COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of an Examination of the Application of the Fuel Adjustment Clause of Duke Energy Kentucky from November 1, 2014 Through October 31, 2016	))))	Case No. 2017-00005

DIRECT TESTIMONY OF

BRETT PHIPPS

ON BEHALF OF

DUKE ENERGY KENTUCKY, INC.

February 20, 2017

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I. INTRODUCTION AND PURPOSE

Q. STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Brett Phipps and my business address is 526 S. Church Street, Charlotte, North Carolina 28202.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed as Managing Director, Fuel Procurement, by Duke Energy Progress, Inc., a utility affiliate of Duke Energy Kentucky, Inc. (Duke Energy Kentucky, or Company).

Q. PLEASE DESCRIBE BRIEFLY YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL EXPERIENCE.

A. I am a 1992 graduate of Marshall University with a Bachelor of Science in Chemistry. I have worked in the energy industry for approximately 23 years. My career began in the mining industry in 1993 where I held various roles associated with surface mining operations. I began my employment with Progress Energy in 1999, where I held roles in terminal operations and sales and marketing for the unregulated business. I transitioned to the regulated business in 2005 where I worked in various fuels procurement functions and leadership roles. I joined Duke Energy Corporation (Duke Energy) in July 2012 and am currently Managing Director, Fuel Procurement. I am a member of the American Coal Council, The Coal Institute the Lexington Coal Exchange, Southern Gas Association, American Gas Association and serve on the Board of Directors of the Coal Trade Association.

Q. HAVE YOU TESTIFIED PREVIOUSLY BEFORE THE PUBLIC SERVICE COMMISSION?

A. Yes, I have testified in numerous fuel adjustment clause (FAC) proceedings before the Kentucky Public Service Commission (Commission).

Q. PLEASE SUMMARIZE YOUR DUTIES AS MANAGING DIRECTOR, FUEL PROCUREMENT.

A. As Managing Director, Fuel Procurement, I oversee Duke Energy's Coal Procurement Group. I am ultimately responsible for all aspects of the purchase and delivery of coal, natural gas, oil and emissions in the five regulated jurisdictions (Kentucky, Indiana, Florida, North Carolina, and South Carolina) that encompass Duke Energy regulated electric utilities' collective footprint. As part of this responsibility, I review forecasts of supply and demand, price, quality, availability, and deliverability. These coal forecasts cover both existing supply sources and potential supply sources that may be economically developed. On behalf of Duke Energy Kentucky, I also supervise the Company's coal and natural gas procurement activities, including the negotiation and delivery of coal purchase contracts.

Q. WHAT IS THE PURPOSE OF YOUR DIRECT TESTIMONY?

A. The purpose of my testimony is to respond to paragraph 6(a)-(e) of the Commission's February 6, 2017 Order, to more broadly discuss and support Duke Energy Kentucky's fuel procurement practices from November 1, 2014 through October 31, 2016. I also sponsor certain of the Company's responses to the Commission Data Requests.

II. DISCUSSION

Q. PLEASE COMMENT GENERALLY ON THE REASONABLENESS OF DUKE ENERGY KENTUCKY'S FUEL PROCUREMENT PRACTICES DURING THE REVIEW PERIOD.

A. Duke Energy Kentucky's coal procurement policy is designed to assure that we procure a reliable and consistent supply of appropriate quality coal for our coal generating stations at a competitive price. Coal is generally purchased under long-term contracts of one to three years in length. The Company secures both its spot (one year or less) and long-term coal supply from producers through competitive bid processes, which are evaluated thoroughly, taking into account coal quality, quantity, transportation alternatives and price, among other factors. The producer (or producers) whose coal offers the best value, particularly with regard to overall utilization costs, is selected for further negotiations to produce contracts. The Company's long-term contracts may contain provisions for periodic price adjustments or a mechanism to adjust prices based upon published market price indices. The Company has established guidelines for the amounts of coal to be placed under contract during a specific period of time, and the Coal Procurement Group follows these guidelines.

The Company's Coal Procurement Group stays continually informed as to the current market for spot and contract coal and specific opportunities for the purchase of such coal. Coal supply needs are determined by an ongoing review of generating station stockpiles, consumption projections, and current coal supply quantities already contracted. In addition, Duke Energy's Coal Procurement

personnel visit each of the Company's contract producers and mining operations regularly and any potential new spot producers as well, gathering information which assists in our analysis of spot coal needs. This information, coupled with constant monitoring of pricing information published in various places (*e.g.* industry newsletters, trade publications, regulatory filings, etc.), as well as a close review of the weekly spot market pricing indices published by brokers and traders provides a thorough understanding of the various spot and long-term alternatives for coal supply. Usually, spot coal commitments are made for small quantities of coal, over short durations, as compared to long-term contracts of greater than one year.

With respect to natural gas, the company maintains supplier agreements to ensure natural gas can be procured at a competitive market price to meet the needs of the Company's gas generation fleet. The gas procurement personnel stay abreast of market trends and prices through real-time market electronic real-time pricing platforms such as the Intercontinental Exchange (i.e. ICE) real-time price feeds, information published in trade publications, industry reports, and various interactions with suppliers and pipelines. As part of natural gas procurement, the gas personnel review projections of natural gas needed based on projected generation unit runs before making commitments to purchase natural gas. The Company's natural gas supply agreements provide the provisions to ensure the company procures the needed volume of natural gas at the most competitive price each day.

Q. PLEASE DESCRIBE THE COAL AND NATURAL GAS SUPPLIER'S ADHERENCE TO CONTRACT DELIVERY SCHEDULES DURING THE REVIEW PERIOD.

A. During the review period, the Company received approximately 90% of all contracted coal during the agreed upon delivery schedule. The small amount of contract delivery shortfalls were spread over several different suppliers and were caused by typical operational and logistical delays. The Company maintained adequate inventory levels and a reliable supply of fuel during the review period.

Duke Energy Kentucky does not maintain long term commitments for natural gas supply given the burn profile and low capacity factor of the Woodsdale natural gas-fired Generating station (Woodsdale), the Company utilizes firm delivered spot gas as needed each day from the most cost competitive supplier. In the review period, the Company did not experience any delivery issues due to pipeline constraints or operational flow orders.

With respect to natural gas needs, the Company monitors conditions along the interstate pipeline that Woodsdale is connected. Duke Energy Kentucky has not historically maintained firm transportation on the interstate pipeline that supplies Woodsdale because the costs of doing so could not justify having such a contract. Procuring delivered gas purchased on a short-term spot basis has been sufficient to meet the Company's generating needs at a cost competitive market. The Company purchases natural gas from the short-term spot market based upon the day-ahead and real-time energy market dispatch awards received through PJM Interconnection LLC (PJM). Duke Energy Kentucky continually monitors the

natural gas markets for pricing and scarcity changes and those changes are factored into the Company's daily bids into PJM. Duke Energy Kentucky witness John Swez explains how the Company, (and all PJM members) operates in PJM.

Q. PLEASE DESCRIBE DUKE ENERGY KENTUCKY'S EFFORTS TO ENSURE COAL ADHERENCE TO CONTRACT DELIVERY SCHEDULES DURING THE REVIEW PERIOD.

A. Duke Energy Kentucky constantly monitors and enforces the provisions of our coal contracts with respect to quantities and qualities of coal due the Company. The Company monitors supplier performance monthly and determines the causes of any supplier under-performance for quantity or quality. If our review determines that the supply shortages were not the result of a Force Majeure event, we will either work with the particular supplier to determine a new alternate delivery schedule or seek damage provisions per the terms of the contract. In either case, we preserve as much of the market value as possible. All coal contracts contain quality adjustment provisions to account for the differences between the actual coal quality shipped and the contracted quality. Monthly quality pricing adjustments are made per the terms of the contract which include penalties for non-conforming shipments of coal. Contracts also contain terms stating if shipments are not in compliance with contract specifications, the Company has the ability to suspend deliveries and terminate the contract if quality deficiencies cannot be corrected.

