the hedge should match the amount necessary to serve forecasted load, seems likely to expose Commonwealth Edison's customers to greater risk than necessary. At the heart of the problem is the question of which risk Commonwealth Edison is hedging against. If the hedge were to avoid physical interruption, the

correct answer would be to hedge against loads – effectively the approach Commonwealth Edison has chosen. However, the primary risk that needs to be addressed in this Plan is economic risk. The appropriate risk to hedge against is the expense of additional spot purchases. Thus the critical distribution is the distribution of purchase cost. Given the correlation between loads and prices, as well as asymmetric risk at higher loads and prices, a higher level of hedge is less risky to the consumer.

10. The chart below shows historical values for Commonwealth Edison's loads and PJM real time prices:



11. I have performed a very simple analysis to check the dependencies among market price, customer load and the price of natural gas relevant to service for Commonwealth Edison's customers, and have found that the anticipated dependent behavior (i.e., prices and loads tend to be simultaneously high or simultaneously low) can be expected to occur, based on recent historical data.

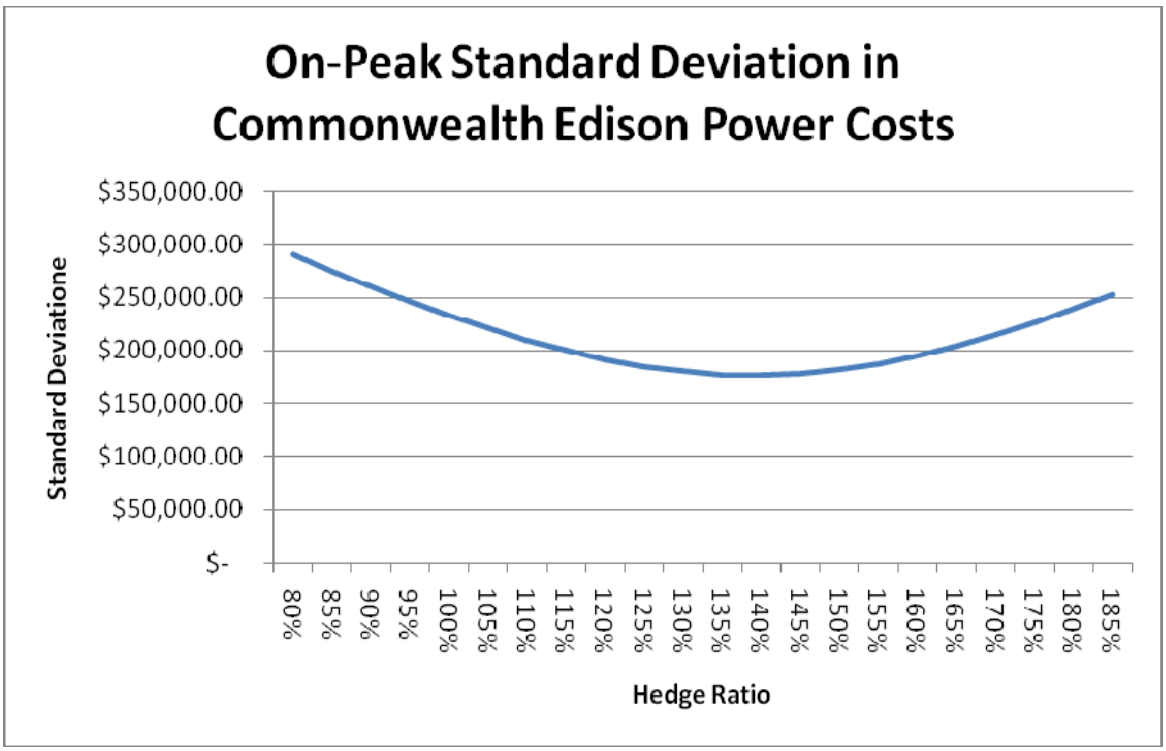
12. The regression results are highly significant:

[redacted]

