

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

APPLICATION OF LOUISVILLE GAS AND ELECTRIC)
COMPANY FOR AN AMENDED ENVIRONMENTAL)
COMPLIANCE PLAN, A REVISED SURCHARGE TO)
RECOVER COSTS, AND CERTIFICATES OF PUBLIC)
CONVENIENCE AND NECESSITY FOR THE)
CONSTRUCTION OF NECESSARY)
ENVIRONMENTAL EQUIPMENT)

CASE NO. 2011-00162

RECEIVED

In the Matter of:

OCT 13 2011

APPLICATION OF KENTUCKY UTILITIES)
FOR CERTIFICATES OF PUBLIC CONVENIENCE)
AND NECESSITY AND APPROVAL OF ITS 2011)
COMPLIANCE PLAN FOR RECOVERY)
BY ENVIRONMENTAL SURCHARGE)

PUBLIC SERVICE
COMMISSION

CASE NO. 2011-00161

**RESPONSES AND OBJECTIONS OF RICK CLEWETT, RAYMOND BARRY, SIERRA
CLUB AND NATURAL RESOURCES DEFENSE COUNCIL TO COMMISSION
STAFF'S FIRST REQUESTS FOR INFORMATION**

Intervenors Rick Clewett, Raymond Barry, Sierra Club, and Natural Resources Defense
Council (collectively, "Intervenors") hereby submit their responses and objections to the
Commission Staff's First Requests for Information:

1. Refer to page 3 of the Direct Testimony of William Steinhurst, Ph.D. at line 16, where Mr.
Steinhurst states that, "[t]he Commission should examine these same issues in its ongoing proceeding
regarding the Companies' IRP" and at lines 23-24 where he states that, "[t]he Commission may wish to
require that filing be made in its proceeding on the Companies' IRP."

a. Explain whether Mr. Steinhurst is aware that, pursuant to 807 KAR 5:058, the
administrative regulation governing the filing of integrated resource plans ("IRPs") by Kentucky's
regulated electric generating utilities, the review of the IRPs is an informal process resulting in a
report by the Commission Staff critiquing the IRP, not a Commission Order which makes a
formal ruling on the utility's IRP.

RESPONSE: William Steinhurst; Counsel

Intervenors object to this request to the extent that it seeks a legal conclusion from an expert witness. Subject to and without waiving the foregoing objection, Intervenors state that Mr. Steinhurst is aware of 807 KAR 5:508 (“the Regulation”), which provides, in relevant part:

(3) Upon receipt of a utility’s integrated resource plan, the commission shall establish a review schedule which may include interrogatories, comments, informal conferences, and staff reports. [Sec. 2(3)]

.....

Section 11. Procedures for Review of the Integrated Resource Plan. (1) Upon receipt of a utility’s integrated resource plan, the commission shall develop a procedural schedule which allows for submission of written interrogatories to the utility by staff and intervenors, written comments by staff and intervenors, and responses to interrogatories and comments by the utility. (2) The commission may convene conferences to discuss the filed plan and all other matters relative to review of the plan. (3) Based upon its review of a utility’s plan and all related information, the commission staff shall issue a report summarizing its review and offering suggestions and recommendations to the utility for subsequent filings. (4) A utility shall respond to the staff’s comments and recommendations in its next integrated resource plan filing.

Mr. Steinhurst also understands that the Commission has set a schedule regarding discovery by Staff and intervenors, but has suspended that schedule. [Orders of 5/16/11 and 7/27/11 in the present proceeding]. While Mr. Steinhurst is not personally familiar with Commission practice in prior IRP proceedings, Intervenors assume for the purpose of this answer that it has been for “an informal process resulting in a report by the Commission Staff critiquing the IRP, not a Commission Order which makes a formal ruling on the utility’s IRP.”

Intervenors note that the Regulation allows for “informal conferences” and “staff reports,” but does not restrict the Commission to those types of process. The Regulation equally allows for the filing of written comments by intervenors, and requires a staff report with “suggestions and recommendations,” which the utility “shall respond to” in its next IRP filing.

However, the Regulation does not appear to preclude any additional procedure the Commission might wish to order, up to and including technical hearings and binding orders issued by the Commission. As such, it could be that the Commission will conclude that the size, complexity and long-lasting cost of service effects of the proposals in the present IRP filing warrants more intensive scrutiny than it may have deemed necessary in the past.

Regardless of the Commission's selection of formal or informal process, the purpose of the IRP is to provide for "regular reporting and commission review of load forecasts and resource plans of the state's electric utilities to meet future demand with an adequate and reliable supply of electricity at the lowest possible cost for all customers within their service areas, and satisfy all related state and federal laws and regulations." 807 KAR 5.508. The proposed filing falls squarely within the stated purpose of the Regulation. Further, the Commission could reasonably interpret one or more of the many specific filing requirements already in the Regulation such that the proposed filing is the required response on a going forward basis. See, for example, 807 KAR 5:508 Sec. 5(2), Sec. 5(4-6), Sec. 8(1 & 2), Sec. 8(3)(b)(12), Sec. (8)(4 & 5).

For the reasons stated in Mr. Steinhurst's prefiled testimony, the proposed filing is the minimum reasonable requirement for the Commission and intervenors to be confident that resource planning complies with the stated purpose of the Regulation and the fundamental realities of coal-fired generation today and in the future.

b. Mr. Steinhurst states that, at lines 19-23, “[t]he Commission should direct the Companies to develop resource alternatives that address the concerns identified in the prefiled testimony of witness Fisher and to file it by a single date certain along with supporting workpapers and documentation sufficient for the Commission and intervenors to fully evaluate the analytical basis for the alternatives.” Given the time constraints and potential lead times related to potential alternatives, by what date does Mr. Steinhurst believe such a filing should be required of Kentucky Utilities Company (“KU”) and Louisville Gas and Electric Company (“LG&E”)?

RESPONSE: William Steinhurst

The Companies and the Commission are in the best position to identify the most appropriate filing date.