Q. PLEASE DESCRIBE DUKE ENERGY KENTUCKY'S EFFORTS TO MAINTAIN THE ADEQUACY OF ITS COAL AND NATURAL GAS

SUPPLIES IN LIGHT OF ANY SUPPLIER'S INABILITY OR UNWILLINGNESS TO MAKE CONTRACT DELIVERIES.

A. As mentioned earlier, the Company monitors supplier delivery performance monthly as part of a strong adherence to contract administration. The Company also closely monitors actual coal burns, actual coal inventories and projected coal burns and inventories. If a supplier fails to make contracted deliveries per the agreed upon schedule, the Company immediately notifies the supplier and discusses the reasons and nature of the shortfall. Depending upon the nature of the failure to perform, the parties either agree to reschedule the missed shipments or the Company enforces the legal terms of the contracts for non-performance. The Company then factors any shortfall or agreed upon make up schedule for missed tons into the forward plans for projected inventories. If the missed shipments will lead to a situation where the Company's coal inventories will fall below established inventory guidelines, the Company will purchase replacement coal through its competitive bid process.

Similarly with respect to natural gas procurement, the Company continually monitors the interstate pipeline that connects to Woodsdale. During times of operational flow restrictions, the pipeline will provide the Company with operational information on the pipeline and the Company will communicate with the pipeline operator as needed to stay abreast of operational conditions.

Q. WERE THERE ANY CHANGES IN COAL AND NATURAL GAS MARKETCONDITIONS THAT OCCURRED DURING THE REVIEW PERIOD OR THAT DUKE ENERGY KENTUCKY EXPECTS TO OCCUR

IN THE NEXT TWO YEARS THAT HAVE SIGNIFICANTLY AFFECTED OR WILL SIGNIFICANTLY AFFECT DUKE ENERGY KENTUCKY'S COAL AND NATURAL GAS PROCUREMENT PRACTICES?

A. Coal markets during the review period and for the foreseeable future continue to be in a state of change due to a number of factors, including but not limited to: (1) uncertainty around proposed, imposed, and stayed U.S. Environmental Protection Agency regulations for power plants; (2) continued abundant natural gas supply and storage resulting in lower natural gas prices combined with installation of new combined cycle generation by utilities, which has also reduced overall coal demand; (3) continued changes in demand for global markets for both steam and metallurgical coal; (4) uncertainty surrounding regulations for mining operations; and (5) the on-going financial viability of many of the Company's coal suppliers.

With respect to natural gas, the nation's natural gas supply has grown significantly over the last several years and producers continue to enhance production techniques to enhance efficiencies and lower production costs. In the shorter term, natural gas prices are reflective of the dynamics between supply and demand factors, seasonal weather and overall storage inventory balances. Over the longer term planning horizon, gas supply is projected to continue to increase along with the needed pipeline infrastructure to move the growing supply to meet demand related to power generation, liquidified natural gas exports and pipeline exports to Mexico.

The Company expects to continue to employ similar procurement practices over the next two years as it has in the past for coal and natural gas. Our practices

have maintained a reliable supply of coal at a very competitive cost for our customers. Practices include the use of staggered terms on long term contracts, seeking to maintain a diversified mix of suppliers and supply sources, ensuring the right quality of coal depending on power market conditions, using a mixture of fixed price contracts and variable price contracts tied to changes in certain indices as appropriate, enforcement of all contract provisions and continuing compliance with Company coal contracting coverage guidelines.

Q. PLEASE IDENTIFY THE RESPONSES TO COMMISSION DATA REQUESTS YOU ARE SPONSORING.

A. I sponsor the Company's responses to Data Request Numbers 15, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 32, 33, 34, 38 and 40 . These responses were prepared by me and under my direction and control and are true and accurate.

III. CONCLUSION

Q. IN YOUR OPINION, WERE DUKE ENERGY KENTUCKY'S FUEL COSTS AND PROCUREMENTS DURING THE REVIEW PERIOD REASONABLE?

A. Yes, they were.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes, it does.

VERIFICATION

STATE OF NORTH CAROLINA)
) **SS:**
COUNTY OF MECKLENBURG)

The undersigned, Brett Phipps, Managing Direct – Fuel Procurement, being duly sworn, deposes and says that he has personal knowledge of the matters set forth in the foregoing testimony and that it is true and correct to the best of his knowledge, information and belief.

Brett Phipps, Affiant

Subscribed and sworn to before me by Brett Phipps on this 20 day of February 2017.

Katie Jamieson
NOTARY PUBLIC

KATIE JAMIESON
Notary Public, North Carolina
Gaston County
My Commission Expires

My Commission Expires: June 14, 2021

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of an Examination of the Application of the Fuel Adjustment Clause of Duke Energy Kentucky from November 1, 2014 Through October 31, 2016	))))	Case No. 2017-00005

DIRECT TESTIMONY OF

JOHN D. SWEZ

ON BEHALF OF

DUKE ENERGY KENTUCKY, INC.

February 20, 2017

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I. INTRODUCTION AND PURPOSE

Q. STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is John D. Swez and my business address is 526 S. Church Street, Charlotte, North Carolina 28202.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed as Director, Generation Dispatch and Operations, by Duke Energy Carolinas, LLC, a utility affiliate of Duke Energy Kentucky, Inc. (Duke Energy Kentucky or Company).

Q. PLEASE BRIEFLY DESCRIBE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL EXPERIENCE.

A. I received a Bachelor of Science degree in Mechanical Engineering from Purdue University in 1992. I received a Masters of Business Administration degree from the University of Indianapolis in 1995. I joined PSI Energy, Inc. in 1992 and have held various engineering positions with the Company or its affiliates in the generation dispatch or power trading departments. In 2003, I assumed the position of Manager, Real-Time Operations. Though my title has changed on several occasions, I assumed my current role on January 1, 2006.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE KENTUCKY PUBLIC SERVICE COMMISSION?

A. Yes, I have testified before the Kentucky Public Service Commission (Commission) on several occasions.

Q. PLEASE BRIEFLY DESCRIBE YOUR DUTIES AS DIRECTOR, GENERATION DISPATCH & OPERATIONS.

A. I am responsible for the Company's: (i) generation dispatch; (ii) unit commitment; (iii) 24-hour real-time operations; and (iv) short-term generating maintenance planning. I am also responsible for the submission of the Company's supply offers to the PJM Interconnection, L.L.C. (PJM) regional transmission organization (RTO) day-ahead and real-time electric power markets, as well as managing the Company's short-term supply position to ensure that the Company has adequate resources committed to serve its retail customers' electricity needs.

Q. WHAT IS THE PURPOSE OF YOUR DIRECT TESTIMONY?

A. The purpose of my direct testimony is to respond to the Commission's February 6, 2017, Order and address the changes in the wholesale electric power market that occurred during the two-year review period of November 1, 2014, through October 31, 2016, and how those changes have impacted Duke Energy Kentucky's power procurement practices. In doing so, I describe the Company's participation in PJM and also describe the various PJM Billing Line Item (BLI) charges and credits that are currently included in the fuel adjustment clause (FAC) and why those charges and credits are appropriate for inclusion in the FAC calculation. Finally, I sponsor certain of the Company's responses to the Commission's Data Requests.

