VERIFICATION

The undersigned, G. Scott Fisher being duly sworn, deposes and says he is the Manager for Resource Planning for American Electric Power, that he has personal knowledge of the matters set forth in the forgoing responses for which he is the identified witness and that the information contained therein is true and correct to the best of his information, knowledge and belief

G. Scott Fisher

STATE OF OHIO)
) Case No. 2016-00413
COUNTY OF FRANKLIN)

Subscribed and sworn to before me, a Notary Public in and before said County and State, by (Insert Name), this the 3 day of March 2017.

Notary Public

Princess M. Brown
Notary Public, State of Ohio
My Commission Expires 04-19-2020

My Commission Expires: 4/19/2020

VERIFICATION

The undersigned, Randy E. Holliday, being duly sworn, deposes and says he is an Economic Forecast Analyst, for American Electric Power, that he has personal knowledge of the matters set forth in the forgoing responses for which he is the identified witness and that the information contained therein is true and correct to the best of his information, knowledge and belief

Randy E. Holliday

STATE OF OHIO)
) Case No. 2016-00413
COUNTY OF FRANKLIN)

Subscribed and sworn to before me, a Notary Public in and before said County and State, by Randy E. Holliday, this the 3 day of March, 2017.

Notary Public

NOTARIAL SEAL
STATE OF OHIO

Princess M. Brown
Notary Public, State of Ohio
My Commission Expires 04-19-2020

My Commission Expires: 4/19/2020

VERIFICATION

The undersigned, John A. Rogness III, being duly sworn, deposes and says he is the Director Regulatory Services for Kentucky Power, that he has personal knowledge of the matters set forth in the forgoing responses for which he is the identified witness and that the information contained therein is true and correct to the best of his/her information, knowledge and belief.

John A. Rogness III

COMMONWEALTH OF KENTUCKY)
) Case No. 2016-00413
COUNTY OF FRANKLIN)

Subscribed and sworn to before me, a Notary Public in and before said County and State, by John A. Rogness III, this the 10th day of March 2017.

Notary Public 481393

My Commission Expires: January 23, 2021

VERIFICATION

The undersigned, John F. Torpey, being duly sworn, deposes and says he is the Director Integrated Resource Planning for American Electric Power, that he has personal knowledge of the matters set forth in the forgoing responses for which he is the identified witness and that the information contained therein is true and correct to the best of his information, knowledge and belief

John F. Torpey

STATE OF OHIO)
) Case No. 2016-00413
COUNTY OF FRANKLIN)

Subscribed and sworn to before me, a Notary Public in and before said County and State, by John F. Torpey, this the 3 day of March 2017.

Notary Public

Princess M. Brown
Notary Public, State of Ohio
My Commission Expires 04-19-2020

My Commission Expires: 4/19/2020

VERIFICATION

The undersigned, Ranie K. Wohnhas, being duly sworn, deposes and says he is the Managing Director Regulatory and Finance for Kentucky Power, that he has personal knowledge of the matters set forth in the forgoing responses for which he is the identified witness and that the information contained therein is true and correct to the best of his information, knowledge, and belief

Ranie K. Wohnhas

COMMONWEALTH OF KENTUCKY)
) Case No. 2016-00413
COUNTY OF BOYD)

Subscribed and sworn to before me, a Notary Public in and before said County and State, by Ranie K. Wohnhas, this the 8th day of March 2017.

Judy K Kegnist 481393
Notary Public

My Commission Expires: January 23, 2021

Case No. 2016-00413
Item No. 1
Page 1 of 1
Witness: John F. Torpey

Q - 1 1 . Refer to the Integrated Resource Plan ("IRP"), page 14 of 1497, where the Rockport Plant Unit Power Agreement ("UPA") is discussed.

a.Identify and describe the changes that non-renewal of the UPA would have on the assumptions and conclusions made for the 15-year period of the IRP.

b.Explain when the actual decision will be made on whether to renew the UPA..

A - 1 a. If Kentucky Power assumed it would not renew the UPA (nominally 390 MW) the Company would be faced with a projected capacity deficit of between 120 MW to 140 MW during the period 2023 to 2030. The assumption not to renew would also result in a reduction in the projected energy position by approximately 2,200 GWh/year (on average) for the same period. As a result Kentucky Power would need to acquire additional resources to meet its capacity and energy requirements.

b. At this time, Kentucky Power anticipates making a decision on whether to renew the UPA no later than early 2019 when Kentucky Power must commit capacity to the 2022/2023 PJM plan year.

Case No. 2016-00413
Commission Staff's First Set of Data Requests
Item No. 2

Witness: Randy E. Holliday

Q - 2 Refer to the I RP, page 15 of 1497, Figure ES-1 . The first footnote states, "Change in load obligation and net capacity position is due to transition from PJM load forecast to internal load forecast."

a. Explain the basis for the transition of the load forecast.

b. Explain why the transition in the load forecast produces a reduction in Kentucky Power's total obligation as shown in Figure ES-1 .

