BEFORE THE
PUBLIC SERVICE COMMISSION OF
SOUTH CAROLINA
DOCKET NO. 2014-1-E

In the Matter of Annual Review of Base Rates For Fuel Costs for Duke Energy Progress, Inc.	)))))	**DIRECT TESTIMONY OF** **KENNETH D. CHURCH FOR** **DUKE ENERGY PROGRESS, INC.**

1 **Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

2 A. My name is Kenneth D. Church and my business address is 526 South Church
3 Street, Charlotte, North Carolina.

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

5 A. I am the Manager of Nuclear Fuel Engineering's Fuel Management & Design for
6 Duke Energy Progress, Inc. ("DEP" or the "Company") and Duke Energy Carolinas,
7 LLC ("DEC").

8 **Q. WHAT ARE YOUR PRESENT RESPONSIBILITIES AT DEP?**

9 A. I am responsible for nuclear fuel procurement and spent fuel management, as well as
10 the fuel mechanical and thermal hydraulic design and reload licensing analysis for
11 the nuclear units owned and operated by DEP and DEC.

12 **Q. PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND**
13 **PROFESSIONAL EXPERIENCE.**

14 A. I graduated from North Carolina State University with a Bachelor of Science degree
15 in mechanical engineering. I began my career with DEC in 1991 as an engineer and
16 worked in various roles, including nuclear fuel assembly and control component
17 design, fuel performance, and fuel reload engineering. I assumed the commercial
18 responsibility for purchasing uranium, conversion services, enrichment services, and
19 fuel fabrication services at DEC in 2001. Beginning in 2011, I incrementally
20 assumed responsibility at DEC for spent nuclear fuel management along with the
21 nuclear fuel mechanical and thermal hydraulic design and reload licensing analysis
22 functions. Subsequently, I assumed the same responsibilities for DEP following the
23 merger between Duke Energy Corporation and Progress Energy, Inc.

1 I have served as Chairman of the Nuclear Energy Institute's Utility Fuel
2 Committee, an association aimed at improving the economics and reliability of
3 nuclear fuel supply and use, and I am currently a registered professional engineer in
4 the state of North Carolina.

5 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS**
6 **PROCEEDING?**

7 A. The purpose of my testimony is to (1) provide information regarding DEP's nuclear
8 fuel purchasing practices, (2) provide costs for the March 1, 2013 through February
9 28, 2014 review period ("review period"), and (3) describe changes forthcoming for
10 the July 1, 2014 through June 30, 2015 billing period ("billing period").

11 **Q. YOUR TESTIMONY INCLUDES TWO EXHIBITS. WERE THESE**
12 **EXHIBITS PREPARED BY YOU OR AT YOUR DIRECTION AND UNDER**
13 **YOUR SUPERVISION?**

14 A. Yes. These exhibits were prepared at my direction and under my supervision, and
15 consist of Church Exhibit 1, which is a Graphical Representation of the Nuclear Fuel
16 Cycle, and Church Exhibit 2, which sets forth the Company's Nuclear Fuel
17 Procurement Practices.

18 **Q. PLEASE DESCRIBE THE COMPONENTS THAT MAKE UP NUCLEAR**
19 **FUEL.**

20 A. In order to prepare uranium for use in a nuclear reactor, it must be processed from an
21 ore to a ceramic fuel pellet. This process is commonly broken into four distinct
22 industrial stages: (1) mining and milling, (2) conversion, (3) enrichment, and (4)
23 fabrication. This process is illustrated graphically in Church Exhibit 1.

Uranium is often mined by either surface (i.e., open cut) or underground mining techniques, depending on the depth of the ore deposit. The ore is then sent to a mill where it is crushed and ground-up before the uranium is extracted by leaching, the process in which either a strong acid or alkaline solution is used to dissolve the uranium. Once dried, the uranium oxide ("U_3O_8") concentrate – often referred to as yellowcake – is packed in drums for transport to a conversion facility. Alternatively, uranium may be mined by in situ leach ("ISL") in which oxygenated groundwater is circulated through a very porous ore body to dissolve the uranium and bring it to the surface. ISL may also use slightly acidic or alkaline solutions to keep the uranium in solution. The uranium is then recovered from the solution in a mill to produce U_3O_8.

After milling, the U_3O_8 must be chemically converted into uranium hexafluoride ("UF_6"). This intermediate stage is known as conversion and produces the feedstock required in the isotopic separation process.

Naturally occurring uranium primarily consists of two isotopes, 0.7% Uranium-235 ("U-235") and 99.3% Uranium-238 ("U-238"). Most of this country's nuclear reactors (including those of the Company) require U-235 concentrations in the 3-5% range to operate a complete cycle of 18 to 24 months between refueling outages. The process of increasing the concentration of U-235 is known as enrichment. Gas centrifuge is the primary technology used by the commercial enrichment suppliers. This process first applies heat to the UF_6 to create a gas, then, using the mass differences between the uranium isotopes, the natural uranium is separated into two gas streams, one being enriched to the desired level of U-235,

known as low enriched uranium, and the other being depleted in U-235, known as tails.