II. DISCUSSION

A. Overview of PJM

Q. PLEASE GENERALLY DESCRIBE DUKE ENERGY KENTUCKY'S POWER PROCUREMENT PRACTICES.

A. During the entire review period, Duke Energy Kentucky has been a member of PJM, the nation's first fully functioning RTO that operates the power grid and wholesale electric market for all or parts of thirteen states and the District of Columbia. As discussed herein and in the Direct Testimony of John A. Verderame, this electric market consists of energy markets, capacity markets, ancillary services markets, and a financial transmission rights (FTR) market. PJM's operation is governed by agreements approved by the Federal Energy Regulatory Commission (FERC) including the Operating Agreement, Open Access Transmission Tariff (OATT), and the Reliability Assurance Agreement. As a member of PJM, Duke Energy Kentucky is subject to these agreements, which among other things, require Duke Energy Kentucky to offer all of its available generation to PJM and to purchase its customer energy load from the PJM Day-Ahead or Real-Time Energy Markets. The Day-Ahead and Real-Time Energy Markets are collectively referred to as the PJM Energy Market for the remainder of my testimony.

Consistent with its PJM membership, during the period under review, the Company met all of its energy needs through the PJM Energy Market and did not purchase any energy outside of PJM. Through PJM's Day-Ahead market, market participants can mitigate their exposure to real-time price risk by selling available generation and purchasing forecasted demand in the Day-Ahead energy market. Duke Energy Kentucky submits demand bids and supply offers as both a load serving entity and a generator owner, respectively. Thus, the Company

simultaneously functions as both a buyer and seller to serve its retail electric customers.

During the review period, Duke Energy Kentucky also participated in PJM's Ancillary Services Markets. Day-Ahead and Real-Time prices for ancillary services appear to be at reasonable price levels consistent with market conditions. Furthermore, Duke Energy Kentucky's generating units are appropriately receiving day-ahead and real-time awards for supply of reserves.

Q. PLEASE BRIEFLY DESCRIBE THE PJM ENERGY MARKET.

A. PJM administers its Energy Market utilizing locational marginal pricing (LMP). LMP can be broadly defined as the value of one additional megawatt of energy at a specific point on the electric grid. In PJM, LMP is composed of three components; the system energy price, the transmission marginal congestion price, and the marginal loss price. Both the Day-Ahead and Real-Time Energy Markets are based on supply offers and demand bids submitted to PJM by market participants, including both generator owners (as sellers) and load serving entities (as buyers).

The Day-Ahead Energy Market provides a means for market participants to mitigate their exposure to price risk in the Real-Time Energy Market. The Day-Ahead Energy Market also provides meaningful information to PJM regarding expected real-time operating conditions for the next day, which enhances PJM's ability to ensure reliable operation of the transmission system. The Real-Time Energy Market functions as a balancing market between generation and load in real-time. Through the PJM Energy Market and the LMP price signals, PJM

provides a market-based solution to value and thus manage energy production, transmission congestion, and marginal losses in the PJM region.

PJM also operates, and Duke Energy Kentucky participates in, the Ancillary Services Market. Ancillary services include:

- Synchronized Reserves, which provide energy during an unexpected period of need;
- Non-Synchronized Reserves, which also provide energy during an unexpected period of need, but which are typically off-line;
- Regulating Reserves, which are utilized to manage short-term changes in energy requirements;
- Day-Ahead Scheduling Reserves, a 30-minute day-ahead reserve product;
- Black Start Service, which provides energy to the grid in the event of a black out condition; and
- Reactive Supply and Voltage Control, which is produced by capacitors and generators and absorbed by reactors and other inductive devices.

PJM Ancillary Services Markets are co-optimized with the PJM Energy Market in order to minimize overall production costs across the PJM footprint.

In addition to these more physical Energy and Ancillary Services Markets, PJM offers financial products that can be utilized to hedge exposure to the Energy Markets. Virtual transactions can hedge risk in the Real-Time Energy Market, and FTR transactions can hedge exposure to day-ahead congestion costs. FTR auctions are conducted annually, quarterly, and monthly. FTRs are defined with

source and sink points that entitle and obligate the holder to a stream of revenues or charges based on the hourly day-ahead congestion price differences across the defined path. Duke Energy Kentucky utilizes FTRs to manage the congestion risk from its generation stations to its load zone. Virtual transactions clear in the Day-Ahead Energy Market as virtual generators and loads at specific points on the grid. Virtual transactions settle based on the difference between the day-ahead and real-time LMP at the specific node. Duke Energy Kentucky may utilize virtual transactions to hedge generator performance risk, primarily during start up or as a potential operational contingency.

Other non-PJM operated financial markets that are based on PJM market settlements exist. Duke Energy Kentucky participates in these financial markets to hedge Duke Energy Kentucky's customers' exposure to day-ahead and real-time energy prices when its generation stations are unavailable due to planned maintenance outages or are not expected to clear the PJM Energy Market in volumes sufficient to serve native load demands.

Q. PLEASE EXPLAIN HOW PJM DISPATCHES GENERATING RESOURCES TO MEET DEMAND.

A. An RTO such as PJM performs a security constrained economic commitment and least-cost security constrained economic dispatch process that simultaneously optimizes energy and reserves for all generation in its footprint in determining which assets to commit and dispatch. This process takes into account the various, unique challenges faced in reliably and economically supplying power to all load across its footprint, most significantly aligning the production of energy

simultaneously with the volatility in demand within the capability of the transmission network. PJM must continually act to account for the fact that customer demand is dynamic in nature, fluctuating over the course of a day, week, and season, while analyzing factors such as costs and operating characteristics of generation from different types of units within its entire footprint and expected and unexpected conditions on the transmission network that affect which generation units can be used to serve load economically and reliably given the numerous constraints that must be considered. Because of these challenges, PJM's dispatch process "is designed to be an optimization process…so that a reliable supply of electricity at the lowest cost possible under the conditions prevailing in each dispatch time interval can be delivered."[1]

Importantly, PJM's decisions as to which generating units should be dispatched are not made exclusively based on the individual unit's cost. Although the price of energy at a generating unit is certainly important, PJM's dispatch process must take into account a number of factors, including system-wide reliability, transmission grid congestion and losses, and numerous operational conditions. PJM has access to complete information regarding the operation of its Day-Ahead and Real-Time Energy Markets in making the determination to commit and dispatch a unit. Because of the efficient and informed nature of PJM's dispatch methodology, a utility's energy purchases in PJM's Day-Ahead

[1] FERC Docket AD05-13-000, *Report on Security Constrained Economic Dispatch by the Joint Board of PJM/MISO Region*, Attachment 1, at pg. 5 (May 24, 2006).

and Real-Time Energy Markets are the most efficient and economic means available to satisfy customer load. Stated another way, energy acquired by all load serving entities from PJM is necessarily and by definition purchased on an economic dispatch basis.

Q. PLEASE BRIEFLY EXPLAIN HOW DUKE ENERGY KENTUCKY'S CURRENT GENERATION PORTFOLIO PARTICIPATES AND IS DISPATCHED IN THE DAY-AHEAD AND REAL-TIME ENERGY MARKETS.

A. Under the terms of PJM's Reliability Assurance Agreement, as a fixed resource requirement (FRR) entity and generation owner in PJM, Duke Energy Kentucky is under a must-offer requirement to offer all of its generation committed to the FRR plan into the Day-Ahead Energy Market. The generating units are offered with designations including: Must Run, Economic, Emergency, Fixed Gen, and Unavailable. Units offered with a Must Run status will clear the market and are generally dispatched at a minimum load during periods when the marginal cost of the unit is above the LMP solved by the dispatch model, or are dispatched up during periods when the marginal cost of the unit is below the LMP solved by the dispatch model. Economic status units will generally be committed if their "all in" costs, including startup costs, are economic across the following day or during periods of the following day. Emergency status units are committed during an energy emergency event. Fixed Gen units are commited but intend to remain fixed or otherwise not follow PJM real-time dispatch. Unavailable status units will not be considered by the commitment and dispatch model.