A - 2 a. The Company's capacity obligations for the first four years of the forecast are tied to the PJM load forecast for the AEP Zone. As required by PJM, the Company's load requirements for the Base Residual Auction and subsequent Incremental Auctions are determined from PJM's load forecast and PJM's weather normalized peak for the base year. After the most recent Base Residual Auction year, the Company relies on its internal peak demand forecast. The internal peak demand forecast is reviewed by Kentucky Power's management team and contains assumptions, inputs, and forecasted results specific to Kentucky Power's service territory. The internal peak demand forecast also includes adjustments to reflect coincidence with PJM RTO peak demand

b. See response to a. The PJM forecast assumes all load serving entities within the AEP Zone experience load growth at the same rate Kentucky Power's load growth typically lags most other load serving entities in the AEP Zone. The Company's forecast beyond the Base Residual Auction year better reflects those growth differentials and results in reduction in expected obligation at the end of the PJM planning period.

Case No. 2016-00413
Commission Staff's First Set of Data Requests
Item No. 3

Witness: John F. Torpey

Q - 3 Refer to the IRP, page 15 of 1497, where it states, in relevant part, "the Plexos® modeling was performed through year 2035, so as to properly consider various cost-based 'end effects' for the resource alternatives being considered ." In Kentucky Power's 2013 IRP, the modeling was performed through 2040, whereas, in the 2016 IRP the modeling was performed through 2035.

a.Explain why Kentucky Power shortened the term of the modeling from what was used in its 2013 IRP.

b. Identify and explain what changes the term of the modeling had on the various cost-based end effects and on the assumptions and conclusions made for the 15-year period of the IRP.

Case No. 2016-00413
Commission Staff's First Set of Data Requests
Item No. 4

Witness: John F. Torpey

Q - 4 Refer to the IRP, pages 61-62 of 1497, which state that [o]over the next three years [Kentucky Power] is anticipating turbine upgrades at the Rockport Plant which will increase unit capacities by 36 MW for Unit 1 and Unit 2 in 2018 and 2020, respectively." Identify and describe the impacts, if any, the upgrades will have on the charges Kentucky Power pays under the UPA for calendar years 2018 through 2022.

A - 4 The Company has not performed an analysis of the charges Kentucky Power would pay under the Rockport Unit Power Agreement specifically as a result of a turbine upgrade projects. The turbine upgrade projects will require additional capital investment in the Rockport units that will result in an increased demand charge. However, the upgrade projects will also result in efficiency improvements that may reduce fuel rates depending on operating conditions.

Case No. 2016-00413
Commission Staff's First Set of Data Requests
Item No. 5

Witness: Gordon S. Fisher

Q - 5 Refer to the IRP, pages 15 and 16 of 1497, regarding Kentucky Power's Preferred Plan, second bullet, where it states, "adds 75 MW (nameplate capacity)/year of wind resources beginning in 2018 for a total of 300 MW through 2021 ." Also refer to the comments filed by the Southern Wind Energy Association ("Southern"), beginning at page 2, which list several recommendations, including that Kentucky Power immediately issue a request for proposal for at least 300 MW of wind energy resources, and select preferred wind power purchase agreement(s) before the end of 2017 for delivery by 2020/2021 . Describe Kentucky Power's strategy for procuring the wind power included in its Preferred Plan and how it is similar to or different from the recommendation of Southern.

A - 5 As described in the Preferred Plan, Kentucky Power would issue a Request for Proposals (RFP) for wind energy to be supplied either through a Purchase Power Agreement (PPA) or as an Asset Purchase Agreement (APA). Kentucky Power will evaluate the proposals it receives and determine if any of the proposals should be further pursued. If the Company concludes that any of the projects submitted in response to the RFP would benefit customers, it will seek Commission approval to move forward with those projects.

Kentucky Power's plan differs from Southern's recommendation in that Kentucky Power's plan is to issue an RFP for 75 MW of wind energy initially; the Southern filing recommends the Company immediately issue an RFP for 300 MW of wind energy for delivery by 2020/2021.

Case No. 2016-00413
Commission Staff's First Set of Data Requests
Item No. 6

Witness: Gordon S. Fisher

Q - 6 Refer to the IRP, pages 15 and 16 of 1497, regarding Kentucky Power's Preferred Plan, fifth bullet, regarding distributed generation. The footnote to this bulleted item states that "Kentucky Power does not have control over the amount, location or timing of these additions." Describe in detail how Kentucky Power arrived at its estimate of 1.1 MW (nameplate) by 2031 .

A - 6 Kentucky Power's approach for forecasting installed distributed generation capacity is based on a forecast provided by PJM and is further described in detail in Section 4.5.3.4 page 114 of 1497 in the IRP.

Q - 7 Refer to the I RP, page 19 of 1497, where it states, "The capacity contribution from renewable resources is fairly modest due to their intermittent performance, as well as the implications of PJM's Capacity Performance rule . ... " Identify and explain the implications of PJM's Capacity Performance rule on renewable resources.

A - 7 The Capacity Performance rule requires generators that have committed capacity to the capacity market make that capacity available during emergency hours or suffer a monetary penalty. These emergency hours may occur at any time, including periods when the wind is not blowing or the sun is not shining. Accordingly, the Company has discounted intermittent resource capacity to address the possibility that those resources may not be available during the emergency period. Please also refer to KPSC 1-35.

Case No. 2016-00413
Item No. 8
Commission Staff's First Set of Data Requests

Witness: Gordon S. Fisher
Witness: John A. Rogness

Q - 8 Refer the IRP, page 33 of 1497. Distributed generation was reduced from 41 MW by 2028 in the 2013 IRP to 1 MW in the 2016 IRP.

a. Discuss what led to this level of decrease from the 2013 IRP to the 2016 IRP.

b. Explain whether Kentucky Power has considered any changes to its net metering tariff to encourage distributed generation in its service area.