Once the UF_6 is enriched to the desired level, it is converted to uranium dioxide ("UO_2") powder and formed into pellets. This process and subsequent steps of inserting the fuel pellets into fuel rods and bundling the rods into fuel assemblies for use in nuclear reactors is referred to as fabrication.

Q. PLEASE PROVIDE A SUMMARY OF DEP'S NUCLEAR FUEL PROCUREMENT PRACTICES.

A. As set forth in Church Exhibit 2, DEP's nuclear fuel procurement practices involve computing near and long-term consumption forecasts, establishing nuclear system inventory levels, projecting required annual fuel purchases, requesting proposals from qualified suppliers, negotiating a portfolio of long-term contracts from diverse sources of supply, and monitoring deliveries against contract commitments.

For uranium concentrates, conversion, and enrichment services, long-term contracts are used extensively in the industry to cover forward requirements and ensure security of supply. Throughout the industry, the initial delivery under new long-term contracts commonly occurs several years after contract execution. DEP relies extensively on long-term contracts to cover the largest portion of its forward requirements. By staggering long-term contracts over time for these components of the nuclear fuel cycle, DEP's purchases within a given year consist of a blend of contract prices negotiated at many different periods in the markets, which has the effect of smoothing out DEP's exposure to price volatility. Diversifying fuel suppliers reduces DEP's exposure to possible disruptions from any single source of

supply. Due to the technical complexities of changing fabrication services suppliers, DEP generally sources these services to a single domestic supplier on a plant-by-plant basis using multi-year contracts.

Q. WHAT CHANGES HAVE OCCURRED IN THE UNIT COST OF THE VARIOUS STAGES OF NUCLEAR FUEL DURING THE REVIEW PERIOD?

A. During the review period, the published long-term market price for uranium concentrates was in the range of $50.00/lb to $57.00/lb. During this same period, the published spot market price, which is referenced in a segment of long-term contracts in order to establish delivery price, ranged from a low of $34.00/lb to a high of $42.25/lb. DEP mitigates the impact of spot market volatility on the portfolio of supply contracts by using a mixture of pricing mechanisms. DEP's portfolio of diversified contract pricing yielded an average unit cost of $48.97/lb for uranium concentrates during the review period.

The decrease in market price for uranium concentrates during the review period was primarily due to reduced demand following the Fukushima event in March 2011. Consistent with its portfolio approach to contracting, DEP entered into several long-term contracts during this period. Industry consultants, however, believe market prices need to increase from current levels in order to provide the economic incentive for the exploration, mine construction, and production necessary to support future industry uranium requirements.

During the review period, the published long-term market price for enrichment services was in the range of $107.00/Separative Work Unit ("SWU") to

$134.00/SWU. As in the uranium market, the decline in long-term market price for enrichment services was primarily due to reduced demand following the Fukushima event. The transition by enrichment suppliers from gaseous diffusion technology to the more cost efficient gas centrifuge technology was also influential. The average unit cost of DEP's purchases of enrichment services during the review period was $127.57/SWU. One hundred percent of DEP's enrichment purchases during the review period were delivered under long-term contracts negotiated at market prices prior to the review period. This included long-term contracts negotiated when market prices had increased due to growing demand from the onset of the nuclear renaissance. As described earlier in my testimony, however, staggering long-term contracts over time for these components of the nuclear fuel cycle means DEP's purchases within a given year consist of a blend of contract prices negotiated at many different periods in the markets. This approach has the effect of smoothing out DEP's exposure to price volatility.

Long-term prices for fabrication services generally trended upward during the review period. For conversion services, long-term market prices remained relatively stable, but spot market prices trended downward. These costs, however, have a limited impact on the overall fuel expense rate given that the dollar amounts for these purchases represent a substantially smaller percentage – 13% and 5%, respectively, for the fuel batches recently loaded into DEP's reactors – of DEP's total direct fuel cost relative to uranium concentrates or enrichment, which are 48% and 34%, respectively.