2. Refer to page 10, lines 7-11, of the Direct Testimony of Jeremy Fisher, Ph.D. (“Fisher Testimony”) where Mr. Fisher states that, “we did not evaluate anticipated NOX and SO2 prices, the impact of including appropriately-sized capacity expansion options, the effect of including electricity purchases and sales outside of the LG&E/KU system as an option, or a more optimal retirement order.”

a. Based on this statement, explain whether it is accurate to characterize Mr. Fisher’s position as one which recommends denial of the KU/LG&E request for Certificates of Public Convenience and Necessity (“CPCN”), but offers nothing for the Commission to consider as alternatives to the KU/LG&E proposals.

RESPONSE: Jeremy Fisher, Counsel

Intervenors object to this request to the extent that it suggests that Intervenors bear the burden of identifying resource proposals that satisfy the requirements for obtaining a CPCN. In fact, it is the Companies as the applicants who bear the burden of setting forth the facts necessary to demonstrate entitlement to a CPCN. 807 KAR 5:001(9)(2)(a). Subject to and without waiving the foregoing objection, Intervenors state as follows:

The characterization of Dr. Fisher’s testimony is incorrect. Dr. Fisher’s position is that the petition presented by the Companies offers insufficient justification to pursue the environmental upgrades. Similarly, Dr. Steinhurst states the recommendation that “the

Commission should direct the Companies to develop resource alternatives that address the concerns identified in the prefiled testimony of witness Fisher...” The Companies are in the best position to provide proof that their plan and investment adequately provides for the least cost for ratepayers, while appropriately managing risk, or to identify and evaluate specific alternatives. Testimony provided by Dr. Fisher offers recommendations on how the Companies should manage and consider risks not currently considered in the Companies’ filing.

- b. Explain whether Mr. Fisher’s direction from the Environmental Intervenors was limited to reviewing and critiquing the KU/LG&E proposals.

RESPONSE: Jeremy Fisher, Counsel

Intervenors object to the extent that this request seeks information that is protected by attorney-client or other applicable privileges. Subject to and without waiving the foregoing objection, Intervenors state as follows:

Dr. Fisher received no such direction. Intervenors requested that Synapse Energy Economics, Inc. review the Companies’ filings and assess whether the Companies had appropriately managed environmental compliance obligations and future risks in their resource planning. Upon review, Synapse staff determined that there were shortcomings in the analysis which required further review, and subsequently purchased a license to run the Strategist model to test alternate scenarios as set out in Dr. Fisher’s testimony. The license was received on August 22nd, 2011, and the correct build of the model was obtained from Ventyx on September 8th, 2011. Until the final model results were completed and entered into the Companies’ scenario comparison spreadsheet on September 12th, neither Dr. Fisher nor Dr. Steinhurst had developed either conclusions or final recommendations.

3. Refer to page 11, lines 20-22, and page 42, lines 16-26, of the Fisher Testimony.
 - a. On page 11, Mr. Fisher recommends that the Commission deny the KU/LG&E request for CPCNs for Brown Units 1 and 2 and “require the Companies to further analyze the financial risks posed in retrofitting Mill Creek 1 & 2 prior to granting CPCNs on these units.” On page 42, lines 16-22, Mr. Fisher says the Commission should deny CPCNs for Brown Units 1 and 2 and Mill Creek Units 1 and 2. On lines 23-26, he then says the Commission should deny CPCNs “for any upgrades to the Companies’ coal units at this time.” Explain why Mr. Fisher’s recommendation appears to have changed between when he prepared page 11 of his testimony and when he completed his testimony.

RESPONSE: Jeremy Fisher

The CPCN filings request authorization for significant dollar amounts. Given both the rate implications and the long-term ramifications of granting these CPCN, the decision whether to grant the CPCNs should be based on the most accurate and encompassing data feasible. For clarification, Dr. Fisher’s recommendation is a tiered approach:

- Under most reasonable assumptions, retrofitting and operating Brown Units 1 & 2 is non-economic relative to replacement natural gas. Therefore the units should be denied CPCNs. It is unlikely that a re-analysis or closer examination of the risks to Brown Units 1 & 2 would result in a different outcome for these units.
- Using a reasonable gas price forecast and evaluating the reasonable risk of an SCR requirement, the economic merit of Mill Creek Units 1 & 2 decline markedly from the Companies’ estimate of over one billion dollars to a marginal benefit of only \$55 million. Employing a mid-level CO₂ price in concert with these corrected assumptions results in a nearly \$700 million net loss. Therefore, the Commission should require the Company to assess the risks, in concert, of multiple regulatory regimes, and to address the fundamental analytical flaws identified in Dr. Fisher’s testimony prior to deciding whether to grant CPCN on the Mill Creek units.
- Finally, a corrected gas price and mid-level CO₂ price appear to render much of the KU/LG&E fleet non-economic (see Exhibit JIF-S3, Box 7). However, in absence of more information about replacement capacity availability and transmission costs and availability, a specific course of action for these other units cannot be recommended at this time. Instead, it is incumbent on the Companies to assess these costs and risks comprehensively prior to requesting a CPCN.

The net impact of these considerations is that Dr. Fisher recommends that, in this docket, the Commission deny the requested CPCNs.

- b. Describe in detail the further analysis of the financial risks of retrofitting Mill Creek Units 1 and 2, which Fisher recommends on page 11, lines 20-22, that the Commission require of KU and LG&E.

RESPONSE: Jeremy Fisher

Intervenors' review of the Companies' filings and use of more reasonable assumptions regarding natural gas prices, ozone NAAQS, and CO₂ prices finds that the financial risk of retrofitting Mill Creek Units 1 & 2 could result in losses of nearly \$700 million relative to a natural gas replacement facility, and possibly higher if the Companies correct additional flaws identified in Dr. Fisher's testimony. The limited time and resources available have foreclosed a full re-analysis, but Dr. Fisher has identified several issues of concern. Given the significant regulatory exposure of the Mill Creek units, the following items, at a minimum, should be part of a re-analysis:

- A range of natural gas price forecasts based on up-to-date information;
- A reasonable range of price forecasts for carbon dioxide;
- A review of the unit's exposure to EPA enforcement of the greenhouse gas tailoring rule;
- Full support and documentation of the risk of SCR requirements at Brown Units 1 & 2, Mill Creek Units 1 & 2, and Ghent Unit 2, including exploration of proposed ozone and NO_x NAAQS, and modeling which appropriately reflects such risk in concert with the reasonable range of gas and carbon dioxide prices;
- Use of a wider range of replacement options in the Strategist model, including demand-side resources and smaller block replacement capacity (i.e. shares of capacity in a larger unit);
- Include reasonable market transactions with neighboring utilities and regional transmission organizations in Strategist modeling;
- Revise the \$16,600/MWh "emergency energy cost" definition, value and quantity expected. While the current definition and value represents the cost of involuntary blackouts, there are often less expensive mechanisms available such as short term

power purchases, demand response, and various emergency procedures that mitigate the need for involuntary blackouts;¹

- Determine and apply a mechanism to find the optimal portfolio of retirement and retrofit decisions that results in the lowest risk and cost to customers, and establish definitively that the suite of retrofit and retirement decisions actually results in the lowest reasonable PVRR;²
- Examine likely emissions costs for criteria pollutants under CSAPR, and expected cost trajectories with other emissions reducing regulations, such as MACT and SO₂, ozone, and NO₂ NAAQS.

4. Refer to page 18, line 10, of the Fisher Testimony. Confirm that the exhibit reference in this line should be Exhibit JIF-2 rather than Exhibit JIF-1.

RESPONSE: Jeremy Fisher

Confirmed. On page 18, line 10 of Dr. Fisher's Direct Testimony, the first sentence of the paragraph should read "The Companies' results are shown in **Exhibit JIF-2**, Box 1."

5. Refer to page 19, lines 23-26, of the Fisher Testimony, which refers to the drop in natural gas prices in recent years "with the discovery of new plays . . ." and the "continued uncertainty about the future of natural gas prices . . ."

- a. Explain whether "the discovery of new plays" refers to shale gas discoveries that have been credited with increasing U.S. domestic gas supplies.

RESPONSE: Jeremy Fisher

Yes. The reference to "new plays" refers to recent shale gas discoveries, and the realization of the technology required to access these gas resources.

- b. Various published reports have dealt with environmental concerns related to the issue of "fracking" – the method used to recover much of the shale gas. Describe Mr. Fisher's view of

¹ In most RTOs, including PJM and MISO (both of which are connected to LG&E/KU), emergency measures dictate a variety of responses, from grid adjustments to calling interruptible load resources, that proceed last resort rolling blackouts. The Companies cost of "energy not served" only represents the most extreme cost as perceived by customers.

² For example, using the Company's modeling assumptions and framework, but simply analyzing Mill Creek 1 & 2 "first" instead of Tyrone 3, drops Mill Creek's net benefit by one-third. For further detail, please see response to Companies' Discovery Request 4.

how the science and the politics related to the fracking issue are likely to impact access to U.S. domestic shale gas supplies.

RESPONSE: Jeremy Fisher

Dr. Fisher does not claim expertise on the environmental concerns related to the issue of “fracking”, but is of the understanding that additional health and safety oversight may be likely. However, even assuming that environmental regulations might reduce or hinder access to resources, even dramatic decreases in the assumed recoverable resources would not appear to increase prices to the trajectory used in the Companies’ forecast. For example, within the AEO 2011 set of forecasts, the EIA traces trajectories of “high shale recovery” and “low shale recovery”, indicative of recoverable shale gas rather than environmental regulations. However, if environmental regulations restricted gas recovery or operations, the net effect might be similar to a low recovery trajectory. Nonetheless, even the highest price forecast by the EIA is still significantly lower than the Companies’ initial forecast (see Figure 1, below. Company forecast not included due to confidentiality).

The Companies have supplied insufficient information to judge how the EIA’s range of prices compare to the new gas price forecast released in the Companies’ redacted Supplemental Analysis

Henry Hub Natural Gas Price Comparisons (2010\$)

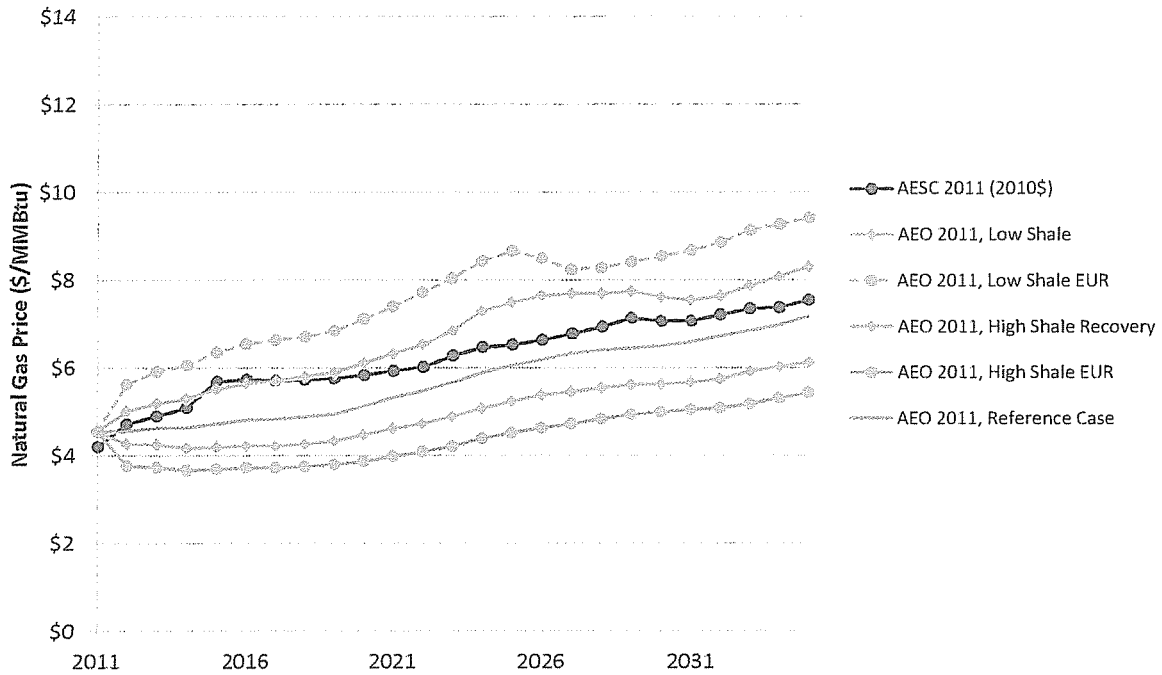


Figure 1. Henry Hub Natural Gas Price Comparisons (2010\$)