Each generating unit is offered hourly with a segmented incremental energy price pair quantity and ancillary service offer curve across the unit's operational range as well as a start-up cost, no-load cost, and operating parameters. The hourly offers are based on numerous factors, including but not limited to, the daily fuel cost, unit efficiency, emissions and variable operations and maintenance (O&M) costs, maximum and minimum loadings, and plant output availability and characteristics. Unit status is determined based upon unit availability, marginal energy costs, expected impact of certain PJM charges and credits, and anticipated market clearing prices.

Day-ahead generation unit offers are submitted to PJM by 10:30 Eastern Prevailing Time the day prior to energy flow. Generally by 13:30 Eastern Prevailing Time that day, following execution of a security constrained unit commitment model, PJM posts energy and ancillary services awards for the following day. These awards are financially binding on both Duke Energy Kentucky and PJM.

In real time, Duke Energy Kentucky makes hourly updates to the energy and ancillary service offers, primarily with respect to unit availability, but also taking into account the unit's operating parameters. The Duke Energy Kentucky generation dispatchers follow PJM generation dispatch signal instructions and relay necessary instructions to the generation stations.

It is possible that in real time, despite receiving a day-ahead energy award, PJM dispatch signals will instruct Duke Energy Kentucky plants to move to generation loadings other than their Day-Ahead award level. These instructions

are based on the Real-Time energy and ancillary services needs of the overall system as manifested through LMP price signals at the generator bus. If the real-time LMP is below a unit's marginal cost of energy, PJM will likely reduce output, or delay or cancel a unit startup. Conversely, if system conditions have changed from day-ahead model assumptions, PJM may direct a Duke Energy Kentucky unit to start up even without a Day-Ahead energy award. Duke Energy Kentucky has an obligation and financial incentive to follow PJM dispatch instructions.

Q. PLEASE DESCRIBE ANY CHANGES THAT OCCURRED IN THE WHOLESALE ELECTRIC POWER MARKET BETWEEN NOVEMBER 1, 2014, AND OCTOBER 31, 2016, THAT SIGNIFICANTLY AFFECTED DUKE ENERGY KENTUCKY'S ELECTRIC POWER PROCUREMENT PRACTICES.

A. Duke Energy Kentucky joined PJM effective January 1, 2012, and thus operated within PJM during the period under review in this proceeding. Thus, the Company continues to offer its generation and bid its load into the PJM market. For the Duke Energy Kentucky generating capacity, the Company offered its resources in an FRR capacity plan. The generating resources that are committed in the FRR plan have a must-offer obligation for their energy in the Day-Ahead Energy Market. Duke Energy Kentucky Witness Mr. Verderame discusses the PJM Capacity markets in greater detail through his direct testimony.

Although the Company's Miami Fort 6 coal-fired unit retired on June 1, 2015, Duke Energy Kentucky's other coal unit, East Bend, continues to compete

favorably in the PJM market, with typical dispatch of this unit at full load during on-peak periods and even during much of the off-peak periods as well. The Company's six combustion turbines at Woodsdale station continue to see limited dispatch within the PJM energy markets. The Company continued to make economic power purchases for both planned and forced outages during the audit period to mitigate exposure to market prices. In addition, Duke Energy Kentucky made economic purchases from PJM when the purchases were more economic than dispatching its own generation for the benefit of the Company's native load.

PJM commits and dispatches these resources via their security constrained unit commitment and least-cost economic dispatch software by modeling the Duke Energy Kentucky generating resources with all other generating resources in the PJM area. If not committed day-ahead, the units may still be called upon in real-time. There are separate LMPs calculated for Day-Ahead versus Real-Time Markets that are paid to the generators or charged to the load. PJM also operates an ancillary service market for regulation, day-ahead scheduling reserves, non-synchronized, and synchronized reserves, each of which is cleared separately with different prices for each product. In addition, PJM reimburses service providers such as Duke Energy Kentucky for blackstart and reactive services. The Duke Energy Kentucky Woodsdale gas-fired combustion turbine plant is currently a blackstart unit in the applicable Duke Energy blackstart plan and, in addition, is reimbursed for certain costs to provide blackstart service by PJM. Duke Energy Kentucky continues to operate its generating resources to optimize revenues available in the PJM capacity market and energy market and for ancillary services,

black start, and reactive service in a reliable manner for the benefit of customers and shareholders.

Q. IS DUKE ENERGY KENTUCKY CONTEMPLATING ANY CHANGES TO ITS PARTICIPATION IN THE PJM CAPACITY PLANNING PROCESS?

A. The Company continually evaluates the merits of a potential switch from the FRR capacity planning process to participate in the Base Residual Auction capacity planning process. The Company has not made a decision in that regard and is mindful of its commitment to seek approval from this Commission in advance of such a change.

B. PJM Charges and Credits Currently in the FAC

Q. PLEASE LIST THE PJM BLI CODES THAT ARE CURRENTLY INCLUDED AS PART OF THE COMPANY'S FAC CALCULATION.

A. The Company is currently including the following BLI Codes in its FAC calculation:

- 1200 - Day-Ahead Spot Market Energy
- 1205 – Balancing Spot Market Energy
- 1210 – Day-Ahead Transmission Congestion
- 1215 – Balancing Transmission Congestion
- 1220 – Day-Ahead Transmission Losses
- 1225 – Balancing Transmission Losses
- 2370 – Day-Ahead Operating Reserve Credit
- 2375 – Balancing Operating Reserve Credit

Q. PLEASE EXPLAIN EACH OF THESE BLI CODES.

A. BLI Codes:

- 1200 - Day-Ahead Spot Market Energy: This represents a portion of the net energy resulting from Company's participation in the PJM markets. Only the portion of the day-ahead spot market energy attributable to purchase power is currently included in the Company's FAC. Said in another way, if the Company has more cleared day-ahead generation than day-ahead demand in an hour, there is no day-ahead spot market energy included for that hour in the FAC. If the Company has less cleared Day-Ahead generation than Day-Ahead demand in an hour, there would typically be a charge for the energy portion of this day-ahead spot market energy purchase power.
- 1205 - Balancing Spot Market Energy: This represents net real-time deviations for day-ahead spot market energy and is charged at the hourly PJM-wide real-time system energy price. If there is no change to the quantity of demand bought or generation sold between the Day-Ahead and Real-Time Energy Markets, there is no adjustment in balancing spot market energy.
- 1210 - Day-Ahead Transmission Congestion: This represents the change in energy costs due to re-dispatch in the Day-Ahead Market during hours when the PJM transmission system is constrained and assessed to participants based on the congestion price component of LMP. Only the portion of the day-ahead transmission congestion

attributable to purchase power is currently included in the Company's FAC. Said in another way, if the Company has more cleared day-ahead generation than day-ahead demand in an hour, there is no Day-Ahead transmission congestion charge or credit included for that hour in the FAC. If the Company has less cleared day-ahead generation than Day-Ahead demand in an hour, there could either be a charge or credit for the day-ahead transmission congestion portion of the day-ahead purchase power.

- 1215 - Balancing Transmission Congestion: This represents the change in energy costs due to redispatch in the balancing market during hours when PJM transmission system is constrained and assessed to participants based on the congestion price component of LMP. If there is no change to the quantity of demand bought or generation sold between the Day-Ahead and Real-Time Energy Markets, there is no adjustment in balancing transmission congestion charges or credits.
- 1220 - Day-Ahead Transmission Losses: This represents the change in energy costs due to transmission losses in the Day-Ahead Market represented in the PJM network model and assessed to participants based on the loss component of LMP. Only the portion of the day-ahead transmission losses attributable to purchase power is currently included in the Company's FAC. Said in another way, if the Company has more cleared day-ahead generation than day-ahead demand in an

hour, there is no Day-Ahead transmission loss charge or credit included for that hour in the FAC. If the Company has less cleared day-ahead generation than day-ahead demand in an hour, there could either be a charge or credit for the day-ahead transmission losses portion of the day-ahead purchase power.