1 **Q. PLEASE DESCRIBE THE RECENT DECISION OF THE D.C. CIRCUIT**
2 **COURT OF APPEALS REGARDING THE COLLECTION OF HIGH**
3 **LEVEL WASTE FEES BY THE DEPARTMENT OF ENERGY PURSUANT**
4 **TO THE NUCLEAR WASTE POLICY ACT.**

5 A. On November 19, 2013, the D.C. Circuit Court of Appeals issued a decision against
6 the U.S. Department of Energy ("DOE") in *Nat'l Ass'n of Regulatory Utility Com'rs*
7 *v. Dep't of Energy*, 736 F.3d 517 (D.C. Cir. 2013)("NARUC v. DOE"). I am not an
8 attorney and, therefore, am not giving a legal opinion, but my understanding from
9 reviewing the decision on my own is that the lawsuit challenged the DOE's
10 continued collection of the one-tenth of a cent per kilowatt-hour fee imposed by the
11 Nuclear Waste Policy Act ("NWPA") to pay for used fuel management and
12 disposal. My understanding is that the court in *NARUC v. DOE* required DOE to
13 "submit to Congress a proposal to change the fee to zero until such a time as either
14 the Secretary chooses to comply with the Act as it is currently written, or until
15 Congress enacts an alternative waste management plan."

16 **Q. HOW WILL THIS DECISION IMPACT DEP'S NUCLEAR FUEL COST?**

17 A. Under the NWPA, the fee remains in effect until DOE acts to propose the fee
18 adjustment to Congress, and the proposal has been before Congress for a minimum
19 of 90 days. Until that time, utilities continue to be obligated to make quarterly
20 Nuclear Waste Fund payments. At the current time, there is a high confidence that
21 there will be a change to the fee collection. Company witness McGee has proposed
22 a fuel and fuel-related factor which reflects the discontinuance of the payment
23 during the billing period. I will note, however, that the suspension of the DOE

1 waste fee may be temporary in nature with some likelihood that a nuclear waste fee
2 could be reinstated in the future.

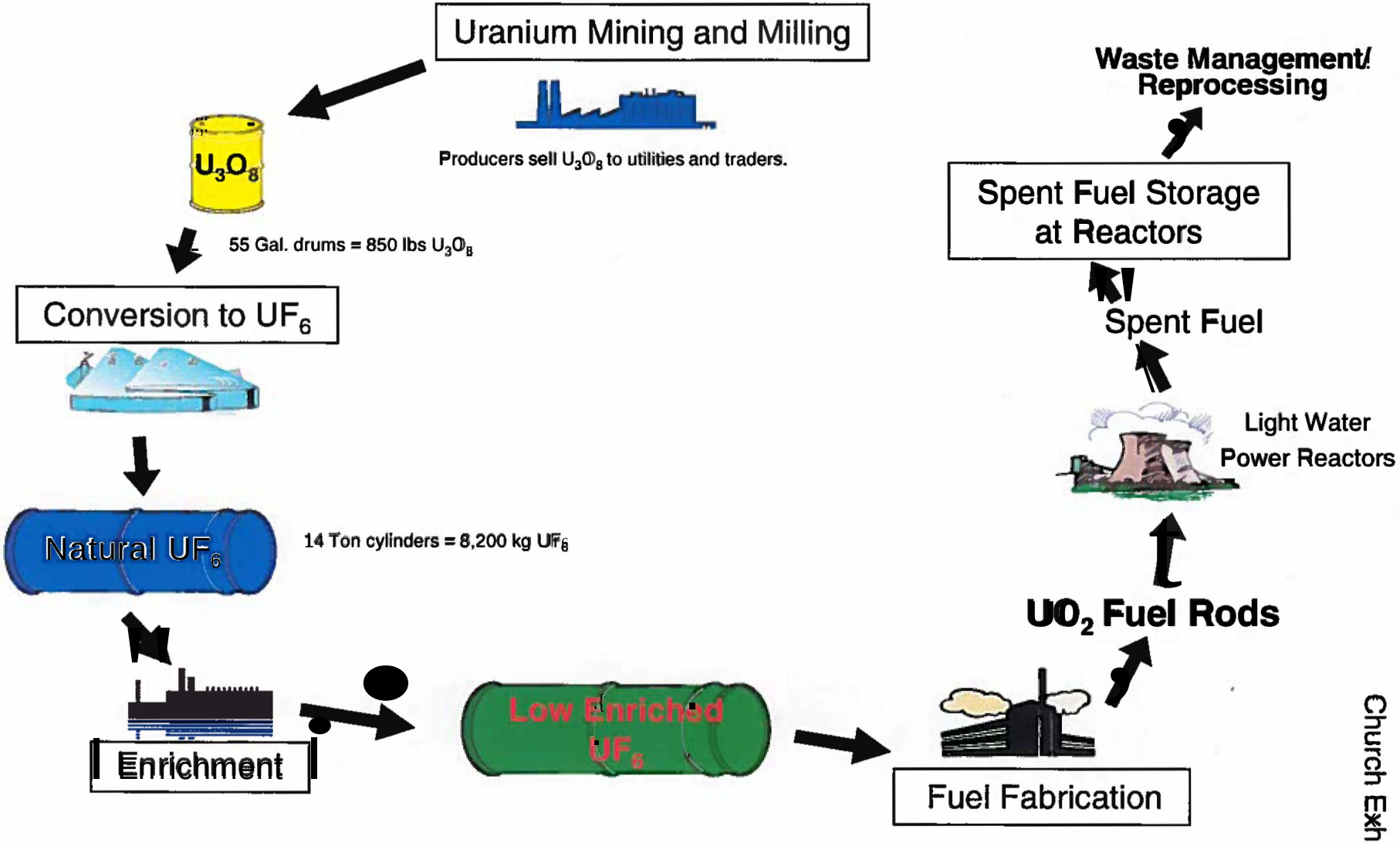
3 **Q. WHAT CHANGES DO YOU SEE IN DEP'S NUCLEAR FUEL COST IN**
4 **THE BILLING PERIOD?**