A - 8 a. In general, the 2013 IRP's forecast for Distributed Generation utilized an annual distributed generation growth assumption of 40%. In the 2016 IRP, the Company based its Distributed Generation growth forecast on a forecast provided by PJM as described in Section 4.5.3.4 of the IRP.

b. The Company has not considered changes to its net metering tariff to encourage distributed generation.

Case No. 2016-00413
Commission Staff's First Set of Data Requests
Item No. 9

Witness: Randy E. Holliday

Q - 9 Refer to the IRP, Section 2.4.3, Short-Term Forecasting Models, page 39 of 1497. Explain how and why January 2006 through January 2016 was chosen as the estimation period for the short-term models.

A - 9 In its short-term modeling, the Company routinely uses the most recent ten full years of historical data as inputs. As a general practice, the Company does not use data that are more than ten years old because they would distort the short-term forecast model results.

Case No. 2016-00413
Commission Staff's First Set of Data Requests
Item No. 10

Witness: Randy E. Holliday

Q - 10 Refer to the IRP, Section 2.4.4, Long-Term Forecasting Models, page 40 of 1497.

a.Indicate whether a lagged price or a moving average of price was used to introduce the concept of lagged response to a price change in the econometric model.

b. Explain how and why 1995-2015 was chosen as the general estimation period for the long-term forecasting models.

A - 10 a. The Company used a moving average of price whenever price is used in a long-term forecast model.

b.The model estimation period reflects the longest availability period for all data utilized in the forecast models. This period length allows the model to capture long-term trends.

Case No. 2016-00413
Commission Staff's First Set of Data Requests
Item No. 11

Witness: Randy E. Holliday

Q - 11 Refer to the I RP, Section 2.4.4.2, Residential Energy Sales, page 43 of 1497. Provide a copy of Kentucky Power's three most recent Residential Customer Surveys and indicate the year of each survey.

A - 11 Please see KPCO_R_KPSC_1_11_Attachment1.xls for a comparison of the results for 2013 and 2016 Residential Customer Surveys and KPCO_R_KPSC_1_11_Attachment2.pdf from the Company's 2010 Residential Customer Survey.

Case No. 2016-00413
Commission Staff's First Set of Data Requests
Item No. 12

Witness: Randy E. Holliday

Q - 12 Refer to the IRP, Section 2.4.4.2, Residential Energy Sales, page 43 of 1497, where it states, "The appliance saturations are based on historical trends from KPCo's residential customer survey." Explain whether these historical trends are from the most recent (2015) survey or from a series of surveys. If from a series of surveys, identify which surveys.

A - 12 The historical trends reflect interpolations of the results of residential customer surveys conducted by the Company in 1982, 1984, 1987, 1990, 1993, 1996, 2000, 2005, 2010, 2013 and 2016.

Q - 13 Refer to the IRP, Section 2.4.4.4.1 , Manufacturing Energy Sales, page 44 of 1497. Explain whether the current forecast reflects load added or subtracted from the model results to reflect plant openings, closures, or load adjustments. If so, identify the amount of load added or subtracted and describe what gave rise to the addition or subtraction.

A - 13 The manufacturing energy sales forecast includes adjustments for both load additions and reductions by customers. The Company reduced the load forecast by approximately 74 GWh per year due to the known closure of two manufacturing facilities. The Company added 31 GWh per year by 2020 to the load forecast to account for expected additions at four customer facilities. The Company made these changes based on information provided to Company customer service representatives by representatives of the manufacturing facilities.

Case No. 2016-00413
Commission Staff's First Set of Data Requests
Item No. 14

Witness: Randy E. Holliday

Q - 14 Refer to the IRP, Section 2.4.4.4.2, Mine Power Energy Sales, page 44 of 1497. Provide an update on Kentucky Power's sales from this customer base from the January 2016 data point through the most recent month for which information is available.

A - 14 KPCO_R_KPSC_1_14_Attachment1.pdf provides Kentucky Power's monthly energy sales from January 2016 to the most recent month for which data are available. After reaching a low in July 2016, the Company's monthly energy sales have experienced a slight recovery in recent months as natural gas prices have increased. However, monthly energy sales remain well below January 2016 levels.

Case No. 2016-00413
Commission Staff's First Set of Data Requests
Item No. 15

Witness: Randy E. Holliday

Q - 15 Refer to the IRP, Section 2.4.6, Forecast Methodology for Seasonal Peak Internal Demand, page 46 of 1497, where it states, "The weather profiles are developed from representative weather stations in the service area." List the weather stations and explain whether there has been any change in the weather stations used by Kentucky Power since its 2013 IRP. If any changes have occurred, identify the changes.

A - 15 The Company uses the Huntington, West Virginia weather station for its peak demand analysis. The Company used the same station in the 2013 IRP.

Case No. 2016-00413
Commission Staff's First Set of Data Requests
Item No. 16

Witness: Randy E. Holliday

Q - 16 Refer to the I RP, Section 2.4.5.2, Losses and Unaccounted-For Energy, page 46 of 1497, and Exhibit C-1 , Annual Internal Energy Requirements and Growth Rates, page 170 of 1497. Explain how the annual losses are calculated.

A - 16 Historical losses reflect the difference between internal energy requirements and the summation of retail energy sales and FERC wholesale energy sales. Forecast losses are estimated based on Company loss studies.