6. Refer to page 20 of the Fisher Testimony, footnotes 8 through 15, which identify several publicly available forecasts of Henry Hub natural gas prices, and Exhibit JIF-3. The footnotes indicate that some of the forecasts were prepared in 2010 and some were prepared in 2011. On page 1 of the exhibit, the prices from the various forecasts have been plotted on a graph along with the prices from the KU/LG&E forecast. For each forecast identified in the footnotes, provide the following:

- a. The forecasted gas prices that are plotted on the graph listed in numeric form for each year covered by each individual forecast; and

RESPONSE: Jeremy Fisher

The forecasted Henry Hub gas prices, in 2010\$, are given in the table below. For digital versions of this data, please refer to the file Synapse Gas Prices and Comparisons (Supplemental) –

CONFIDENTIAL.xlsx in the Interveners’ Response to the Companies Discovery Question 11.

	KU/LG&E	AEO 2010	AEO 2011	AESC 2011	NPCC 2011 (Low)	NPCC 2011 (Med)	NPCC 2011 (High)	Globex futures	EIPC High Scenario	Navigant GHG As-Is	Navigant GHG Plus	Prop. Source (2011, from EIPC review)	RGGI (2010, from EIPC review)	EPA (2010, from EIPC review)
2011	5.83	5.84	4.55	4.22	4.25	4.25	4.25	3.75	4.99	5.11	5.11	4.51	4.95	
2012	6.08	6.35	4.57	4.74	4.24	4.34	4.73	4.29	5.47	5.20	5.32	5.36	5.42	4.27
2013	6.32	6.30	4.63	4.92	4.24	4.43	5.20	4.73	5.88	3.56	4.70	5.84	5.46	4.60
2014	6.57	6.26	4.64	5.11	4.13	4.51	5.73	5.00	6.22	3.15	4.56	6.30	5.59	4.85
2015	6.84	6.45	4.74	5.70	4.14	4.60	6.35	5.20	6.40	3.34	4.57	6.81	5.72	5.09
2016	7.24	6.55	4.82	5.75	4.15	4.70	7.28	5.40	6.56	3.38	4.58	6.78	5.84	4.92
2017	7.66	6.56	4.84	5.72	4.16	4.79	7.32	5.61	6.70	3.51	4.66	6.37	5.97	4.77
2018	8.09	6.61	4.89	5.74	4.12	4.91	7.37	5.84	6.90	3.56	4.73	6.48	6.05	4.69
2019	8.53	6.69	4.95	5.77	4.08	5.03	7.55	6.06	7.19	3.68	4.87	6.58	6.08	4.63
2020	9.04	6.83	5.13	5.85	4.06	5.16	7.61	6.30	7.30	3.91	5.07	6.69	6.23	4.46
2021	9.63	6.93	5.33	5.95	4.11	5.29	7.81	6.55	7.27	3.97	5.36	6.69	6.45	4.66
2022	10.24	7.12	5.48	6.03	4.11	5.42	7.88	6.82	7.61	4.12	5.67	6.89	6.60	4.82
2023	10.87	7.15	5.67	6.29	4.11	5.56	7.98	7.09	8.07	4.30	6.00	7.16	6.66	4.93
2024	11.59	7.11	5.90	6.49	4.19	5.69	8.06		8.48	4.54	6.37	7.41	6.86	4.99
2025		7.19	6.07	6.54	4.20	5.84	8.25		8.87	4.68	6.70	7.28	7.05	5.18
2026		7.35	6.20	6.65	4.16	5.98	8.25		9.08	4.84	7.01	6.92	7.35	5.31
2027		7.49	6.34	6.80	4.19	6.13	8.60		9.31	5.01	7.36	6.44	7.61	5.50
2028		7.74	6.41	6.95	4.24	6.29	8.78		9.67	5.17	7.68	6.50	7.85	5.68
2029		7.99	6.45	7.15	4.27	6.44	9.12		9.96	5.42	8.15	6.59	8.05	5.81
2030		8.27	6.50	7.07	4.26	6.60	9.37		10.18	5.64	8.64	6.89	8.23	5.92
2031		8.63	6.60	7.08						5.91	9.17			
2032		8.74	6.73	7.23						6.14	9.70			
2033		8.77	6.85	7.36						6.48	10.35			
2034		8.99	6.98	7.39						6.76	11.04			
2035		9.13	7.19	7.56						7.08	11.62			
2036				7.68										
2037				7.82										
2038				7.95										
2039				8.08										
2040				8.22										
2041				8.36										

b. Its Henry Hub forecasted natural gas prices plotted on a graph as in Exhibit JIF-3 and listed in numeric form for the same entity's forecast prepared in the year prior to the year identified in the footnote.

RESPONSE: Jeremy Fisher

Such data has not been compiled by Interveners for this proceeding. The prior year's natural gas price projections requested here are not useful data because there has been a landslide shift in natural gas availability and prices. Since 2009, dramatic increases in shale gas production (see Figure 2 below from NPC) and new estimates of dry gas production (see Figure 3, compiled from AEO 2009-2011 forecasts) have significantly reduced the forecast price of natural gas (see Figure 4, compiled from AEO 2009-2011 forecasts). Such data has not been prepared for this testimony.