5 A. The Company anticipates an increase in nuclear fuel costs on a cents per kWh basis
6 through the next billing period. Because fuel is typically expensed over two to three
7 operating cycles – roughly three to six years – DEP's nuclear fuel expense in the
8 upcoming billing period will be determined by the cost of fuel assemblies loaded
9 into the reactors during the review period, as well as prior periods. A portion of the
10 fuel residing in the reactors during the billing period will have been obtained under
11 historical contracts negotiated in attractive markets. Newer contracts signed prior to
12 recent market decreases, however, reflect increasing price trends, and are now
13 contributing to a portion of the uranium, enrichment, and fabrication costs reflected
14 in the total fuel expense. Also, as discussed earlier in my testimony, DEP is closely
15 following the ultimate legal determination regarding the collection of the nuclear
16 waste fee.

17 The average fuel expense, assuming DEP is able to cease collection of the
18 nuclear waste fee, is expected to decrease from 0.716 cents per kilowatt hour
19 ("kWh") incurred in the review period, to approximately 0.639 cents per kWh in the
20 billing period. This change does reflect the discharge of fuel with a lower cost basis
21 from the reactor and its replacement with fuel procured under new contracts
22 negotiated in higher markets, but decreases due to removal of the DOE waste fee.

1 **Q. WHAT STEPS IS DEP TAKING TO PROVIDE STABILITY IN ITS**
2 **NUCLEAR FUEL COSTS AND TO MITIGATE PRICE INCREASES IN**
3 **THE VARIOUS COMPONENTS OF NUCLEAR FUEL?**
4 A. As I discussed earlier and as described in Church Exhibit 2, for uranium
5 concentrates, conversion, and enrichment services, DEP relies extensively on
6 staggered long-term contracts to cover the largest portion of its forward
7 requirements. By staggering long-term contracts over time and incorporating a
8 range of pricing mechanisms, DEP's purchases within a given year consist of a
9 blend of contract prices negotiated at many different periods in the markets, which
10 has the effect of smoothing out DEP's exposure to price volatility.
11 Although costs of certain components of nuclear fuel are expected to
12 increase in future years, nuclear fuel costs on a cents per kWh basis will likely
13 continue to be a fraction of the cents per kWh cost of fossil fuel. Therefore,
14 customers will continue to benefit from DEP's diverse generation mix and the strong
15 performance of its nuclear fleet through lower fuel costs than would otherwise result
16 absent the significant contribution of nuclear generation to meeting customers'
17 demands.
18 **Q. DOES THIS CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY?**
19 A. Yes, it does.

The Nuclear Fuel Cycle



Church Exhibit 1

Church Exhibit 2

Duke Energy Progress Nuclear Fuel Procurement Practices

The Company's nuclear fuel procurement practices are summarized below.

- Near and long-term consumption forecasts are computed based on factors such as: nuclear system operational projections given fleet outage/maintenance schedules, adequate fuel cycle design margins to key safety licensing limitations, and economic tradeoffs between required volumes of uranium and enrichment necessary to produce the required volume of enriched uranium.
- Nuclear system inventory targets are determined and designed to provide: reliability, insulation from short-term market volatility, and sensitivity to evolving market conditions. Inventories are monitored on an ongoing basis.
- On an ongoing basis, existing purchase commitments are compared with consumption and inventory requirements to ascertain additional needs.
- Qualified suppliers are invited to make proposals to satisfy additional or future contract needs.
- Contracts are awarded based on the most attractive evaluated offer, considering factors such as price, reliability, flexibility and supply source diversification/portfolio security of supply.
- For uranium concentrates, conversion and enrichment services, long term supply contracts are relied upon to fulfill the largest portion of forward requirements. By staggering long-term contracts over time, the Company's purchases within a given year consist of a blend of contract prices negotiated at many different periods in the markets, which has the effect of smoothing out the Company's exposure to price volatility. Due to the technical complexities of changing suppliers, fabrication services are generally sourced to a single domestic supplier on a plant-by-plant basis using multi-year contracts.
- Spot market opportunities are evaluated from time to time to supplement long-term contract supplies as appropriate based on comparison to other supply options.
- Delivered volumes of nuclear fuel products and services are monitored against contract commitments. The quality and volume of deliveries are confirmed by the delivery facility to which Duke Energy Progress has instructed delivery. Payments for such delivered volumes are made after Duke Energy Progress' receipt of such delivery facility confirmations.