Q - 17 Refer to the IRP, Section 2.4.6, Forecast Methodology for Seasonal Peak Internal Demand, page 46 of 1497. Kentucky Power modeled weather profiles based on 30 years of historical weather data.

a. Explain whether Kentucky Power considered using 20 years or some other period of historical weather data.

b. If the answer to part a. is yes, explain why Kentucky Power decided against using 20 years or some other period of historical weather data.

c. Provide the annual heating and cooling degree days for 20 years and the percent differences.

A - 17 a.- c. The Company periodically evaluates other definitions of normal weather periods. The most recent analysis was completed in 2015, and the results were presented at Itron's Energy Forecasting Group annual meeting. The summary presentation is provided in KPCO_R_KPSC_1_17_Attachment1.pdf. The analysis shows there is no statistically significant difference between the 30 year normal and the 20 year normal, but there was significantly more volatility associated with the shorter period normal definitions. The 30 year normal produces a reliable forecast without introducing unnecessary volatility. For the Huntington West Virginia weather station, the 20 year and 30 year average heating degree days were 2,438 and 2,452, respectively. Similary, the 20 year and 30 year average cooling degree days were 1,175 and 1,189, respectively. The 20 year and 30 year degree days were calculated for the year ending 2016.

Q - 18 Refer to the IRP, Section 2.6.2, DSM Impacts on the Load Forecast, page 50 of 1497. Explain why the IRP model selected optimal levels of economic energy efficiency ("EE").

A - 18 The Plexos model selects incremental levels of new EE that: (a) are needed to meet the capacity requirement and are a least cost solution; or (b) result in lower overall portfolio cost.

Case No. 2016-00413
Commission Staff's First Set of Data Requests
Item No. 19

Witness: Randy E. Holliday

Q - 19 Refer to the IRP, Section 2.6.3, Interruptible Load, page 50 of 1497. Kentucky Power states that the load forecast does not reflect any load reduction from interruptible customers, as the interruptible load is seen as a resource when the Company is peaking. Explain whether this assumption reflects a change in methodology from Kentucky Power's 2013 IRP.

A - 19 No. The Company's load forecast in both instances treated interruptible load as a supply side resource and did not assume any interruptions.

Q - 20 Refer to the IRP, Section 2.6.4, Blended Load Forecast, page 51 of 1497. Describe any instances when the long-term model incorporates a structural shift in the underlying economy within the first 24 months of the forecast horizon and explain how "professional judgment" was used to adjust for this structural shift in the forecast.

A - 20 The long-term model projects an inflection point in manufacturing sales due to an expected recovery in manufacturing gross regional product as forecast by Moody's Analytics. Also, it is forecasted that coal mining will be more stable after a sharp decline in 2016. Professional judgment is used to evaluate models and develop expectations for future load growth.

Case No. 2016-00413
Commission Staff's First Set of Data Requests
Item No. 21

Witness: Randy E. Holliday

Q - 21 Refer to the IRP, Section 2.7, page 53 of 1497, where it states, "For Kentucky Power, the low-case and high-case energy and peak demand forecasts for the last forecast year, 2031 , represent deviations of about 8.1% below and 8.8% above, respectively, the base-case forecast." Provide the deviation percentages for the years 2020 and 2025.

A - 21 For 2025, the deviations were 6.4% below and 6.7% above the base-case forecast. For 2020, the deviations were 3.7% below and 3.3% above the base-case forecast.

Case No. 2016-00413
Commission Staff's First Set of Data Requests
Item No. 22

Witness: Randy E. Holliday

Q - 22 Refer to the IRP, Section 2.8, Energy Price Relationships, page 54 of 1497. Provide the short -term and long-term price elasticities of demand for electricity that are utilized in Kentucky Power's forecasting models.

A - 22 Confidential treatment is being sought for information provided in this response. KPCO_R_KPSC_1_22_Attachment1_Confidential.pdf provides electric price elasticities from the Company's residential and commercial energy sales models. The models utilized by the Company for manufacturing and mine power energy sales yielded estimated price elasticities of -0.219 and -0.216, respectively.

Q - 23 Refer to the IRP, Section 2.9.3, Forecasting Methodology, page 56 of 1497, which states that Kentucky Power explores opportunities to enhance forecasting methods on a continuing basis.

a. State whether the forecasts in this I RP reflect any changes from the methods used in developing the forecasts included in Kentucky Power's 2013 IRP.

b. If there were changes in methods since the 2013 IRP, identify and describe all such changes, and explain why they were made.

A - 23 a.- b. Although the Company is always seeking modeling improvements, there were no significant changes to load forecasting methodology between the 2013 and 2016 IRP filings.

Case No. 2016-00413
Commission Staff's First Set of Data Requests
Item No. 24

Witness: Randy E. Holliday

Q - 24 Refer to the IRP, Section 2.12.4, Forecast Updates, page 58 of 1497. Provide the load forecast updates submitted by Kentucky Power in 2014, 2015, and 2016.

A - 24 KPCO_R_KPSC_1_24_Attachment1.pdf provides the requested forecast updates.

Q - 25 Refer to the IRP, Section 2.12.5, KPSC Staff Recommendations Addressed, page 59 of 1497, Item 3. Explain whether Kentucky Power has considered using actual historical data for 12-month periods ending in September, which would eliminate the use of forecast data and would include a single complete winter season.

A - 25 Yes. The load forecasting process begins in January of each year in order to adequately meet the Company's internal and external needs. When the load forecast is developed the Company utilizes the most recent data available and historical data as far back as 1984.

