

**BEFORE**  
**THE PUBLIC UTILITIES COMMISSION OF OHIO**

In the Matter of the Application of Duke )  
Energy Ohio, Inc., for a Certificate of )  
Environmental Compatibility and Public ) Case No. 16-253-GA-BTX  
Need for the C314V Central Corridor )  
Pipeline Extension Project. )

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**DIRECT TESTIMONY OF**  
  
**ADAM LONG**  
  
**ON BEHALF OF**  
  
**DUKE ENERGY OHIO, INC.**

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March 26, 2019

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### **ATTACHMENT:**

AL-1: Map of Duke Energy Ohio System

**I.     INTRODUCTION AND PURPOSE**

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

2     A.     My name is Adam Long and my business address is 4720 Piedmont Row Drive,  
3             Charlotte, North Carolina.

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

5     A.     I am employed by Duke Energy Progress, LLC, as the General Manager of Pipeline  
6             Operations.

7     **Q.     PLEASE     BRIEFLY     SUMMARIZE     YOUR     EDUCATIONAL**  
8             **BACKGROUND AND PROFESSIONAL EXPERIENCE.**

9     A.     I graduated from North Carolina University with a bachelor's degree in Mechanical  
10            Engineering. For the past twenty years, I have been employed by multiple pipeline  
11            companies with significant experience in the design, construction and operations of  
12            natural gas and hydrocarbon liquid facilities.

13    **Q.     PLEASE SUMMARIZE YOUR RESPONSIBILITIES AS General Manager**  
14            **of Pipeline Operations.**

15    A.     I am responsible for directing an organization of 76 employees who are responsible  
16            for operating and maintaining natural gas facilities, propane facilities, liquefied  
17            natural gas facilities, pipeline control systems and control room operations located  
18            in the Duke Energy Ohio, Duke Energy Kentucky, Inc., (Duke Energy Kentucky)  
19            and Piedmont Natural Gas – Tennessee, North Carolina and South Carolina service  
20            areas. My organization engages in a variety of activities, including inspections,  
21            repairs, operations and construction. My organization is also responsible for

1 performing those functions necessary for regulatory compliance at those natural gas  
2 facilities, liquefied natural gas facilities and propane facilities.

3 **Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE OHIO POWER**  
4 **SITING BOARD?**

5 A. No.

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

8 A. The purpose of my testimony is to discuss the Company's propane-air peaking  
9 plants and related infrastructure and, more specifically, to explain why those  
10 facilities need to be retired. I will also discuss the concept of system planning and  
11 the role it plays in Duke Energy Ohio's provision of safe and reliable natural gas  
12 service to its more than 405,000 customers in southwest Ohio. Finally, I will  
13 address how the proposed distribution pipeline that is the subject of this proceeding  
14 will enable the Company to retire the propane peaking facilities while fulfilling its  
15 service commitments. I thus address one of the critical reasons for the need for the  
16 proposed pipeline.

## **II. PROPANE-AIR PEAKING PLANTS**

17 **Q. PLEASE PROVIDE THE HISTORY OF DUKE ENERGY OHIO'S**  
18 **PROPANE-AIR PEAKING PLANTS.**

19 A. Duke Energy Ohio and its subsidiary, Duke Energy Kentucky, currently own two  
20 propane-air peaking plants one of which is located in Cincinnati, Ohio and the other  
21 in Erlanger, Kentucky. These plants were brought on line in the early 1960s.  
22 Initially, these plants functioned to provide a seasonal and constant source of supply

1 during the winter heating season. However, as the network of natural gas pipelines  
2 comprising the Company's system grew, its ability to meet seasonal demand  
3 without reliance on these plants grew. Now, the Company relies on these plants for  
4 peaking services during those periods of time when system demand is at its highest.  
5 Presently, the propane-air peaking plants contribute approximately 10 percent of  
6 the supply needed to serve our firm, heat-sensitive demand on peak days.

7 **Q. PLEASE EXPLAIN HOW THE PROPANE-AIR PLANTS FUNCTION**  
8 **RELATIVE TO THE NATURAL GAS DELIVERY SYSTEM.**

9 A. Liquid propane is first vaporized and mixed with compressed air. Thereafter, it is  
10 injected into the natural gas distribution system to maintain pressure and provide  
11 additional volume required by Duke Energy Ohio customers. Importantly, so that  
12 the plants may function properly, there must be natural gas flowing across the  
13 system with which the propane may be mixed. This is necessary because propane  
14 has different combustion dynamics than natural gas and appliances and equipment  
15 that are configured to burn natural gas cannot safely or efficiently burn a gas stream  
16 that is comprised primarily of propane.