- 1225 - Balancing Transmission Losses: This represents the change in energy costs due to transmission losses in the balancing market represented in the PJM network model and are assessed to participants based on the loss component of LMP. If there is no change to the quantity of demand bought or generation sold between the day-ahead and real-time energy markets, there is no adjustment in balancing transmission losses charges or credits.
- 2370 and 2375 - Day-Ahead Operating Reserve Credit and Balancing Operating Reserve Credit: The credit that results from PJM scheduled generation and demand resources that operate as requested by PJM and are guaranteed to fully recover their offer amounts. The credits are the portion of the offer amount in excess of the scheduled MWh times LMP. These credits are included in the Company's FAC clause for any generators that were determined to serve native load.

Q. WHY ARE THESE BLI'S APPROPRIATE FOR INCLUSION IN THE FAC?

A. BLI 1200, 1205, 1210, 1215, 1220 and 1225 represent the components of power purchases from PJM that were necessary to serve native load. These BLI's would

exist in a different form absent the Company's involvement in PJM as either additional fuel expense or purchased power but they are materially the same thing. Thus, absent the Company's involvement in PJM, and operating as stand-alone balancing authority, in lieu of these BLI's, the Company would run additional generating units, incurring additional fuel expense, or made additional bi-lateral energy transactions to serve its load. Absent these power purchases from PJM, the Company would not be serving the energy needs of its native load customers.

BLI 2370 and 2375 represent additional credits beyond payment from LMP to generators that are necessary to keep the generator whole to its offer. Thus, without these credits following the allocation of the fuel expense from an individual generator, the generator would get short changed and not receive the credit necessary to keep the unit whole to its offer.

Q. ARE THERE ANY ADDITIONAL PJM BILLING LINE ITEMS THAT SHOULD BE INCLUDED IN THE FAC CALCULATION GOING FORWARD THAT THE COMPANY HAS NOT BEEN INCLUDING, OR POTENTIAL CHANGES TO ALLOCATION METHODOLOGY OF THESE BILLING LINE ITEMS?

A. Yes.

Q. PLEASE EXPLAIN.

A. The PJM BLIs that the Company is currently charging and crediting native load customers in the FAC reflect the calculations and methodology as of the Company's most recent Commission-approved base electric rate case that occurred when the Company was operating under the Midcontinent Independent

System Operator (MISO) and well before the Company moved to PJM on January 1, 2012. The Company has not had a base electric rate case since becoming a PJM member. Because MISO and PJM do not use identical billing criteria, a review of all BLIs will be necessary at the time of the Company's next base rate proceeding to ensure that all such charges and credits are appropriately reflected in the FAC, base rates, or another recovery mechanism.

Q. PLEASE IDENTIFY THE RESPONSES TO COMMISSION DATA REQUESTS YOU ARE SPONSORING.

A. I sponsor the Company's responses to Data Request Numbers 9, 10, 11, 13, 14, 31, 35, 36, 37, 39 and 42. These responses were prepared by me and under my direction and control and are true and accurate.

III. CONCLUSION

Q. IN YOUR OPINION, WERE DUKE ENERGY KENTUCKY'S POWER PROCUREMENT PRACTICES REASONABLE DURING THE AUDIT PERIOD?

A. Yes.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes, it does.

VERIFICATION

STATE OF NORTH CAROLINA)
) **SS:**
COUNTY OF MECKLENBURG)

The undersigned, John D. Swez, Director of General Dispatch & Operations, Power Trading and Dispatch, being duly sworn, deposes and says that he has personal knowledge of the matters set forth in the foregoing testimony and that it is true and correct to the best of his knowledge, information and belief.

John D. Swez, Affiant

Subscribed and sworn to before me by John D. Swez on this 20 day of February 2017.

KATIE JAMIESON
Notary Public, North Carolina
Gaston County
My Commission Expires

NOTARY PUBLIC

My Commission Expires: June 14, 2021

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of an Examination of the Application of the Fuel Adjustment Clause of Duke Energy Kentucky from November 1, 2014 Through October 31, 2016	))))	Case No. 2017-00005

DIRECT TESTIMONY OF

JOHN A. VERDERAME

ON BEHALF OF

DUKE ENERGY KENTUCKY, INC.

February 20, 2017

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I. INTRODUCTION

Q. STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is John A. Verderame, and my business address is 526 S. South Church Street, Charlotte, North Carolina 28202.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed by Duke Energy Progress, Inc. (Duke Energy Progress) as Managing Director, Power Trading and Dispatch. Duke Energy Progress is the utility formerly known as Progress Energy Inc., (Progress Energy) located in North and South Carolina. As part of the merger integration process, Duke Energy Progress now provides various administrative and other services to the regulated affiliated companies within Duke Energy Corporation (Duke Energy Corp.), including Duke Energy Kentucky, Inc., (Duke Energy Kentucky or the Company).

Q. PLEASE DESCRIBE BRIEFLY YOUR EDUCATION AND PROFESSIONAL EXPERIENCE.

A. I received a Bachelor of Arts degree in Economics from the University of Rochester in 1983, and a Masters in Business Administration in Finance from Rutgers University in 1985. I have worked in the energy industry for 16 years. Prior to that, from 1986 to 2001, I was a Vice President in the United States (US) Government Bond Trading Groups at the Chase Manhattan Bank and Cantor Fitzgerald. My responsibilities as a US Government Securities Trader included acting as the Firm's market maker in US Government Treasury securities. I joined Progress Energy, in 2001, as a Real-Time Energy Trader. My responsibilities as a

Real-Time Energy Trader included managing the real-time energy position of the Progress Energy regulated utilities. In 2005, I was promoted to Manager of the Power Trading group. My role as manager included responsibility for the short-term capacity and energy position of the Progress Energy regulated utilities in the Carolinas and Florida.

In 2012, upon consummation of the merger between Duke Energy Corp. and Progress Energy, Progress Energy became Duke Energy Progress and I was promoted to my current position.

Q. HAVE YOU EVER TESTIFIED BEFORE THE KENTUCKY PUBLIC SERVICE COMMISSION?

A. Yes. I have previously testified in the Company's Fuel Adjustment Clause proceedings as well as other cases that have involved the Company's participation in energy and capacity markets.

Q. PLEASE SUMMARIZE YOUR DUTIES AS MANAGING DIRECTOR, POWER TRADING AND DISPATCH.

A. As Managing Director, Power Trading and Dispatch of Duke Energy Progress, I am responsible for Power Trading and Generation Dispatch on behalf of the Company's regulated utilities in the Carolinas, Florida, Indiana, Ohio, and Kentucky. I am primarily responsible for Duke Energy Kentucky's generation dispatch, unit commitment, 24-hour real-time operations, and plant communications related to short-term generating maintenance planning. I lead the team responsible for managing the Company's capacity position with respect to meeting its Fixed Resource Requirement (FRR) obligation as a member of PJM

Interconnection, L.L.C. (PJM), for the submission of the Company's supply offers and demand bids in PJM's day-ahead and real-time electric energy (collectively Energy Markets) and ancillary services markets (Ancillary Services Markets), as well as managing the Company's short-term and long-term supply position to ensure that the Company has adequate economic resources committed to serve its retail customers' electricity needs. In that respect, my teams are also responsible for any financial hedging done to mitigate exposure to short-term energy prices and congestion risks.