BEFORE THE
PUBLIC SERVICE COMMISSION OF
SOUTH CAROLINA
DOCKET NO. 2014-1-E

In the Matter of	)	
Annual Review of Base Rates	)	**DIRECT TESTIMONY OF**
for Fuel Costs for	)	**SASHA J. WEINTRAUB FOR**
Duke Energy Progress, Inc.	)	**DUKE ENERGY PROGRESS, INC.**

1 **Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

2 A. My name is Alexander ("Sasha") J. Weintraub. My business address is 526 South
3 Church Street, Charlotte, North Carolina 28202.

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

5 A. I am Vice President, Fuels & Systems Optimization for Duke Energy Corporation
6 ("Duke Energy"). In that capacity I am responsible for the procurement of fossil
7 fuels and environmental reagents for the Duke Energy Progress, Inc. ("DEP" or the
8 "Company") and Duke Energy Carolinas, LLC ("DEC")(collectively, the
9 "Companies") generation fleet, as well as for the generation fleets of the other Duke
10 Energy regulated utilities. I am also responsible for portfolio management and short
11 term power trading for Duke Energy, and am responsible for the fossil fuel price
12 forecasts used for fuel filings and resource planning purposes for all of Duke
13 Energy's regulated utility subsidiaries, including DEP.

14 **Q. PLEASE BRIEFLY SUMMARIZE YOUR EDUCATIONAL AND**
15 **PROFESSIONAL EXPERIENCE.**

16 A. I have a Bachelor of Science degree in Engineering from Rensselaer Polytechnic
17 Institute, a Master's in Mechanical Engineering from Columbia University, and a
18 Ph.D. in Industrial Engineering from North Carolina State University. From
19 February 2003 until June 2005, I was Director of Coal Marketing and Trading for
20 Progress Fuel Corporation, a former subsidiary of Progress Energy, Inc. ("Progress
21 Energy"). Subsequently, I was Director of Coal for DEP and Duke Energy Florida,
22 Inc. ("DEF"), and before assuming my current position, I was Vice President - Fuels
23 and Power Optimization for DEP and DEF.

1 **Q. HAVE YOU TESTIFIED BEFORE THIS COMMISSION IN ANY PRIOR**
2 **PROCEEDINGS?**
3 A. Yes. I testified before the Public Service Commission of South Carolina in DEP's
4 2013 annual fuel proceeding in Docket No. 2013-1-E, as well as in DEC's 2013
5 annual fuel proceeding in Docket No. 2013-3-E. I also testified before this
6 Commission in Docket No. 2011-158-E, and I have testified on multiple occasions
7 on behalf of Duke Energy in proceedings before this and other state commissions.
8 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS**
9 **PROCEEDING?**
10 A. The purpose of my testimony is to describe DEP's fossil fuel purchasing practices,
11 provide fossil fuel costs for the period March 1, 2013 through February 28, 2014
12 ("review period"), and describe changes forthcoming for the period July 1, 2014
13 through June 30, 2015 ("billing period"). I also provide an update from a
14 procurement and operations perspective on the Joint Dispatch Agreement ("JDA")
15 that – pursuant to the merger agreement between Duke Energy and Progress Energy
16 ("Merger") – Duke Energy is using to deliver savings to its North Carolina and
17 South Carolina customers, as well as fuel savings that DEP has realized to date on
18 behalf of its customers as a result of the Merger.
19 **Q. PLEASE PROVIDE A DESCRIPTION OF THE EXHIBITS TO YOUR**
20 **TESTIMONY.**
21 A. Weintraub Exhibit 1 summarizes the Company's Fossil Fuel Procurement Practices,
22 and Weintraub Exhibit 2 summarizes monthly contract and spot coal purchases

1 during the review period and the period of March 1, 2012 through February 28, 2013
2 ("prior review period").
3 **Q. WERE THESE EXHIBITS PREPARED BY YOU OR AT YOUR**
4 **DIRECTION?**
5 A. Yes, they were prepared at my direction.
6 **Q. PLEASE PROVIDE A SUMMARY OF DEP'S FOSSIL FUEL**
7 **PROCUREMENT PRACTICES.**
8 A. A summary of the Company's fossil fuel procurement practices is set out in
9 Weintraub Exhibit I.
10 **Q. PLEASE DESCRIBE DEP'S DELIVERED COST OF COAL DURING THE**
11 **REVIEW PERIOD.**
12 A. The Company's average delivered coal cost per ton decreased less than 1.0% from
13 $90.74 per ton from the prior review period to $90.31 per ton in the review period.
14 The average transportation costs increased approximately 16%, from $27.38 per ton
15 in the prior review period to $31.83 per ton in the review period. The increase in
16 transportation costs reflects DEP's ability to use lower cost coals from non-Central
17 Appalachian regions, thereby lowering the overall delivered cost of coal.
18 **Q. PLEASE DESCRIBE THE LATEST TRENDS IN COAL MARKET**
19 **CONDITIONS.**
20 A. Coal markets continue to be in a state of flux due to a number of factors, including:
21 (1) recent U.S. Environmental Protection Agency regulations for power plants that
22 result in utilities retiring or modifying plants, which lower total domestic steam coal
23 demand, and can result in some plants shifting coal sources to different basins; (2)