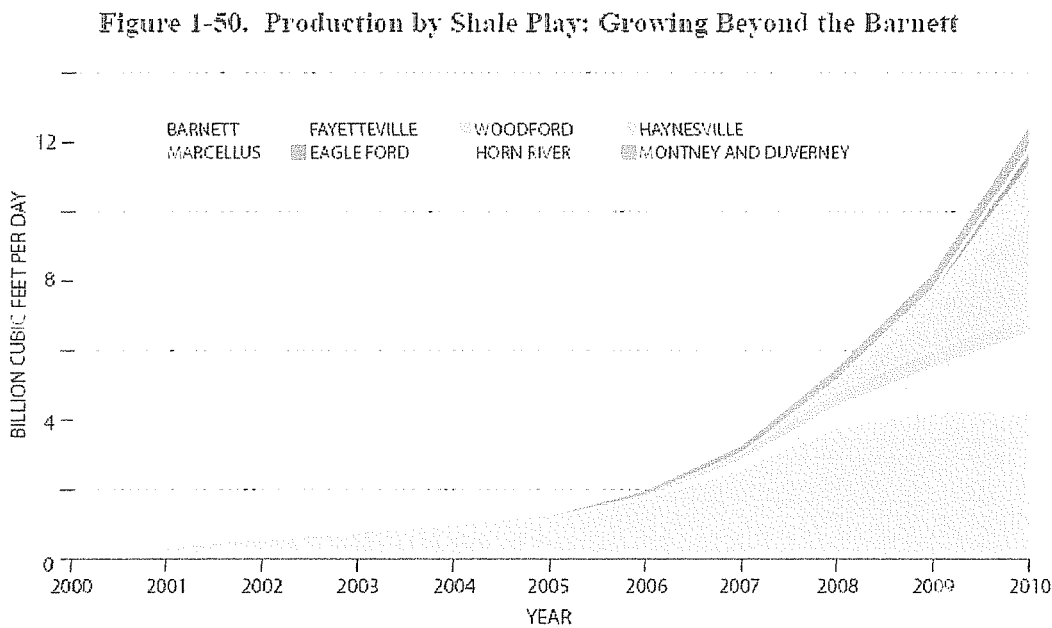


Figure 2. Production by Shale Play: Growing Beyond the Barnett. From National Petroleum Council (NPC)³

³ National Petroleum Council (NPC). September 2011. "Prudent Development – Realizing the Potential of North America's Abundant Natural Gas and Oil Resources", September 15, 2011. Available online at http://www.npc.org/Prudent_Development.html

Dry Gas Production (TCF) from AEO 2009, 2010, and 2011 Forecasts

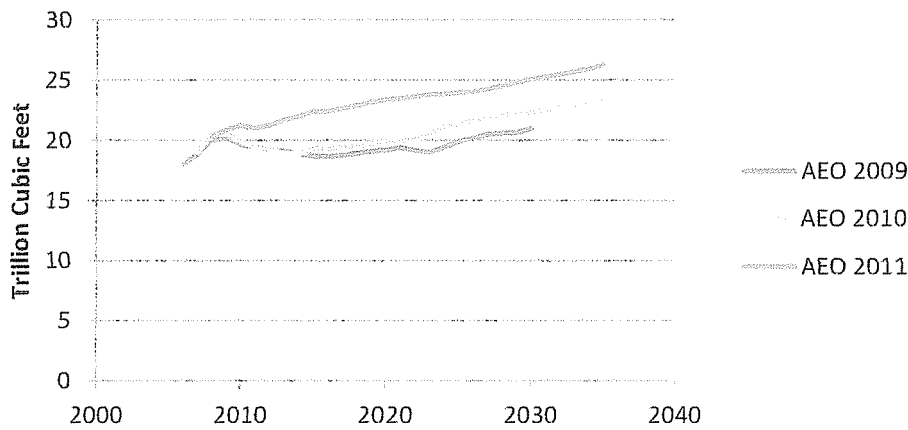


Figure 3 US Lower 48 Dry Gas Production (TCF) from Annual Energy Outlook 2009, 2010, and 2011 Forecasts⁴

Henry Hub Price (2010\$) from AEO 2009, 2010, and 2011

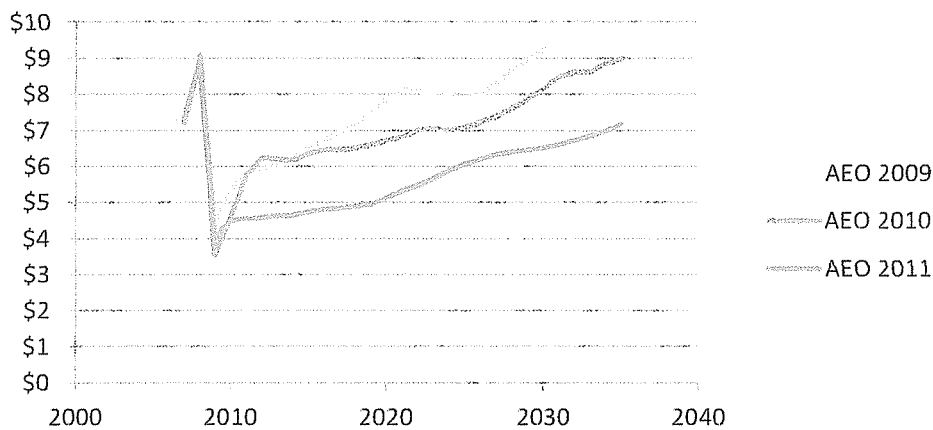


Figure 4 Natural Gas Henry Hub Price Forecasts (2010\$) from AEO 2009, 2010, and 2011.

7. Refer to page 21 of the Fisher Testimony.
 - a. Explain how Mr. Fisher made the decision to use the forecast of Henry Hub gas prices prepared by the Avoided Energy Supply Component Study Group in 2011 in his analysis, rather than one of the other publicly available forecasts.

⁴ Table 114 in AEO 2009 Reference Case; Table 13 in AEO 2010 and 2011.

RESPONSE: Jeremy Fisher

Dr. Fisher does not claim specific expertise in natural gas price forecasting, but rather in the typical application of these prices and other considerations to electric system modeling. There are a variety of natural gas price forecasts released by a number of entities, both private and public. Dr. Fisher chose to use the AESC forecast for internal consistency with the latest Synapse research, and the stringent review that went into the forecast. The forecast was prepared by an expert contracting with Synapse. The AESC research and assumptions were examined in detail by the utilities and companies sponsoring the research, these utilities and companies have a diverse range of interests in the AESC results. The report is sponsored such that utilities and efficiency program administrators have a consistent set of avoided costs that can be used in regulatory filings throughout New England. As such, participants in the study have a strong incentive to vet the accuracy of the assumptions.

The AESC gas price forecast is quite similar, and in fact, based in large part upon, the forecasts provided by the EIA in the Annual Energy Outlook. Dr. Fisher would not object to the use of the EIA forecast and further, would recommend that the Companies develop or utilize a reasonable range of vetted, auditable forecasts to bound a risk assessment.

- b. Explain whether Strategist modeling runs were performed using the prices contained in any of the other gas price forecasts.