Q. WHAT IS THE PURPOSE OF YOUR DIRECT TESTIMONY?

A. The purpose of my testimony is to respond to the Commission's February 6, 2017 Order and specifically to address changes in the wholesale electric power market that the Company expects to occur within the next two years that will significantly affect Duke Energy Kentucky's power procurement practices. In doing so, I provide an overview of the Company's participation in PJM as it pertains to the capacity markets and discuss the customer benefits that the Company's PJM membership provides. I then describe PJM proposals currently under consideration by the Federal Energy Regulatory Commission that will impact both the Company and Duke Energy Kentucky's customers going forward.

II. DISCUSSION

Q. HAVE THERE BEEN ANY RECENT AND SIGNIFICANT DEVELOPMENTS WITH RESPECT TO DUKE ENERGY KENTUCKY'S POWER PROCUREMENT PRACTICES AS IT PERTAINS TO ITS OPERATION IN PJM?

A. Yes. Effective December 30, 2014, Duke Energy Kentucky became the sole owner of East Bend 2, having completed its purchase of the remaining 31 percent interest from Dayton Power and Light (DP&L).

Q. WHY IS THIS SIGNIFICANT?

A. The acquisition of East Bend 2 represents additional capacity and energy that is being dedicated to Duke Energy Kentucky's customers. However, it also represents the first step in a change to the Company's generation portfolio profile. The East Bend purchase was predicated on the need to replace capacity that needed to be retired due to the then forthcoming federal environmental regulations, primarily the Mercury and Air Toxics Standards (MATS). The Company retired approximately 163 MegaWatts (MWs) of net installed capacity from its Miami Fort Unit 6 Generating Station (MF6) on June 1, 2015. The East Bend acquisition represents approximately 186 MWs of net installed capacity that replaced MF6 upon its retirement.

The significance of this purchase and retirement is that, together, the two transactions result in a shift in the Company's base load generation portfolio. As more fully described in the direct testimony of Company witness John D. Swez, under the PJM construct, the Company purchases energy from PJM to meet all of the demands of its Kentucky customers and offers all of its owned generating resources for sale in the Day-Ahead and Real-Time Energy markets. The Company's generation thus serves as a hedge against wholesale energy prices because the energy sales from those Company-owned generating resources can offset energy purchases. Once MF6 was retired, the majority of Duke Energy

Kentucky's customer demand purchases were offset by sales to PJM by a single unit. While East Bend is a reliable and reasonable cost unit, the increased reliance of this unit and the consequent decrease in resource diversity translated into a different exposure to short-term power prices when the station is not operating due to either forced or scheduled maintenance outages. This portfolio change potentially impacts the Company's strategies in both the PJM capacity and energy markets.

Q. PLEASE DESCRIBE ANY CHANGES TO THE WHOLESALE ELECTRIC POWER MARKET THAT THE COMPANY EXPECTS TO OCCUR WITHIN THE NEXT TWO YEARS THAT WILL SIGNIFICANTLY AFFECT DUKE ENERGY KENTUCKY'S POWER PROCUREMENT PRACTICES.

A. While broad federal regulatory and energy commodity markets trends certainly impact Duke Energy Kentucky, the wholesale power markets that most directly impact Duke Energy Kentucky are the energy and capacity markets of PJM.

From a macro level perspective, the Company believes that the energy and electricity sector continues to go through an extraordinary period of change. This change is primarily driven by shifts in load growth patterns, commodity price relationships, the move towards sustainable generation, and increasing regulatory uncertainty. Continued low price natural gas is driving a transition in the traditional concept of "base load generation." As coal fired generation continues to retire, the natural gas and intermittent resources connecting to the grid, both in front of and behind the meter, drive potential impacts on how grid operators will

reliably meet demands, and the investments that will be required in energy resources and grid infrastructure and modernization. It remains to be seen what impact the incoming presidential administration will have on the arc of environmental regulation; but that uncertainty itself will be a challenge to utilities such as Duke Energy Kentucky.

There are several FERC or PJM initiatives under way that have the potential to impact Duke Energy Kentucky customers directly over the next two years. Briefly, examples of these initiatives include:1) Potential changes to PJM energy offer price caps and offer flexibility; 2) changes to applicability and exemptions to the PJM Minimum Offer Price Rule; 3) changes to how fast start and intermittent resources such as batteries and demand response are accounted for and compensated in the capacity and energy markets; and 4) impacts of potential changes to the Capacity Performance construct as PJM evaluates the effectiveness of construct incentives and disincentives in achieving stated goals as Capacity Performance reaches full transition.

The Company believes that the PJM energy markets will continue to function as they do today; however, wholesale energy and capacity price volatility will likely experience upward pressure. Drivers behind this increased volatility include pricing impacts from new environmental regulations as they become effective, trends towards a more renewable and efficient generation mix, and structural market changes implemented by PJM. Specifically, in response to extreme winter weather condition events, PJM sought significant changes to its wholesale capacity market construct. These changes significantly impact both

Duke Energy Kentucky and its customers. The changes implemented by PJM were specifically intended to increase capacity market payments and impose significant non- performance penalties in order to incentivize investment in the generation assets inside the PJM footprint.

Q. PLEASE DESCRIBE THE PJM CAPACITY MARKET.

A. PJM's capacity market is called RPM, which is an acronym for Reliability Pricing Model. The purpose of RPM is to provide a market construct that enables PJM to secure adequate generation resources to meet the reliability needs of the regional transmission organization (RTO). The RPM construct and the associated rules regarding how PJM members participate in the PJM capacity market is described within the PJM Open Access Transmission Tariff (OATT) and Reliability Assurance Agreement (RAA). The PJM capacity market operates on a planning period that spans twelve months beginning June 1st and ending May 31st of each year (Delivery Year). In PJM, the capacity market structure is intended to provide transparent forward market signals that support generation and infrastructure investment. There are two ways for a PJM member to participate in the RPM capacity structure: 1) through the RPM baseline procurement auctions; or 2) as a self-supply FRR entity. The baseline procurement auction is called a base residual auction (BRA). BRAs are conducted three years in advance of the actual Delivery Year in order to allow bidders to complete construction of projects that clear the BRA. The PJM capacity market is designed to provide incentives for the development of generation, demand response, energy efficiency, and transmission solutions through capacity market payments.

Another important component of RPM is that price signals are locational, and designed to recognize and quantify the geographical value of capacity. PJM divides the RTO into multiple sub-regions called locational delivery areas (LDA) in order to model the locational value of generation.

Q. PLEASE BRIEFLY EXPLAIN PJM'S FRR PROCESS.

A. The PJM OATT and RAA specify the obligations and compensation to load serving entities (LSE) for supplying capacity. The FRR process is an alternative means for a PJM LSE such as Duke Energy Kentucky to satisfy its customer capacity obligation under the PJM RAA. Under the FRR construct, an LSE must annually submit a preliminary three year forward, and a final current year FRR capacity plan that meets a PJM defined customer capacity obligation (FRR Plan). The FRR Plan must identify the unit-specific generating or demand response resources that will be providing the MWs of capacity that will fulfill the LSE's customer obligation. FRR allows the LSE to match its customer reliability requirement to its own generation, demand response, energy efficiency and/or transmission resources, while still being permitted to sell some or all of its excess supply into RPM. Duke Energy Kentucky would face severe penalties and limitations on its ability to choose the FRR option if PJM were to deem either its initial or final FRR plans to be insufficient or it's generation otherwise non-compliant with PJM requirements.