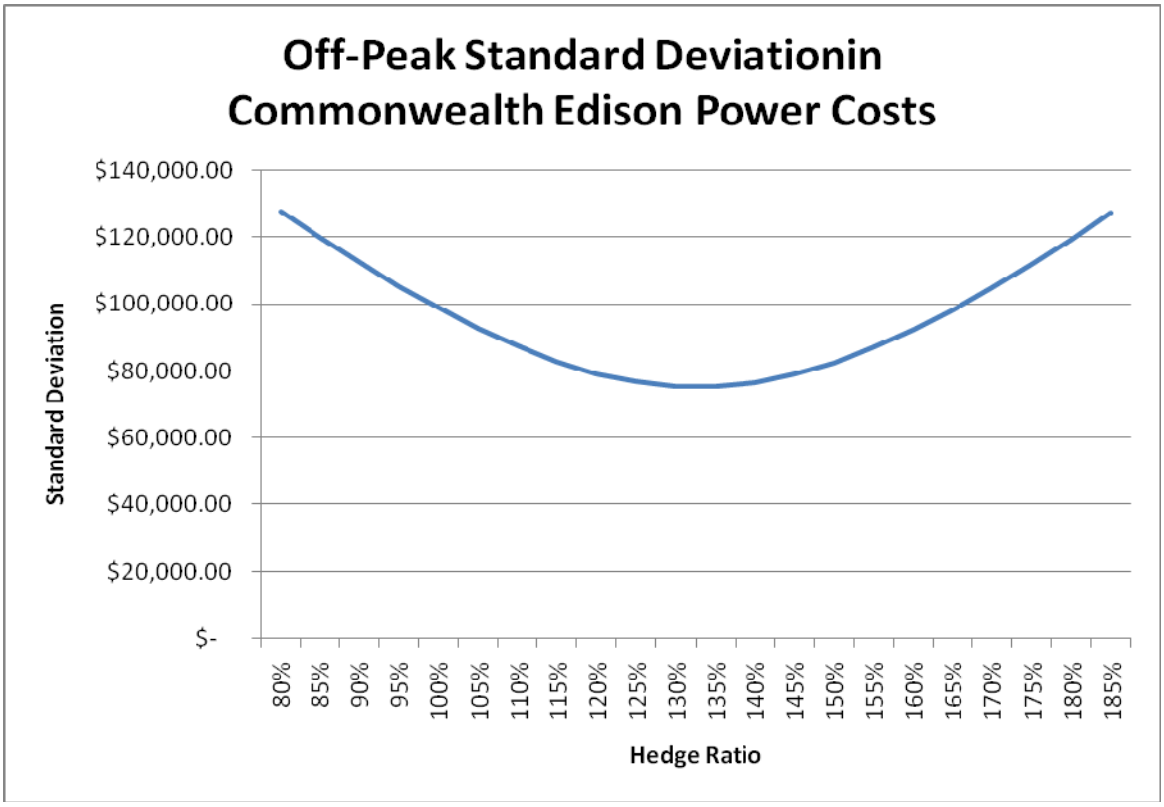
Clearly, there is a high degree of confidence that prices and loads are correlated. The regression does not imply causation but this is not the issue in the risk analysis. The issue is whether the risk potential for higher loads during periods of higher prices should be included in Commonwealth Edison's analysis.

13. Furthermore, my analysis strongly suggests that some positive hedging would benefit customers by exposing them to lower risk, in a standard value-at-risk sense, where risk can be usefully measured as the standard deviation of the distribution of cost outcomes.

14. Commonwealth Edison's historical data strongly indicates that it is possible to reduce cost risk by increasing the amount of hedging above the level of expected load, largely because high prices are associated with high loads. The chart below shows the risk measure result of a historical simulation of Commonwealth Edison's loads using PJM real time prices from May 1, 2004 through November 30, 2006, explored across a range of hedge ratios.