Q - 26 Refer to the IRP, Section 3.1, Current Supply-Side Resources, page 62 of 1497, the first complete paragraph, regarding discussion of Figure 9 and the table found in Exhibit G-11 , Volume A, page 239. As PJM does not offer any projection of capacity requirements beyond 2019, explain why Kentucky Power would expect its capacity obligation to be less for years 2020-2031 .

A - 26 Please refer to the Company's response to KPSC 1-2.

Case No. 2016-00413
Commission Staff's First Set of Data Requests
Item No. 27

Witness: John F. Torpey

Q - 27 Refer to the IRP, Section 3.1, Current Supply-Side Resources, page 62 of 1497, last paragraph. Explain the impact to Kentucky Power's capacity obligation should the UPA with Rockport not be renewed and what the expected contingencies are.

A - 27 Please refer to the Company's response to KPSC 1-1.

Q - 28 Refer to the IRP, Section 3.2.3, National Ambient Air Quality Standards (NAAQS), page 66 of 1497. Under the final data requirements rule for the 2010 1-hour S02 Primary NAAQS, states had to submit their intentions for addressing sources with S02 emissions greater than 2,000 tons per year by July 1, 2016. Three options were available: 1) monitoring; 2) modeling; or 3) emission limitations.

a. For Rockport and Mitchell, respectively, what options were chosen by the Indiana Department of Environmental Management and the West Virginia Department of Environmental Protection, assuming that option 3 was not a viable option?

b. If the monitoring option was chosen, was the monitoring network installed by the January 1, 2017 deadline?

c. If the modeling option was chosen, what did the modeling analys is reveal that was due by January 13, 2017?

A - 28 a. Air quality modeling was utilized by both the Indiana Department of Environmental Management (IDEM) and the West Virginia Department of Environmental Protection (WVDEP) for the Rockport and Mitchell Plants, respectively, as the basis for their attainment State Implementation Plan submittals to the United States Environmental Protection Agency (USEPA).

b. Not applicable.

c. The modeling analysis performed by IDEM for the Rockport Plant showed no exceedances of the 1-hour SO2 NAAQS based on 2012-2014 emissions. USEPA concurred and approved IDEM's submittal.

The modeling analysis submitted to USEPA by the WVDEP for the Mitchell Plant showed no exceedances of the 1-hour SO2 NAAQS. WVDEP utilized an emission rate in its modeling that was lower than the

Mitchell Plant's currently-permitted emission rate, but higher than the current actual emission rate. Accordingly, it is unlikely that Mitchell Plant operations will be impacted. WVDEP's air quality modeling was submitted to USEPA in January 2017 and is currently under review by the agency.

Q - 29 Refer to the IRP, Section 3.2.4, Coal Combustion Residuals ("CCR") Rule, page 66 of 1497. Kentucky Power states that "initial estimates of the anticipated plant modifications and capital expenditures are factored into this IRP." What are the expected impacts to Kentucky Power's ratepayers?

A - 29 The expected impact to Kentucky ratepayers due to the estimated cost of compliance with the CCR rule (expressed as the carrying cost of compliance projects divided by Kentucky Power's estimated energy requirements) included in the IRP are:

	CCR Nominal $/kWh
2017	$0.00008
2018	$0.00020
2019	$0.00026
2020	$0.00030
2021	$0.00030
2022	$0.00031
2023	$0.00031
2024	$0.00031
2025	$0.00031
2026	$0.00031
2027	$0.00031
2028	$0.00031
2029	$0.00030
2030	$0.00030
2031	$0.00031

Case No. 2016-00413
Commission Staff's First Set of Data Requests
Item No. 30

Witness: John F. Torpey

Q.-30 Refer to the IRP, Section 3.2.5, Effluent Limitations Guidelines, page 67 of 1497.

a. Provide the information concerning the necessary plant modifications and capital expenditures for each of Kentucky Power's generating units, as well as the Rockport plants.

b. What is the estimated impact to Kentucky Power's ratepayers for compliance with this rule at Mitchell and Rockport?

A.-30 a. Kentucky Power is still evaluating technologies for compliance with the ELG rule. However, for planning purposes, the Company estimated that its share of the ELG capital cost included in the IRP totals approximately [redacted] at Mitchell Plant and [redacted] at Rockport Plant.

b. The estimated impact included in the Kentucky Power IRP for compliance with the ELG rule (expressed as the carrying cost of ELG projects divided by Kentucky Power's energy requirements) is:

	ELG Nominal $/kWh
2017	$0.00006
2018	$0.00015
2019	$0.00025
2020	$0.00035
2021	$0.00046
2022	$0.00048
2023	$0.00049
2024	$0.00049
2025	$0.00049
2026	$0.00048
2027	$0.00048
2028	$0.00048
2029	$0.00048
2030	$0.00048
2031	$0.00048

Q - 31 Refer to the IRP, Section 3.2.8, Carbon Dioxide ("C02") Regulations, page 70 of 1497, including the Clean Power Plan ("CPP"). Should the courts determine that the CPP should be limited to Building Block 1 measures only, describe what, if any, efficiency gains could be implemented at Rockport and Mitchell, their anticipated costs, and any anticipated downtime of the units.