Duke Energy Kentucky annually submits both a preliminary and a final FRR Plan to PJM. This is consistent with the Commission's Order in Case No. 2010-00203 whereby the Commission required the Company to participate in

PJM as an FRR entity until such time as it received Commission approval to participate in the PJM capacity auctions. To date, Duke Energy Kentucky has not requested such permission, but will do so if the Company determines that a change would be in the best interests of its customers and should be made. The Company continues to evaluate the merits of exiting the FRR and becoming a full RPM auction participant.

Q. PLEASE EXPLAIN WHAT BEING AN FRR ENTITY MEANS FOR DUKE ENERGY KENTUCKY.

A. As an FRR entity, Duke Energy Kentucky must secure and commit unit-specific generation resources to meet the peak load capacity requirements for all of its customers in advance of the PJM's annual BRA through its FRR Plan. Presently, the load requirements include both the forecasted load of Duke Energy Kentucky's customers, as well as the reserve requirement for that load mandated by PJM. As the FRR plan timeline follows the RPM auction timeline, the Company will soon have to submit its initial FRR Plan for the delivery period spanning June 1, 2020 through May 31, 2021, and its final FRR plan for the delivery period spanning June 1, 2017 through May 31, 2018.

The Duke Energy Kentucky FRR plan currently includes East Bend 2 and Woodsdale generating stations, as well as any bilateral capacity purchases required to meet customer demand.

Q. PLEASE EXPLAIN THE RECENT CHANGES TO THE CAPACITY MARKET CONSTRUCT THAT PJM IMPLEMENTED.

A. In a stated effort to improve the reliability of generating resources in the PJM footprint, PJM has redesigned the RPM construct with the newly coined "Capacity Performance" construct. In doing so, it is redefining its capacity products and proposing new performance-based penalties. Specifically, PJM established two classes of capacity, "Capacity Performance" Capacity and for a limited transitional period, "Base Capacity". Also during the transitional period the current Annual Capacity product will continue to exist for FRR participants. Capacity Performance Resources must be capable of sustained, predictable operation that allows resource to be available to provide energy and reserves during performance assessment hours throughout the Delivery Year. Capacity Performance capacity is subject to non-performance charges assessed during emergency conditions throughout entire Delivery Year. Base Capacity is only held to the Capacity Performance standard from June through September. Capacity Performance will quite simply be required to be available to the RTO during periods of high load demand or system emergency, or face substantial performance penalties. With Capacity Performance, PJM is adopting a no-excuses policy in order to improve reliability through a new penalty structure.

In this new construct, PJM sets a goal of transitioning all capacity in the footprint to Capacity Performance by the 2020-2021 Delivery Year. In other words, by June 1, 2020 all capacity purchased on behalf of the load through RPM or eligible for inclusion in FRR capacity plans must meet the Capacity Performance criteria.

Q. HOW WOULD YOU CLASSIFY THE CURRENT DUKE ENERGY KENTUCKY RESOURCES?

A. In my opinion, East Bend 2 meets the minimum requirements of a Capacity Performance resource in that it is a coal fired facility with a significant reserve of fuel stored on-site. The Woodsdale Combustion Turbine facility does not meet Capacity Performance requirements. The primary fuel at Woodsdale is natural gas delivered under a non-firm delivery contract. In the event that natural gas was unavailable at the site, due to delivery limitations on the natural gas pipeline, the station would not be able to meet a demand for energy from PJM. Currently Woodsdale, due to its low capacity factor, does not have contracted firm natural gas transportation. While the Woodsdale Units were historically capable of running on propane as a secondary fuel, there is very limited storage capability at the site and it is not operationally feasible to expand or replenish propane supplies. Propane is not a viable solution for Woodsdale to prudently meet Capacity Performance expectations. The Company is currently evaluating Capacity Performance compliance opportunities for Woodsdale and anticipates making a recommendation to the Commission in the coming months.

Q. WHEN DID THE CAPACITY PERFORMANCE RULES GO INTO EFFECT?

A. PJM described a transitional period to achieve 100% Capacity Performance over four years, some years for which it had already conducted the three year forward Base Auctions under the old construct. PJM has conducted transitional auctions at increasing percentages of Capacity Performance for the 2016-2017 Delivery Year

through the 2019-2020 Delivery Years. While generation included in FRR capacity plans must eventually meet Capacity Performance requirements, and be exposed to the same non-performance penalties, FRR entities, such as Duke Energy Kentucky, were exempted from Capacity Performance in the final FERC order approving Capacity Performance through the 2018-2019 Delivery Year. Following the transitional percentages applied to the general market, Duke Energy Kentucky has filed a preliminary FRR plan for the 2019-2020 Delivery Year that includes 80% of its obligation as Capacity Performance capacity. The preliminary FRR plan that Duke Energy Kentucky will file later this year will be required to include 100% Capacity Performance capacity.

Q. PLEASE EXPLAIN POTENTIAL IMPACTS TO THE COMPANY AND CUSTOMERS OF CAPACITY PERFORMANCE.

A. The generation assets that the Company has invested in are sound and dependable. Duke Energy Kentucky continues to invest in and maintain these assets so that they remain reliable resources and continue to provide benefits to Duke Energy Kentucky's customers. The Company believes that the investments it makes in generation assets are under the purview of this Commission; and as such, believes that as an FRR entity, the Company and all FRR entities should be exempted from compliance with the Capacity Performance proposal. Duke Energy Kentucky argued this position through the PJM stakeholder process and as an intervener in the current PJM proceeding before the Federal Energy Regulatory Commission.

Ultimately the final FERC order approving Capacity Performance included some concessions to FRR entities; but those concessions primarily addressed the timing of full compliance with Capacity Performance described above. The Company anticipates that significant and ongoing capital investments and operating and maintenance expenses will be required in order to ensure that Duke Energy Kentucky resources meet the no excuses availability requirements of Capacity Performance. Because fuel certainty is an integral component of meeting Capacity Performance requirements, these expenses will likely include capital expenditures in dual fuel capability or other costs to ensure generation unit availability, as well as potential upgrades at generation stations designed to mitigate, to the greatest extent possible, exposure to the significant penalties in the proposal for non-performance. Other anticipated responses to Capacity Performance risks could include the onsite maintenance of critical long lead time replacement part inventories that could reduce exposure to prolonged outages during penalty periods. The penalties proposed by PJM in Capacity Performance represent a paradigm shift in risk exposure for the Company. A significant outage at East Bend that happens to coincide with a compliance period could easily subject the Company to penalties that exceed its total yearly earnings.

PJM has also proposed an FRR-only option of meeting compliance penalties through the addition of physical generation into subsequent FRR Plans. While this option may prove to be an economically viable alternative, the Company cannot simply elect to make investments in supplemental capacity absent some assurance of cost recovery. The Company must first come to this

Commission with any such proposal and receive approval. In short, under its current regulatory authority, there are few explicit recovery options for expenses incurred to meet these requirements or mitigate these significantly increased risks. The Company and the Commission must continue to work together to develop an appropriate and reasonable strategy to address these necessary changes to the wholesale electric capacity markets.

Q. DO YOU BELIEVE THE CHANGES THAT PJM HAS MADE ARE HARMFUL TO DUKE ENERGY KENTUCKY OR ITS CUSTOMERS?

A. PJM has recognized a reliability issue in its footprint, and is acting in good faith to improve reliability of electric supply. The changes being considered are intended to incentivize investment in generating resources by both enhancing the value of capacity that meets the proposed performance guidelines and through the implementation of severe penalties for non-performance. To the extent that these changes improve reliability and cost efficiency in the PJM footprint, Duke Energy Kentucky customers certainly benefit.