RESPONSE: Jeremy Fisher

No.

8. At page 23, lines 3-5, and page 28, lines 15-22, of the Fisher Testimony, Mr. Fisher states (1) the Brown Units 1 and 2 should be retired based on his re-analysis using a different gas price forecast and (2) that KU/LG&E should reconsider the decision to retrofit Brown Units 1 and 2 based on his re-analysis of the need to install Selective Catalytic Reduction devices ("SCR") on the coal units that have not previously been retrofitted with SCRs.

- a. In reaching his conclusions as to the possible retirement of Brown Units 1 and 2, describe the consideration Mr. Fisher gave to the configuration of the Brown Generating Station, specifically, that all three generating units at the site share a single Flue Gas Desulfurization ("FGD") system.

RESPONSE: Jeremy Fisher

Dr. Fisher does not claim expertise in power plant engineering, but is familiar with the new shared FGD system at Brown Units 1-3. Because the company assessed the economic viability of Brown 1 & 2 independently of the newly constructed FGD, it was assumed that that there were no technical barriers to retiring those units. If the company did not correctly assess the technical feasibility of retiring Brown 1 & 2 due to the shared FGD system, it would seem that this information should have been addressed substantively in the application and analysis. As a recently sunk cost, the presence of a newly constructed FGD system may pose a financial concern for the Companies, but it does not change the calculation of rationally examining forward-going costs and opportunities at the units.

- b. If no consideration was given to the three Brown units sharing a single FGD system, either because Mr. Fisher was not aware of it, or for any other reason, explain whether now having the knowledge of this arrangement has any impact on his conclusions.

RESPONSE: Jeremy Fisher

As discussed in response to request 8.a, consideration was given to the three Brown units sharing a single FGD system.

9. Refer to page 26, lines 5-7, and page 27, lines 18-20, where Mr. Fisher states his belief that stronger National Ambient Air Quality Standards for ozone will require adding SCRs to the KU/LG&E coal plants that do not already have SCRs.

- a. Describe in more specific terms the basis for Mr. Fisher's belief.

RESPONSE: Jeremy Fisher

To clarify, the referenced statements should read “will likely require,” as there is not absolute certainty on the future stringency of the ozone NAAQS, the decisions that will be made by the Commonwealth’s Energy and Environment Cabinet to comply with such NAAQS, nor the technology that will be necessary to ultimately achieve the emission reductions needed to ensure compliance with the NAAQS. This correction will be made to the final direct testimony of Dr. Fisher.

The “likely require[ment]” for SCR is supported by the increasing stringency of ozone NAAQS, a regulation not considered in the Companies’ application. In March of 2008, the EPA strengthened the ozone standard from 0.08 ppm to 0.075 ppm [73 Fed Reg 16436], and is currently proposing to revise the standard yet again to between 0.060 ppm and 0.070 ppm [75 Fed Reg 2938]. While this proposal has recently been suspended by the current Administration, it is reasonable to expect that regulatory and legal requirements on the EPA will compel the promulgation of a final ruling in the next few years. The EPA has announced that it plans to revisit this rule in 2013.

If there is a new standard and certain counties become nonattainment counties, the Commonwealth (or the Louisville APCD for Jefferson County) will have to write a SIP that outlines how nonattainment areas will be brought into attainment. The Commonwealth has the authority to require controls on contributing sources under the Clean Air Act Section 110(a)(2)(A) which, generically, allows the state to adopt whatever controls are necessary to meet the requirements of the Clean Air Act.

According to the EPA, there are two counties near Brown 1 & 2 (Fayette and Jessamine) that, between 2006-2008, would have violated all of the more stringent standards, at 0.072 and

0.074 ppm (4th highest eight hour rolling average, averaged over 3 years).⁵ More recent quality-controlled data are unavailable as of yet for these counties, but preliminary data from the EPA's Air Quality System (AQS) suggests that should the same eight-hour rolling average be applied to 2009 and 2010 data, both counties would violate any standard set at 0.065 or below.⁶ Under the CAA, the Commonwealth would have the obligation to bring these areas into attainment.

Jefferson County, the seat of Mill Creek units 1 & 2, has been proposed by the Commonwealth to be a "nonattainment" area for the 2008 ozone standard, violating the standard at two air quality monitors. Excerpts from Kentucky's submission of designation recommendations to the EPA follow below this explanation.⁷ Briefly, the Commonwealth found that Jefferson County did not meet the 0.075 standard, and in addition, contributed nearly 70% of NO_x emissions from stationary sources to the Louisville area of evaluation. The largest stationary sources in the county are Mill Creek and Cane Run units. It is uncertain if the retirement of the Cane Run units will sufficiently reduce NO_x emissions at the air quality monitors such that the county can meet the more stringent air quality standards. It is Dr. Fisher's opinion that the Companies should conduct such modeling to assess this risk.

However, a brief calculation helps illustrate the risk that Jefferson and Oldham Counties (both in the Louisville Area of Evaluation) might continue to violate the more stringent ozone standards even after the retirement of the Cane Run units, and full operation of existing SCR at Mill Creek 3 & 4. Roughly speaking, if we assume that the Louisville Metropolitan Statistical Area (MSA) is a self-contained system, and that NO_x is the limiting pollutant in ozone formation

⁵ US EPA. 2010. Counties Violating the Primary Ground-level Ozone Standard, 2006 – 2008. <http://www.epa.gov/air/ozonepollution/pdfs/CountyPrimaryOzoneLevels0608.pdf>

⁶ 4th highest eight-hour rolling average, averaged between 2009 and 2011 in Fayette and Jessamine Counties (0.068 ppm and 0.067 ppm, respectively) from AQS hourly ozone monitoring data (<http://epa.gov/ttn/airs/airsaqs/detaildata/downloadaqsdata.htm>)

⁷ Available at: http://www.epa.gov/ozonedesignations/2008standards/rec/letters/04_KY_rec.pdf

in the MSA, the following provides a very rough estimation of the benefit of SCR at Mill Creek.⁸ Overall NO_x emissions in the Louisville MSA were approximately 97,000 tons in 2005 (KY Recommendation to EPA, Table 5 of Louisville Analysis)⁹, of which approximately 25,000 tons were from “point” sources in Jefferson County. Data gathered from the US EPA Clean Air Markets Database show that Mill Creek and Cane Run units contributed about 20,000 tons, or 20%, of that NO_x burden in the same year (2005).¹⁰ Without Cane Run, the contribution from these two coal plants would be around 13,000 tons (a 13% reduction in total Louisville MSA NO_x),¹¹ and if the SCR were also operated at Mill Creek 3 & 4 year-round, the contribution from these two plants might be closer 7,000 tons¹² (a 19% reduction in total Louisville MSA NO_x).