A - 31 The requested information is not available. The Company's compliance analysis focused on the CPP as finalized. Because the current version of the CPP includes state-specific mass- and rate-based emission goals based on USEPA's determination that the best system of emission reduction (BSER) included Building Blocks 1 through 3, the Company has not evaluated what efficiency projects, if any, it could undertake if the state-specific mass- and rate-based emissions goals were based on a determination that BSER was limited to reductions encompassed solely by Building Block 1.

Q - 32 Refer to the IRP, Section 3.3.5, Volt VAR Optimization ("WO"), page 84 of 1497, which states, "WO enables Conservation Voltage Reduction ("CVR") on a utility's system. CVR is a process by which the utility systematically reduces voltages in its distribution network, resulting in a proportional reduction of load on the network." Also refer to page 33 of 1497, where Kentucky Power states, "Demand side programs, including WO have more than doubled in the 2016 plan compared to the 2013 plan , from 44 MW to 89 MW."

a. Provide the current amount of WO on Kentucky Power's system, and whether it is residential, commercial and/or industrial.

b. Explain whether the current amount of WO on Kentucky Power's system has enabled CVR and, if so, describe.

A - 32 a. Kentucky Power has deployed VVO on 24 circuits as of 12/31/2016. VVO is applied to an entire circuit or distribution feeder. There is no distinction among customer types.

b. All of Kentucky Power's deployed VVO has CVR enabled. A description of VVO/CVR is provided in Section 3.3.5, page 84 of 1497.

Case No. 2016-00413
Commission Staff's First Set of Data Requests
Item No. 33

Witness: John F. Torpey

Q - 33 Refer to the IRP, Section 4.3.1 .1 , Emission Reduction Credit ("ERC") Pricing, page 101 of 1497, where it states, "In fact, based on mass-based versus ratebased pricing approaches, from other observed projections, overall mass versus rate pricing profiles were generally consistent." Describe in greater detail the ways in which the mass and rate pricing profiles are consistent.

A - 33 To the extent a state chooses to comply with the CPP using a market-based approach - either rate-based or mass-based, the Company found that the costs of ERCs and allowances are relatively close given the wide range of assumptions available to parties performing such evaluations. Therefore, for purposes of estimating CPP compliance costs given the parameters discussed on page 143 of 1497 of the IRP, ERC costs on a "per MWh" basis and allowances prices on a "dollar per ton" basis were assumed to be equal.

Case No. 2016-00413
Commission Staff's First Set of Data Requests
Item No. 35
Page 1 of 1
Witness: John F. Torpey

Q - 35 Refer to the IRP, Section 4.4, PJM Capacity Performance Rule Impacts, page 1 08 of 1497. With the assumption that "solar resources will be valued at 38% of nameplate rating, consistent with current PJM criteria for new solar sources," explain why the assumption for wind is that "wind resources will be valued at 5% of nameplate capacity rating, a reduction from the current PJM criterion of 13.5% for new wind resources."

A - 35 The current PJM criterion for wind resources is 13.5% of nameplate capacity; however, when the PJM Capacity Performance rules take full effect in the 2020/2021 PJM Capacity year the penalty for a resource that has been included as part of the Company's capacity plan not being available increases significantly. In light of the potential financial risk for non-availability, it is Kentucky Power's management's judgment that, for planning purposes, intermittent wind resources be given a lower capacity value. Solar resource capacity value will be evaluated as more experience is gained with those resources.
As wind resources are added to the Kentucky Power fleet, the location and performance of those resources, together with the ability to couple wind and solar resources, may allow for a revision to that assumption.

Case No. 2016-00413
Commission Staff's First Set of Data Requests
Item No. 36

Witness: Gordon S. Fisher

Q.-36 Refer to the IRP, Section 4.5.2, Levels of Energy Efficiency Potential, page 109 of 1497.

a. Explain the various benefits and costs and how those benefits and costs are determined in defining economic potential.

b. Provide the avoided cost value that is used, how the avoided cost is determined, and whether avoided cost is influenced by declining load and customer base.

c. Provide a schedule showing the amount of the avoided costs used for cost/benefit tests in the 2010, 2013, and 2016 lAPs. Also, provide the amount of the avoided cost used for modeling purposes from 2013 through 2016.

d. Identify and explain any difference(s) in determining avoided cost in the 2010, 2013, and 2016 lRPs.qQ.

A.-36 a. The benefits of Energy Efficiency (EE) are the avoided costs associated with a customer reducing its consumption of electricity. For the customer, these avoided costs are primarily avoided energy costs. For the utility and its customers, these avoided costs consist of avoided energy costs and avoided capacity costs, including losses.

Each EE measure has an associated cost of implementation. The cost of an EE measure consists of the customer incentive cost and program cost. For the IRP, the incentive cost is 50% of the incremental cost of the measure versus a baseline measure. The program costs are assumed to be 20% of the incentive cost. When the benefits of implementing an EE measure (i.e. the avoided costs over the lifetime of a measure) are greater than the cost of implementation, the measure is considered to be economic.

b. The avoided costs of an EE measure are described in Section 4.3, beginning on page 99 of 1497 of the IRP, and the values are shown in Figure 21 and Figure 22 of the IRP and provided in KPCO_R_KPSC_1_36_Attachment1.xlsx. Avoided costs are influenced by many factors including load and customer base.

c. The avoided costs which are factored into the modeling of EE programs are shown in KPCO_R_KPSC_1_36_Attachment1.xlsx. The attachment includes the avoided costs for each of the last three IRPs (2009, 2013, and 2016).