softening demand in global markets for both steam and metallurgical coal; (3) increased prices and volatility for gas due to adverse winter weather; (4) continued increase in gas supply combined with installation of new combined cycle ("CC") generation by utilities, especially in the Southeast, which also lowers overall coal demand; and (5) increasingly stringent safety regulations for mining operations, which result in higher costs and lower productivity.

Q. HOW DO YOU EXPECT THESE TRENDS TO AFFECT DEP'S COAL BURN AND INVENTORY LEVELS?

A. Due to the increasing competitiveness for low cost electricity between natural gas and coal, it is anticipated that DEP's coal generation will fluctuate with prevailing market conditions. With the increase in natural gas prices in response to extreme weather, DEP's actual coal burn for the review period was 7.6 million tons, which is more than 40% higher than the 5.4 million tons originally anticipated in the currently billed rate. The projected coal burn reflected in the rate proposed for the billing period is 6.4 million tons. DEP's billing period projections for coal generation, however, may be impacted due to changes in natural gas prices, volatile power prices, and demand. Although inventory levels were below target at the end of the review period as a result of much stronger than expected coal burns due to severe winter weather and lower than expected receipts of coal, DEP has returned to near target inventory levels as of the end of April 2014. Future inventory levels are dependent on actual versus projected coal burns and actual coal deliveries based on performance of the railroads.

1 **Q. WHAT IS THE PROJECTED AVERAGE DELIVERED COAL COST FOR**
2 **THE BILLING PERIOD?**

3 A. Combining coal and transportation costs, the Company projects average delivered
4 coal costs of approximately $89.88 per ton for the billing period. This represents a
5 slight decrease from the review period actual cost. This projected cost, however, is
6 subject to change based on (1) changes in oil prices, which impact transportation
7 rates; (2) potential additional costs associated with suppliers' compliance with legal
8 and statutory changes, the effects of which can be passed on through coal contracts;
9 (3) performance of contract deliveries by suppliers and railroads which may not
10 occur despite the Company's strong contract compliance monitoring process; (4) the
11 amount of non-Central Appalachian coal the Company is able to consume: and (5)
12 the market prices for DEP's open coal positions that are prevalent at the time of
13 purchase.

14 **Q. WHAT STEPS IS DEP TAKING TO CONTROL COAL COSTS?**

15 A. The Company continues to maintain a comprehensive coal procurement strategy that
16 has proven successful over many years in limiting average annual coal price
17 increases and maintaining average coal costs at or well below those seen in the
18 marketplace. Aspects of this procurement strategy include having the appropriate
19 mix of contract and spot purchases, staggering contract expirations which thereby
20 limit exposure to market price changes, diversifying coal sourcing as economics
21 warrant, and pursuing contract extension options that provide flexibility to extend
22 terms within a particular price band.

23 The Company expects to address any spot and long-term coal requirements

throughout this year with any potential competitively bid purchases, if made, taking into account projected coal burns, as well as coal inventory levels.

Q. PLEASE DESCRIBE DEP'S PROCUREMENT PRACTICES FOR NATURAL GAS.

A. The Company's in-house personnel are responsible for natural gas contracting, competitive procurement, scheduling, and balancing efforts for the gas generation fleet. The Company has implemented gas procurement practices that include periodic Request for Proposals ("RFPs"), market solicitations, and short-term market engagement activities to procure a reliable, flexible, diverse, and competitively priced natural gas supply that supports DEP's combustion turbine ("CT") and CC facilities.

Lastly, as described in previous testimony filed in Docket No. 2013-1-E, in December 2012 the Company received approval for the Asset Management and Delivered Supply Agreement ("AMA") between DEP and DEC, which was implemented on January 1, 2013. In the AMA, DEC is the designated Asset Manager that procures and manages the combined gas supply needs for DEC and DEP, and performs the necessary scheduling and balancing on the pipelines.

Q. HOW IS NATURAL GAS DELIVERED TO DEP'S GENERATING FACILITIES?

A. The Company procures long-term firm transportation that provides natural gas to its generating facilities. In addition, as needed, DEP may procure delivered supply, shorter-term firm pipeline capacity through the capacity release market, and have

1 market supply options that provide the needed natural gas supply to its generating
2 facilities.