Q. DO YOU BELIEVE DUKE ENERGY KENTUCKY'S CUSTOMERS BENEFIT FROM THE COMPANY'S MEMBERSHIP IN PJM?

A. Yes. Duke Energy Kentucky's customers benefit significantly from PJM's centrally dispatched RTO construct. PJM dispatches generation in broad consideration of total RTO cost minimization, the benefits of which are directly passed to customers in the form of energy alternatives to owned generation. Further, these markets provide an opportunity for non-native sales from the Company's generation, the majority proceeds of which flow back to Duke Energy

Kentucky's customers through a credit on their bills. PJM's focus is on maintaining and improving reliability across its entire system, which directly translates to more efficient and reliable access to electric resources to serve Kentucky demand.

III. CONCLUSION

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes.

VERIFICATION

STATE OF NORTH CAROLINA)
) **SS:**
COUNTY OF MECKLENBURG)

The undersigned, John Verderame, Managing Director of Power Trading & Dispatch, being duly sworn, deposes and says that he has personal knowledge of the matters set forth in the foregoing testimony are true and correct to the best of his knowledge, information and belief.

John Verderame, Affiant

Subscribed and sworn to before me by John Verderame on this 20 day of February 2017.

Katie Jamieson
NOTARY PUBLIC

KATIE JAMIESON
Notary Public, North Carolina
Gaston County
My Commission Expires

My Commission Expires: June 14, 2021

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of an Examination of the Application of the Fuel Adjustment Clause of Duke Energy Kentucky from November 1, 2014 Through October 31, 2016.	))))	Case No. 2017-00005

DIRECT TESTIMONY OF

THEODORE H. CZUPIK JR.

ON BEHALF OF

DUKE ENERGY KENTUCKY, INC.

February 20, 2017

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I. INTRODUCTION AND PURPOSE

Q. STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Theodore H. Czupik Jr. and my business address is 139 E. Fourth Street, Cincinnati, Ohio 45201.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed by the Duke Energy Business Services LLC (DEBS) as Rates and Regulatory Strategy Manager. DEBS is a service company subsidiary of Duke Energy Corporation and a non-utility affiliate of Duke Energy Kentucky, Inc. (Duke Energy Kentucky or Company).

Q. PLEASE DESCRIBE BRIEFLY YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL EXPERIENCE.

A. I received a Bachelor of Science degree in Accounting from the University of Dayton in 1985. I became a Certified Public Accountant (CPA) in the State of Ohio in 1988.

I began my career with The Cincinnati Gas & Electric Company (CG&E) in 1985 as a Staff Accountant in the Accounting Department. Between 1985 and 1993, I held various positions in the Accounting Department until I transferred to the Rate Department in 1993. I progressed through various positions until receiving my current position as Rates & Regulatory Strategy Manager in January 2014.

Q. PLEASE DESCRIBE YOUR PROFESSIONAL AFFILIATIONS.

A. I am a member of the American Institute of Certified Public Accountants and the Ohio Society of Certified Public Accountants.

Q. HAVE YOU TESTIFIED PREVIOUSLY BEFORE THE PUBLIC SERVICE COMMISSION?

A. Yes. I have testified in several fuel adjustment clause (FAC) proceedings before the Kentucky Public Service Commission (Commission).

Q. PLEASE SUMMARIZE YOUR DUTIES AS RATES AND REGULATORY STRATEGY MANAGER.

A. As Rates & Regulatory Strategy Manager, my duties include filing various monthly, quarterly and annual rate recovery mechanisms, preparation of cost of service studies, and preparation of other schedules used in retail rate filings for Duke Energy Kentucky and its parent, Duke Energy Ohio, Inc.

Q. WHAT IS THE PURPOSE OF YOUR DIRECT TESTIMONY?

A. The purpose of my direct testimony is to sponsor the calculation of Duke Energy Kentucky's FAC, including the adjustments during the review period of November 1, 2014, through October 31, 2016. I support the calculation of the Company's proposed base FAC rate to be set in this proceeding. Finally, I sponsor several of Duke Energy Kentucky's responses to the Commission's Data Requests contained in Appendix B of its February 6, 2017, Order.

II. DISCUSSION

A. The Company's FAC Calculation

Q. PLEASE COMMENT GENERALLY ON THE REASONABLENESS OF DUKE ENERGY KENTUCKY'S CALCULATION OF ITS FAC RATE DURING THE REVIEW PERIOD.

A. In the Commission's August 11, 2015, Order in Case No. 2014-00454, Duke Energy Kentucky's base rate of recovery for fuel was set at 2.9117 ¢/kWh based upon the Company's July 2014 fuel costs. Duke Energy Kentucky began using the new base fuel rate in its monthly adjustments to its FAC rate effective with the September 2015 expense month for rates effective in November 2015 billing cycle. The monthly adjustments were prepared by me or under my direction and control and, to the best of my knowledge, information, and belief, accurately reflected the Company's actual fuel and economy power costs.

Q. IN YOUR OPINION WAS THE COMPANY'S BASE FUEL RATE DURING THE REVIEW PERIOD ACCURATE AND REASONABLE?

A. Yes.

Q. WHAT RATE DOES THE COMPANY PROPOSE FOR THE BASE FUEL COST IN THE UPCOMING TWO-YEAR PERIOD FOR THE FAC?

A. The Company proposes to set its base fuel rate at 2.3837 ¢/kWh. The calculation is provided in response to Staff-DR-01-001 prepared in response to the Commission Data Requests set forth in Appendix B of its February 6, 2017, Order.

Q. WHAT IS YOUR RATIONALE FOR DETERMINING THIS TO BE A REASONABLE LEVEL FOR THE BASE FUEL AMOUNT?

A. The rate I am proposing for the base fuel rate is the closest actual fuel rate in the prior twelve months to the Company's projected fuel rate over the next two years. This judgment is based upon a comparison of the average forecasted fuel rate for the calendar year 2017 and 2018 and the average forecasted fuel rate for the two-year period of 2017 and 2018 with the actual fuel rates for the prior twelve months. The projected fuel rate over the next two years is slightly higher than the actual fuel rate for October 2016 as reflected in the Company's response to Staff-DR-01-001.

Q. IN YOUR OPINION IS THE COMPANY'S PROPOSED BASE FUEL COST REASONABLE?

A. Yes.

B. Data Requests and Tariffs Sponsored

Q. PLEASE IDENTIFY THE RESPONSES TO COMMISSION DATA REQUESTS YOU ARE SPONSORING.

A. I sponsor the Company's responses to Data Request Numbers 1, 2, 3, 4, 5, 6, 7, 8, 12, 13, 16, 17, 23, 30, 36, and 37. These responses were prepared by me and/or under my direction and control and are true and accurate to the best of my knowledge and belief.

Q. IS DUKE ENERGY KENTUCKY PROVIDING COPIES OF ITS PROPOSED TARIFFS REFLECTING THE CHANGE IN THE BASE FUEL RATE DESCRIBED IN YOUR DIRECT TESTIMONY?

A. Yes. A copy of the Company's proposed tariffs reflecting the change in base rates as a result of the proposed change in the base fuel rate are included in the attachment responding to Staff-DR-01-017. That attachment was prepared at my request and/or under my direction and control.

III. CONCLUSION

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes, it does.

VERIFICATION

STATE OF OHIO)
) **SS:**
COUNTY OF HAMILTON)

The undersigned, Theodore H. Czupik, Jr., Rates & Regulatory Strategy Manager, being duly sworn, deposes and says that he has personal knowledge of the matters set forth in the foregoing testimony and that is it true and correct to the best of his knowledge, information and belief.

Theodore H. Czupik Jr.
Theodore H. Czupik, Jr., Affiant

Subscribed and sworn to before me by Theodore H. Czupik, Jr., on this 20th day of February, 2017.

Adele M. Frisch
NOTARY PUBLIC

ADELE M. FRISCH
Notary Public, State of Ohio
My Commission Expires 01-05-2019

My Commission Expires: 1/5/2019