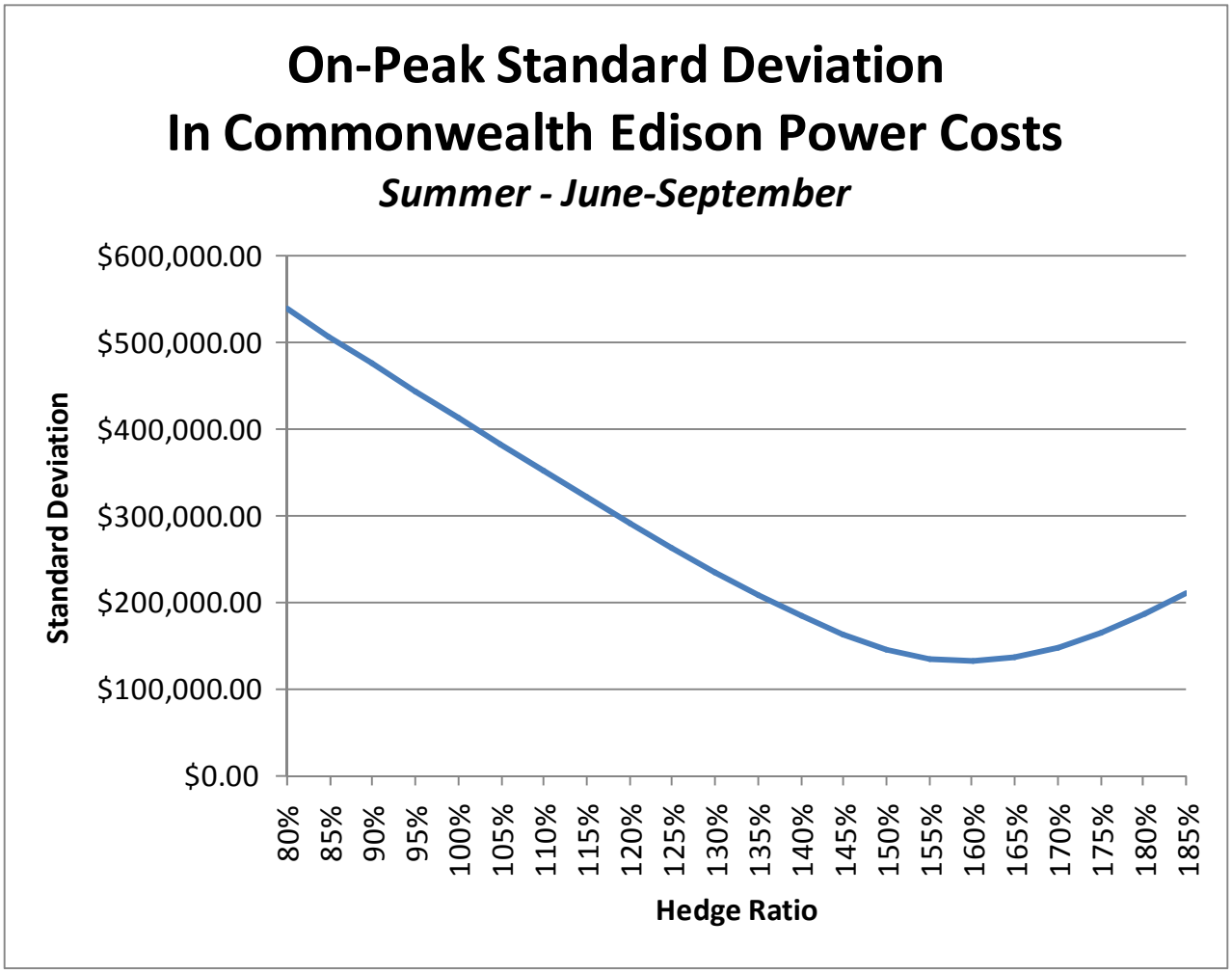


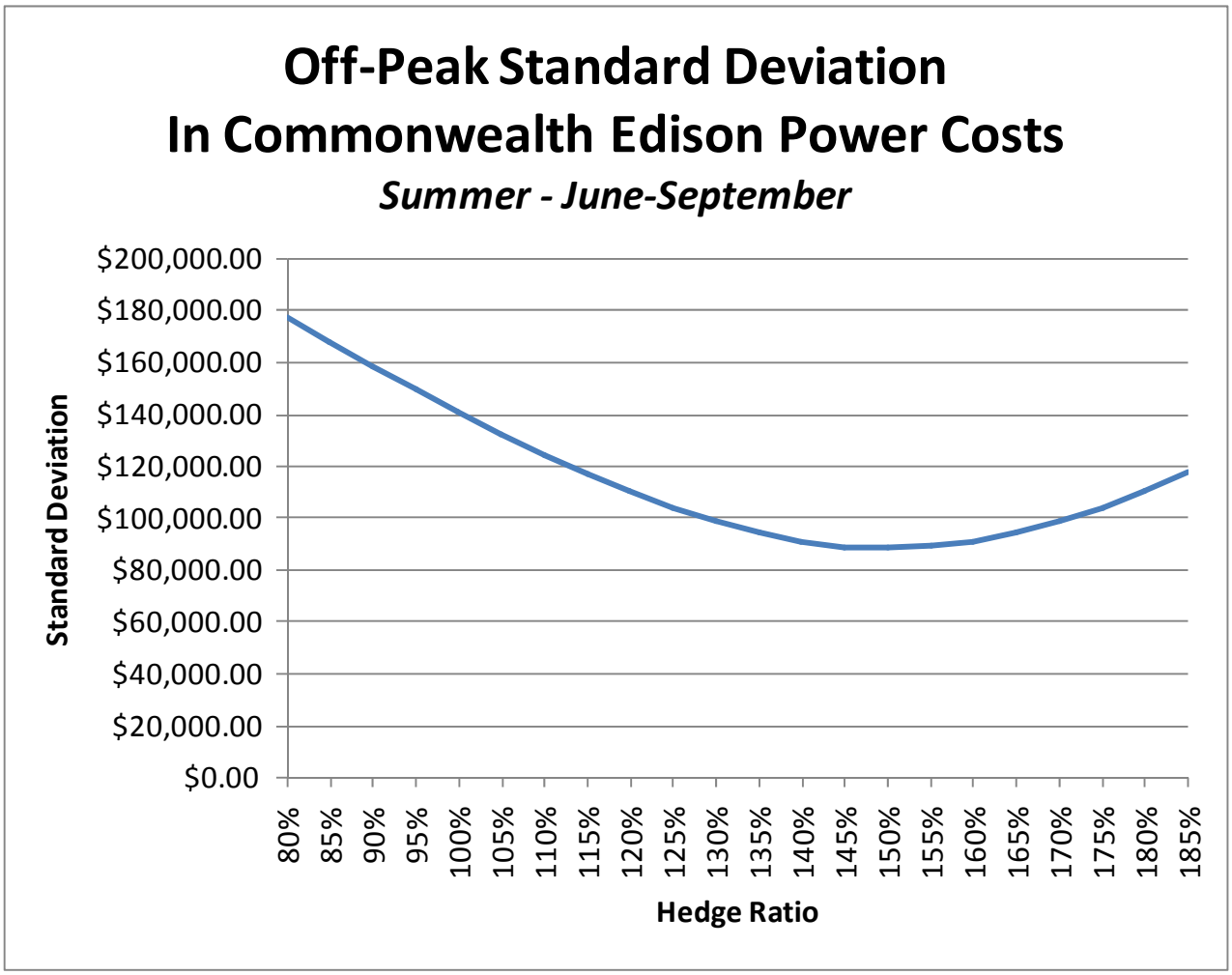
15. Similar results are present for off-peak loads:



16. In fact, the level of hedging that yielded the minimum risk in my analysis using both on-peak and off-peak historical data occurred at about 135% of expected load. This is considerably greater than the position recommended in Commonwealth Edison's Procurement Plan.

17. If just the peak air conditioning months of June through September are examined, minimum risk hedging, evaluated by a similar analysis, is significantly higher, on the order of 160%, as shown in the following two charts.





18. I cannot determine why my results differ so markedly from those of the Commonwealth Edison Plan until I have adequately reviewed the data and analytical details used by Commonwealth Edison to produce the Plan. This review requires examination of materials received on November 9, 2007, and will require several days of study, assuming that the materials are complete.

19. It is impossible to evaluate the extent to which ComEd plans to use Demand Response to mitigate the risks identified above, because the Plan simply indicates that details of the company's Demand Response programs will be provided in a separate docket on Thursday, November 15, 2007. Since Demand Response can be used to offset the risks identified above, it is important that details concerning the Demand Response programs be addressed in the ComEd Plan so that these programs can be properly evaluated to determine whether risks to consumers have been adequately mitigated.

20. This completes my affidavit.

ICC Docket No. 07-0528

Commonwealth Edison Company's Response to
People of the State of Illinois' (AG) Data Requests 1.01 – 1.17
Dated: November 2, 2007

REQUEST NO. AG 1.10:

Regarding Chart II-1 on page 46 of the Procurement Plan, were any other scenarios analyzed besides the seven portrayed in the chart? If so, please provide all data and analyses used or developed by or for Commonwealth Edison Company regarding such scenarios. Provide any probabilities that have been associated with each scenario by or for Commonwealth Edison Company.

RESPONSE:

The request refers to Chart II-1, but probably is meant to refer to Chart III-1, which is found on Page 46 of the Plan. The response below assumes that the request refers to Chart III-1.

No other scenarios besides those portrayed in the chart were analyzed, as Page 53 of the Plan states:

> These scenarios provide a good illustration and understanding of portfolio cost risk. While there is truly an infinite number of possible future scenarios, the selected scenarios were chosen because they are plausible, internally consistent, and represent fairly extreme market conditions. Other scenarios could have been analyzed, such as a scenario in which market prices spiked in just one summer month, but such scenarios would represent less risk and hence would not be informative.

No probabilities have been associated with the seven scenarios analyzed. Pages 43-46 of the Plan describe how the price levels associated with the scenarios relate to price volatility calculations.

Robert McCullough

STATE OF OREGON)
) ss.
County of Multnomah)

This instrument was acknowledged before me on November 13, 2007 by Robert McCullough.

OFFICIAL SEAL
TASHA CHAMBERS
NOTARY PUBLIC-OREGON
COMMISSION NO. 410470
MY COMMISSION EXPIRES OCTOBER 2, 2010

Notary Public for Oregon
My commission expires: OCT 2. 2010