The Louisville MSA violations of 0.079 and 0.081 in Jefferson and Oldham counties (Table 1 in KY Recommendation to EPA) could subsequently be reduced to 0.066 to 0.070 with the 13% reduction, or 0.064 to 0.068 with the 19% reduction. While the EPA is now delaying promulgation of the ozone rule until 2013, the proposed limit sets the standard between 0.060 and 0.070, thus resulting in potential violations under the very rough assumptions given here. Contributions from other counties, other retirements, additional controls, load growth, and cross-state reductions will all influence this calculation, and the actual reduction can be best estimated with air modeling.

⁸ This calculation only serves as a rough illustration, and should not substitute for rigorous air modeling.

⁹ The following example is given for year 2005 because Synapse is only able to obtain the Commonwealth's estimate of total all-sector emissions for that year.

¹⁰ US EPA. 2011. Clean Air Markets – Data and Maps. Unit Level Emissions at <http://camddataandmaps.epa.gov/gdm/>.

¹¹ Assuming NO_x reduction of 90% with SCR; Percent reduction in total Louisville MSA NO_x from calculated as $1 - ((20,000 - X) / 97,000)$, where X = NO_x emissions from Cane Run and Mill Creek units.

¹² The SCR units at Mill Creek 3 & 4 appear to only be operated during the ozone season. Assuming that these units operate year-round is a more conservative estimate for the purposes of this rough calculation.

Finally, to obtain the required reductions, states and air districts have a history of using both least cost and the most readily enforceable mechanisms to obtain air quality improvements. “End of pipe” environmental controls at stationary sources have traditionally been considered a reasonable mechanism to achieve improved air quality, and SCR is the most effective environmental control, on a mass basis, for the reduction of NO_x, an ozone precursor. The combination of increasingly stringent NAAQS, reasonably assumed NAAQS violations in Kentucky, and the traditional requirement of environmental controls at stationary sources forms the basis of Dr. Fisher’s opinion that SCR will likely be required at coal units that do not currently have these controls in Kentucky. The timing of these requirements is uncertain, but it is reasonable to expect that the Companies will evaluate the risk of this compliance obligation.

Excerpts from:

Commonwealth of Kentucky Boundary Recommendations: 8-Hour Ozone Standard (March 2009).

For the 2006-2008 monitoring period, Jefferson County had three ozone monitors, two of which had values exceeding the 8-hour ozone National Ambient Air Quality Standard (NAAQS - 0.075 ppm). The 3-year average (2006-2008) of the annual fourth-highest daily maximum 8-hour average ozone concentration at monitors 21-111-0051, 21-111-0027, and 21-111-1021 was 0.0790 ppm, 0.0773 ppm, and 0.0713 ppm, respectively.

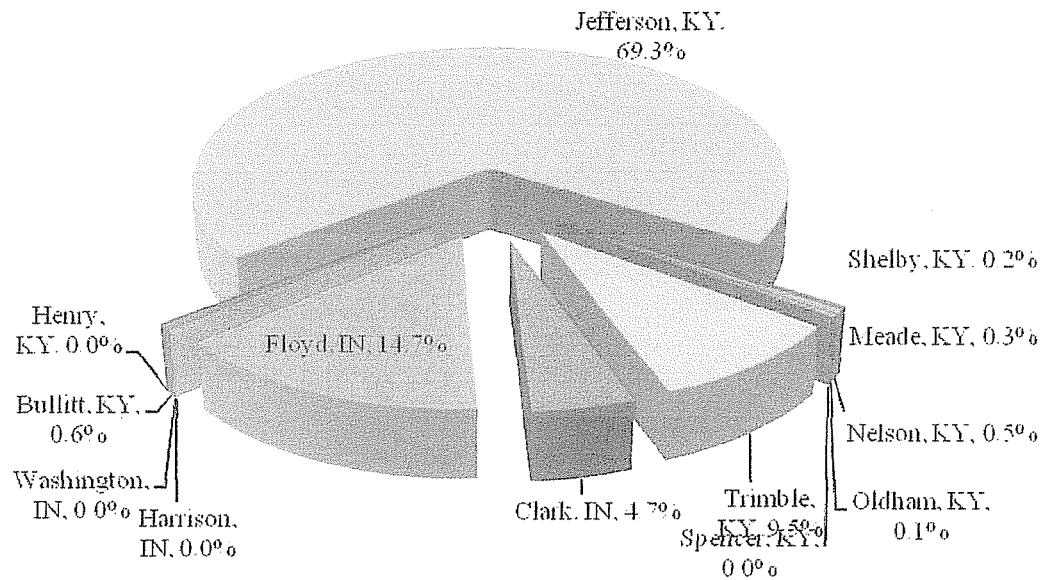
A violation of the 8-hour ozone NAAQS for 2006-2008 was additionally documented in Clark County and Floyd County, Indiana. (p10 of Louisville Area of Evaluation, KY-IN)

Point source NO_x emissions from Jefferson County were estimated at 25,008.46 tpy in 2005, which represents approximately 69.3% of the total 36,070.82 tpy of the overall NO_x point source emissions from the Louisville area of evaluation, KY-IN. (See chart Lou-7)

Major point sources located within Jefferson County are subject to New Source Review (NSR), non-CTG RACT requirements, Maximum Achievable Control Technology (MACT) requirements for sources of Hazardous Air Pollutants (HAPS), and New Source Performance Standards (NSPS). Sources are also subject to applicable requirements imposed by the Clean Air Interstate Rule (CAIR), and the NO_x SIP Call. Also 401 KAR 50:012 applies to sources statewide, requiring that “all major air contaminant sources shall as a minimum

apply control procedures that are reasonable, available, and practical.” (p11 of Louisville Area of Evaluation, KY-IN)
 Jefferson County, based on 2006-2008 ozone monitoring data, is not meeting the 8-hour ozone standard, as previously noted on page 10. (p13 of Louisville Area of Evaluation, KY-IN)

2005 NEI Louisville Point Source NOx Emissions



b. For purposes of this question, assume the following: based on Mr. Fisher’s analysis of the cost of adding SCRs, the Commission denied the CPCN requests for Brown Units 1 and 2, Ghent Unit 2, and Mill Creek 1 and 2, and this ultimately leads to the retirement of these five units. Explain how Mr. Fisher would recommend the Commission respond if, at a later date, it was shown that his analysis was wrong and that the units should have been granted CPCNs and retrofitted as KU/LG&E propose.