3 **Q. DOES DEP MAINTAIN AN INVENTORY OF NATURAL GAS?**

4 A. The Company has a storage agreement as part of the AMA. As the Asset Manager,
5 DEC will procure all the needed supply for the combined Carolinas gas needs and as
6 part of that agreement, will have access to the released storage agreement. On any
7 given day, DEC may utilize the storage to balance and support the Carolinas gas
8 needs.

9 **Q. WHAT CHANGES IN VOLUME DOES THE COMPANY ANTICIPATE**
10 **WITH NATURAL GAS CONSUMPTION?**

11 A. The Company's natural gas consumption is expected to continue to increase. The
12 Company consumed approximately 119 billion cubic feet ("Bcf") of natural gas in
13 the review period, compared to approximately 89 Bcf in the prior review period.
14 This increase was driven by the addition of new Lee CC generation at the end of
15 2012. In addition, DEP's Sutton CC went into service in the latter part of 2013. For
16 the billing period, DEP's current forecasted natural gas consumption is
17 approximately 131Bcf. The forecasted increase in natural gas consumption includes
18 a full year of generation from Sutton CC.

19 **Q. PLEASE DESCRIBE THE CURRENT STATE OF THE NATURAL GAS**
20 **MARKET, INCLUDING THE NATURAL GAS PRICES EXPERIENCED**
21 **DURING THE REVIEW PERIOD.**

22 A. The development of shale gas has created a fundamental shift in the nation's natural
23 gas market. Shale gas is natural gas that is trapped within shale formations, and

which can provide an abundant source of petroleum and natural gas. Within recent years, improvements in production technologies have allowed greater access to the natural gas trapped in these formations, and has resulted in increased reserves that can produce natural gas supply more quickly and economically. Given continued production increases, forward natural gas prices continue to remain at lower levels. With respect to natural gas prices experienced during the recent Polar Vortex, extreme weather and higher than normal natural gas demand resulted in DEP experiencing much higher spot natural gas prices during January and February 2014 than it experienced in previous review periods. The Company's average price of gas purchased for the review period was $6.10 per Million British Thermal Units ("MMBtu"), compared to $5.03 per MMBtu during the prior review period.

Q. PLEASE DESCRIBE THE OUTLOOK FOR THE NATURAL GAS MARKET, INCLUDING THE EXPECTED NATURAL GAS PRICE TREND FOR THE BILLING PERIOD.

A. New production from shale gas has contributed to substantial increases in the supply of U.S. marketed natural gas. This increase has outstripped demand growth. The Company expects the shale gas production percentage of total natural gas domestic production to continue to increase over time. The current forward prices for natural gas reflect this continued increase in competitively priced supply with an average delivered price of $4.15 per MMBtu through the billing period.

Q. IN LIGHT OF DEP'S INCREASED USAGE OF NATURAL GAS, WHAT IS DEP DOING TO MITIGATE THE EFFECTS THAT INCREASING NATURAL GAS PRICES COULD HAVE ON FUEL COSTS?

1 A. The Company has been executing a natural gas hedging strategy for the last several
2 years in order to mitigate the price volatility of natural gas. The strategy
3 incorporates a "dollar-cost averaging" approach of hedging that financially "locks-
4 in" natural gas prices at a fixed price over time for a percentage of forecasted natural
5 gas burns. DEP will continue to monitor and make adjustments as necessary to its
6 natural gas hedging program.

7 **Q. PLEASE EXPLAIN THE JDA BETWEEN DEP AND DEC.**

8 A. As explained in my previous testimony filed in Docket No. 2013-1-E, the JDA is an
9 agreement between DEP and DEC where DEC acts as the Joint Dispatcher for
10 DEP's and DEC's power supply resources. The JDA has allowed DEP's and DEC's
11 generation resources to be dispatched as a single system to meet the two utilities'
12 retail and firm wholesale customers' requirements at the lowest possible cost. As a
13 result, the joint dispatch process allows DEP and DEC to serve their retail and
14 wholesale native load customers more efficiently and economically than they can on
15 a stand-alone basis. The JDA also provides a methodology for calculating the
16 savings generated by the joint dispatch process and for equitably allocating the
17 savings between DEP and DEC.

18 The joint dispatch savings automatically flow through to the Companies'
19 retail customers through their fuel clauses. For native load wholesale customers, the
20 joint dispatch savings are passed through as permitted by the applicable wholesale
21 contracts. Under the joint dispatch process, the energy cost attributable to each
22 utility's native load are the costs actually incurred by the utility for energy allocated
23 to native load service, adjusted by the cost allocation payments calculated by the

1 Joint Dispatcher, which are treated as purchases and sales between the Companies.
2 As a result, the energy cost ultimately incurred by DEP and DEC to serve their
3 respective native loads will be equal to the stand-alone costs they would have
4 incurred but for the joint dispatch arrangement, less each utility's share of the joint
5 dispatch savings.