d. The avoided costs are based upon the wholesale prices provided in the Company's Fundamental Forecasts. Differences in avoided costs among the IRPs may be explained by differing assumptions in the forecasts used. The primary difference was the approach taken to potential CO2 mitigation policy. The 2009 IRP utilized the 2008 H2 Fundamentals Forecast. This forecast included a $12.74 per metric ton CO2 dispatch burden on all (new and existing) fossil fuel-fired generation units commencing in 2015. The 2013 IRP utilized the 2013 H1 Fundamentals Forecast. This forecast included a $15 per metric ton CO2 dispatch burden on all (new and existing) fossil fuel-fired generation units commencing in 2022. The 2016 IRP utilized the 2016 H2 Fundamentals Forecast. This forecast employed a delayed implementation (2024 vs. 2022) CO2 dispatch burden on all existing fossil fuel-fired generating units in order to achieve national mass-based

emission targets similar to those proposed in the suspended ("stayed") Clean Power Plan. The input assumptions are summarized in KPCO_R_KPSC_1_36_Attachment1.xlsx.

Q - 37 Refer to the I RP, Section 4.5.3.1, Incremental Energy Efficiency Modeled, page 112 of 1497. Kentucky Power sates that each EE bundle is included in the portfolio of optimized resources if the model determines that it is economical.

a. Provide the criterion which makes a bundle economical.

b. Provide the list of EE bundles and explain whether it was determined to be economical and included or determined to be non-economical and not included.

A - 37 a. An EE resource is selected if it: (a) is needed to meet the capacity requirement and is a least cost solution; or (b) lowers the cost of the portfolio. The value of the EE resource is based on the expected energy and capacity savings versus its cost to deploy.

b. Section 4.5.3.1 describes the EE bundles modeled, and Tables 13 and 14 provide the bundle characteristics. The bundles selected in the Preferred Plan are: Residential Lighting, Residential Appliances, Residential Thermal Shell, Residential Water Heating, Commercial Cooling, Commercial Equipment and Commercial Lighting.

Q - 38 Refer to the IRP, Section 4.5.3.4, Distributed Generation ("DG"), page 114 of 1497.

a. Explain if Kentucky Power evaluated the impact of commercial DG.

b. Refer to Figure 25. Provide the annual growth rate of Kentucky Power's forecasted rooftop solar installations.

A - 38 a. Levels of commercial distributed generation are included in the total estimated distributed generation levels shown in Figure 25. Kentucky Power did not separately evaluate the impact of commercial distributed generation.

b. The compound annual growth rate from 2016 to 2031 is approximately 15%.

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Commission Staff's First Set of Data Requests
Item No. 39

Witness: Gordon S. Fisher

Q - 39 Refer to the IRP, Section 4.5.3.5, Combined Heat and Power ("CHP"), page 115 of 1497, which states, "The option developed is a 15 MW facility utilizing a natural gas fired combustion turbine, Heat Recovery Steam Generator (HRSG) and SCR to control NOx." a. Explain whether the 15-MW facility is newly. constructed or a retrofit, and whether it will be Kentucky Power's facility or that of a customer within Kentucky Power's service territory. b. If the CHP facility is Kentucky Power's, with an estimated installed cost of $1 ,800/kW and an assumed capacity factor of 90 percent, explain the need for such a facility, and provide the cost/benefit to construct.

A - 39 a. The CHP resource described in the IRP was assumed to be a newly constructed facility. The Company modeled the CHP resource as a Kentucky Power facility to capture the cost in the IRP.

b. The Company included the CHP resource in Kentucky Power's Preferred Plan to reflect the potential of this type of resource to be added within Kentucky Power's service territory. The inclusion of the CHP resource was not driven by a capacity need. Please see Section 5.3, pages 137 - 138 of the IRP for more detail.

Q - 40 Refer to the I RP, Section 5.1, The Plexos Model -An Overview, page 130 of 1497.

a. When Plexos adds the program costs of DSM alternatives, confirm that they are added based on marginal cost pricing, and when added have the least marginal cost.

b. Explain what encompasses the program costs of DSM alternatives and provide an example.

c. Explain whether the DSM alternatives are forecasted DSM additions or existing DSM programs.

A - 40 a. Confirmed. The selection of any resource is based on its cost and performance characteristics relative to the other resource options. When a resource is added to a plan it produces the lowest marginal cost over the planning period for that plan.

b. Please refer to the Company's response to KPSC 1-36 for an explanation of DSM EE program costs. DSM VVO resource costs are described in Section 4.5.3.2 and in Table 15 on pages 112-113. DSM DR resource costs are described in Section 4.5.3.3 and in Table 16 on page 113. An example of a resource cost for a DSM EE measure is as follows: a SEER 15 Heat Pump is estimated to have an incremental cost of $158. The incentive for this measure is considered to be 50%, or $79. The administrative expense is considered to be 20% of the incentive, or $15.80. The total cost of this measure, for one customer, would be $94.80. Tables 15 and 16 show how the resource costs are estimated for DSM VVO and DSM DR.

c. DSM alternatives are incremental DSM resources that the model can choose to select; they are not existing DSM programs.

Q - 41 Refer to the IRP, Section 5.2.1 , Modeling Options and Constraints, page 134 of 1497. Explain why the large-scale solar resources costs differ between Tier 1 and Tier 2.

A - 41 In summary, Tier 1 pricing is based on a "Best in Class" pricing from a bidding process, and Tier 2 is based on BNEF's cost for utility scale solar. Please refer to Section 4.6.5.1.1, page 122, for a description of the solar cost modeled.