RESPONSE: Jeremy Fisher

In all planning exercises, there is a risk that the underlying assumptions are incorrect or that forecasts will not reflect actual trends. One way to address uncertainty in resource planning is to assess and model the reasonable range of values for the uncertain assumptions in appropriate combinations that capture their interactions, choosing the best course of action with the information available on both the expected outcomes and their robustness. Other methods for

assessing such uncertainties include portfolio risk metrics derived from Monte Carlo analyses, which are more complex than simple scenarios analysis, but commonly used by some utilities.

Dr. Fisher is not recommending that, a priori, the Companies be compelled to close the subject coal plants. Rather, the recommendation is that the Companies be required to assess the reasonable risks of multiple environmental regulations, in concert, with reasonably expected natural gas prices. We would assume (and hope the Commission would require) that, having assessed and correctly modeled these risks and opportunities, the Companies would propose a mechanism by which they can effectively hedge against noncompliance with these regulations. Using the Companies' static measures (i.e. regulations either exist or they do not, and there is only one expected gas price future) and simply correcting assumptions generates modeling results that suggest the economic retirement of a large number of coal units. However, the Company may be able to structure a "no regrets" compliance plan such that it is minimally exposed to both large magnitude capital costs and yet meets environmental requirements: mothballing some units to defer decisions, exploring power purchase opportunities, and targeting capital investments towards certain "winners" could be some such mechanism by which the Companies could provide an environmental compliance hedge.

Under the given hypothetical, the Commission should ensure that the Companies pursue the resource planning strategy that best comports with 807 KAR 5:508 on a going-forward basis at that time, particularly that regulation's preamble: "the purpose of the IRP is to provide for regular reporting and commission review of load forecasts and resource plans of the state's electric utilities to meet future demand with an adequate and reliable supply of electricity at the lowest possible cost for all customers within their service areas, and satisfy all related state and federal laws and regulations."

10. Refer to page 30, lines 10-15, of the Fisher Testimony, where Mr. Fisher refers to the increasingly contentious politics associated with regulating CO₂ and other greenhouses gases and states, “if the weight of evidence does eventually prevail, it is my opinion that there will be no choice but to find mechanisms to reduce CO₂ emissions” Describe the extent to which Mr. Fisher, as a geological scientist, would typically rely on a single opinion in making a recommendation or decision that would likely have long-term implications.

RESPONSE: Jeremy Fisher

Dr. Fisher is not encouraging the Commission to rely on a single opinion, but rather is offering testimony based on a long and extensive series of scientific reports, all of which conclude that increases in CO₂ are likely to result in dramatic climate change, with potentially catastrophic results. Numerous scientific organizations in the US have released statements affirming that global climate change is real, and that emissions of greenhouse gasses from human activities are a root cause. These organizations include the US Global Change Research Program, the National Research Council, the American Association for the Advancement of Science, the American Chemical Society, the American Institute of Physics, the American Physical Society, the American Geophysical Union, the Geological Society of America, the National Association of Geoscience Teachers, the American Meteorological Society, the American Institute of Biological Sciences, the American Medical Association, and the American Public Health Association.

11. Refer to page 31, lines 1-3, of the Fisher Testimony. Explain how Mr. Fisher selected 2018 as the year to include a starting price for CO₂ emissions.

RESPONSE: Jeremy Fisher

The 2018 year represents a reasonable scenario choice, given the uncertainty in the current political climate around being able to find a successful consensus on mitigating global climate change. Realistically, it may take several years until political will can coalesce around a reasonable course of action, and possibly some lag in implementing such a policy. The Synapse

2011 Carbon Price Forecast recognizes this temporal uncertainty in two bounding scenarios, one which starts in 2015 and the other which starts in 2020. The “mid” forecast, starting in 2018, simply represents a trajectory from an uncertain, but near-future out-year.

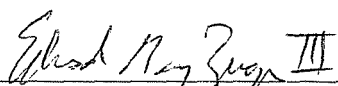
By comparison, in a current docket in the State of Georgia (#34218), Georgia Power Company, a Southern Company, uses four carbon trajectories: “With its modeling analysis consultant, Charles River Associates (“CRA”), the Company developed four possible CO2 control requirement futures... The four paths start in 2015 at \$0, \$10, \$20 and \$20 per metric ton of CO2 (2008\$).” While such a scenario has not been tested by Synapse, using a starting year of 2015 rather than 2018 would likely result in reducing the net economic benefit or increasing the net economic loss associated with installing pollution controls on each of the Companies’ coal units.

12. Refer to page 39, lines 5-7, of the Fisher Testimony. Confirm that a word, or words, should be inserted in the sentence either before or after the word “quickly” and provide the corrected sentence.

RESPONSE: Jeremy Fisher

Confirmed. The term “diminish” should come after the word “quickly”. Also, for clarification, please replace the term “value” with “benefit” such that the sentence reads as follows: “However, the NPVRR differences between scenarios due to ‘emergency power cost’ can quickly diminish the \$33 million dollar ~~value~~ benefit and feasibly change the results of the analysis.”

Respectfully submitted,


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Dated: October 13, 2011

CERTIFICATE OF SERVICE

I certify that I mailed a copy of the foregoing Responses and Objections of Rick Clewett, Raymond Barry, Sierra Club, and Natural Resources Defense Council to Commission Staff's First Request for Information by first class mail on October 13, 2011 on the following:

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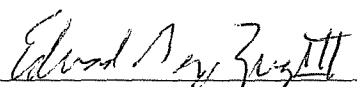
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