6 Through March 2014, the combined merger savings from the JDA and the
7 Companies' fuel procurement activities are $274 million. DEP's and DEC's
8 customers are then allocated their share of the combined savings based upon the
9 resource ratios of the combined company. This resource ratio is 38% for DEP and
10 62% for DEC through March 2014.

11 **Q. HOW DOES THE COMPANY OPERATE ITS PORTFOLIO OF**
12 **GENERATION ASSETS TO RELIABLY AND ECONOMICALLY SERVE**
13 **ITS CUSTOMERS?**

14 A. Both DEP and DEC utilize the same process to ensure that the assets of the
15 Companies are reliably and economically available to serve their respective
16 customers. To that end, both companies consider the latest forecasted fuel prices,
17 outages at the generating units based on planned maintenance and refueling
18 schedules, forced outages at generating units based on historical trends, generating
19 unit performance parameters, and expected market conditions associated with power
20 purchases and off-system sales opportunities in order to determine the most
21 economic and reliable means of serving their customers.

22 **Q. DOES THIS CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY?**

23 A. Yes, it does.

Duke Energy Progress, Inc. Fossil Fuel Procurement Practices

Coal

- Near and long-term consumption forecasts are computed based on factors such as: load projections, fleet maintenance and availability schedules, coal quality and cost, environmental permit and emissions considerations, wholesale energy imports and exports.
- Station and system inventory targets are determined and designed to provide: reliability, insulation from short-term market volatility, and sensitivity to evolving coal production and transportation conditions. Inventories are monitored continuously.
- On a continuous basis, existing purchase commitments are compared with consumption and inventory requirements to ascertain additional needs.
- All qualified suppliers are invited to make proposals to satisfy any additional or future contract needs.
- Contracts are awarded based on the lowest evaluated offer, considering factors such as price, quality, transportation, reliability and flexibility.
- Spot market solicitations are conducted on an on-going basis to supplement contract purchases.
- Delivered coal volume and quality are monitored against contract commitments. Coal and freight payments are calculated based on certified scale weights and coal quality analysis meeting ASTM standards. During the review period the Company utilized both destination and/or origin weights and analysis.

Gas

- Near and long-term consumption forecasts are computed based on factors such as load projections, commodity and emission prices, and fleet maintenance and availability schedules.
- Short-term and Long-term Periodic Requests for Proposals and informal market solicitations will be conducted to potential suppliers to procure a cost competitive, secure and reliable natural gas supply over time to meet forecasted gas usage.
- Short-term and spot purchases are conducted on an on-going basis to supplement term natural gas supply.
- On a continuous basis, existing purchases are compared to forecasted gas usage to ascertain any additional needs.

Fuel Oil

- No. 2 diesel is burned primarily for initiation of coal combustion (light-off at steam plants) and in combustion turbines (peaking assets).
- All diesel fuel is moved via pipeline to applicable terminals where it is then loaded on trucks for delivery into the Company's storage tanks. Because oil usage is highly variable, the Company relies on a combination of inventory and reliable suppliers who are responsive and can access multiple terminals. Diesel is replaced on an "as needed basis" as called for by station personnel with guidance from fuel procurement staff.

- Formal solicitation for supply is conducted as needed with an emphasis on maintaining a network of reliable suppliers at a competitive market price in the region of our generating assets.

DUKE ENERGY PROGRESS
Summary of Coal Purchases
Twelve Months Ended Febuary 2014 & 2013
Tons

Line No.	Month	Contract (Tons)	Spot (Tons)	Total (Tons)
1	March 2013	502,344	0	502,344
2	April	365,100	0	365,100
3	May	428,174	0	428,174
4	June	554,544	0	554,544
5	July	631,953	0	631,953
6	August	735,088	0	735,088
7	September	761,610	0	761,610
8	October	479,841	0	479,841
9	November	592,803	11,701	604,504
10	December	548,247	22,864	571,111
11	January 2014	409,842	23,533	433,375
12	February	272,292	159,621	431,913
13	**Total** (Sum L1:L12)	**6,281,838**	**217,719**	**6,499,557**

Line No.	Month	Contract (Tons)	Spot (Tons)	Total (Tons)
14	March 2012	780,531	12,809	793,340
15	April	595,721	0	595,721
16	May	688,255	0	688,255
17	June	957,296	206	957,502
18	July	759,349	0	759,349
19	August	878,974	2,277	881,250
20	September	826,079	0	826,079
21	October	864,605	0	864,605
22	November	725,227	0	725,227
23	December	890,910	1,217	892,127
24	January 2013	471,048	2,448	473,497
25	February	498,700	491	499,191
26	**Total** (Sum L14:L25)	**8,936,695**	**19,448**	**8,956,143**