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Commission Staff's First Set of Data Requests
Item No. 42

Witness: John F. Torpey

Q - 42 Refer to the IRP, Section 5.3.2, Comparing the Cost of the Preferred Plan, pages 139-141 of 1497. Explain if the comparison between the Preferred Plan and the "Do Nothing Plan" is done based on a mid, high, or low assumption analysis.

A - 42 The comparison between the Preferred Plan and the "Do Nothing Plan" was made using the Mid commodity pricing scenario.

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Item No. 43

Witness: Randy E. Holliday

Q - 43 Refer to the IRP, Exhibit C-1 , Annual Internal Energy Requirements and Growth Rates, page 170 of 1497. Compare the variance between the 2016 forecast losses and the actual 2016 losses.

A - 43 The Company's actual losses were 419 GWh compared to the forecast losses of 408 GWh.

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Item No. 44

Witness: Randy E. Holliday

Q - 44 Refer to the IRP, Exhibit C-6, DSM/EE included in Load Forecast, page 176 of 1497. Also refer to Case No. 2015-00271, Exhibit 6.1 Explain and reconcile why the forecasted DSM energy, summer peak, and winter peak in Exhibit C-6 differ from the program summary tables in Exhibit 6.

A - 44 The Company's consultant, Applied Energy Group, provided a market potential study that identified programs that are possible regardless of costs. The Company's estimate relied on the programs approved by the KPSC or identified in the IRP as economic to pursue.

Q - 45 Refer to the IRP, Exhibit C-7, Blended Forecast vs. Long-Term Model Results, page 177 of 1497.

a. Explain why the customer forecasts for residential and industrial are not a blend of long-term and short-term forecasts.

b. Explain why the sales forecasts for each class are not a blend of long-term and short-term forecasts.

A - 45 a. - b. The forecasting process includes the comparison of short-term and long-term forecasts for the near term. This evaluation encompasses the forecast of monthly patterns and annual trends. The Company elected not to blend long-term and short-term forecasts for residential and industrial customers, and for sales forecasts for each customer class, based on recent trends, economic growth patterns, knowledge of the Company's load, and professional judgment.

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Item No. 46

Witness: Randy E. Holliday

Q - 46 Refer to the IRP, Exhibit C-19, Profiles of Monthly Peak Internal Demands, page 189 of 1497. Provide this exhibit with a legend.

A - 46 Please refer to KPCO_R_KPSC_1_46_Attachment1.pdf.

Q - 47 Identify and describe any procedures in addition to its current processes that Kentucky Power can adopt in evaluating current and potential DSM programs.

A - 47 The Company has not identified any further procedures to recommend.

The Company's current DSM evaluation process includes conducting Process, Market, and Impact Savings evaluations over the three-year program life cycle.

Kentucky Power is conducting the Process and Market evaluation after the first year of program operation. A final report for the Process and Market evaluation will be completed by August 2017. The primary objective of the Process and Market evaluation is to support and improve the design and management of DSM programs that achieve cost-effective savings while maintaining high levels of customer satisfaction and customer participation. Data collection activities associated with the Process and Market evaluation are based on target participant samples of 90% confidence interval with an error margin of +/- 10%.

An Impact Savings evaluation is used to estimate gross and net demand, energy savings, and program cost effectiveness. This evaluation is based on appropriate selection of international performance measurement and verification protocols (IPMVP). The impact evaluation includes data from the initial two years of the program operating cycle.

Upon completion of the current three year review, the Company will prepare a report identifying the final results of the Impact Savings, Process and Market evaluations. The report will include a retrospective and a prospective cost-effectiveness analysis of the Company's DSM portfolio.

Q - 48 Even though Kentucky Power is not currently offering any industrial DSM programs, and many of its industrial customers have their own in-house energy conservation and EE initiatives, state whether Kentucky Power has received any inquiries as to available grants, subsidies or low-interest loans for energy conservation or EE that may help those customers remain economically stable or market completive.

A - 48 Kentucky Power has received no inquiries as to available grants, subsidies or low-interest loans for energy conservation from any industrial customer. The Company has received limited inquiries from industrial customers seeking general information on company sponsored energy efficiency programs.

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Commission Staff's First Set of Data Requests
Item No. 49

Witness: John A. Rogness

Q - 49 Provide a detailed discussion on Kentucky Power's consideration of implementing a Prepay Metering program

A - 49 Kentucky Power previously considered a prepay meter program. A prepay meter program requires an advanced metering infrastructure to provide customers with real-time access to their energy usage and costs. The Company installed an advanced meter reading system in 2006, and the cost to upgrade that system with the advanced metering infrastructure for a prepay meter program is not justified.

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Item No. 50

Witness: John A Rogness

Q - 50 Explain whether there has been any change, internally or externally, in the methods of evaluation, measurement, and verification used by Kentucky Power for existing or proposed DSM programs. Identify the cost associated with such changes, if they exist.

A - 50 There has been no change with the methodology Kentucky Power employs to evaluate company DSM programs.

Case No. 2016-00413
Commission Staff's First Set of Data Requests
Item No. 51

Witness: Gordon S. Fisher
Witness: Randy E. Holliday

Q - 51 Explain if there are any industrial DSM opportunities assumed in the forecast.

A - 51 There were no DSM adjustments for industrial customers in the load forecast.