17 **Q. HOW IS THE PROPANE THAT IS USED IN THESE PLANTS STORED?**

18 A. The propane is stored in mined caverns that were put in operation in the 1960s.

19 **Q. IS STORAGE OF PROPANE IN MINED CAVERNS TYPICAL OF THE**  
20 **PRACTICES USED BY MOST NATURAL GAS DISTRIBUTION**  
21 **COMPANIES TODAY?**

1 A. No. Indeed, this approach to propane storage is now extremely rare. Few utilities  
2 use propane at all for peaking purposes and those that do generally do not store the  
3 propane in mined caverns.

4 **Q. ARE THE PROPANE-AIR PEAKING PLANTS SUBJECT TO ANY**  
5 **REGULATIONS?**

6 A. The plants are operated and maintained consistent with National Fire Protection  
7 Association (NFPA) 59. The Erlanger cavern and associated pipeline are operated  
8 and maintained in compliance with Title 49 of the Code of Federal Regulations,  
9 Part 195 (49 CFR Part 195).

10 **Q. HOW ARE THESE PLANTS MAINTAINED?**

11 A. The plants are subject to annual maintenance as necessitated under NFPA 59 and  
12 49 CFR Part 195. Although certain components of the plants are original, other  
13 components have been replaced or upgraded to enable their continued, safe  
14 operation.

15 **Q. WHEN YOU DISCUSS THE MAINTENANCE OF THE PLANTS, DOES**  
16 **THAT INCLUDE MAINTENANCE OF THE CAVERNS?**

17 A. There is no maintenance to the caverns themselves given their composition – mined  
18 limestone. However, the cavern pressure is continuously monitored. Additionally,  
19 cavern equipment, such as lines and submersible pumps, are subject to regular  
20 inspection and maintenance. In this regard, the lines will undergo corrosion  
21 inspections and, as necessary, be recoated.

1   **Q.   HAVE THE PLANTS BEEN UPGRADED SINCE THEY WERE**  
2       **INITIALLY PUT IN SERVICE?**

3   A.   Any plant requires maintenance and, as appropriate and necessary, upgrade. The  
4       propane-air peaking plants are no different. Thus, over the course of their operation,  
5       the plants have been upgraded through the introduction of newer technologies. For  
6       example, the original vaporizer system has been replaced with a more efficient  
7       system and automated valves have been substituted for manual valves. Further,  
8       detection equipment, chart recorders, and compressor lubrication systems have  
9       been added to the plants.

10   **Q.   HAVE THE CAVERNS BEEN UPGRADED SINCE THEY WERE**  
11       **INITIALLY PUT INTO SERVICE?**

12   A.   No. There is no upgrade that can be done to the caverns themselves. The  
13       subterranean caverns are natural and carved formations and are not amenable to  
14       upgrades or replacement. These caverns are distinguishable from more modern  
15       above-ground, storage tanks that are used in other propane air peaking facilities.

16   **Q.   HOW ARE THE PROPANE-AIR PEAKING PLANTS AND STORAGE**  
17       **FACILITIES MONITORED?**

18   A.   They are monitored through the Company's control system. The dome pressure of  
19       the caverns is continuously monitored, even when the propane-air peaking plants  
20       are not in operation by the Gas Control Room.

21   **Q.   HOW ARE THE PROPANE STORAGE FACILITIES REPLENISHED?**

22   A.   During the non-winter heating season, propane is transported via trucks and then  
23       transferred to the caverns.

1   **Q.    ARE THERE RESTRICTIONS ASSOCIATED WITH THE TRANSFER OF**  
2   **PROPANE INTO THE STORAGE FACILITIES?**

3   A.    Yes. Propane is a combustible substance and, as such, particular precaution is taken  
4        when the Company is refilling the caverns with the propane needed to operate the  
5        propane-air peaking plants. Such precautions are dictated by NFPA 58 and include  
6        restricted access and removal of possible ignition sources within a designated buffer  
7        zone during active unloading activities.

8   **Q.    ARE THERE RISKS INHERENT IN PROPANE OTHER THAN THOSE**  
9   **RELATED TO THE TRANSFER PROCESS MENTIONED ABOVE?**

10  A.    Propane is heavier than air and, unlike natural gas, is not dispersed upward. Rather,  
11        it will find a lowest point and may pool in that location. A practical consequence  
12        of this natural characteristic of propane is that leaks can be more difficult to identify  
13        because the propane will have settled in a low area. Propane also has a higher BTU  
14        and a hotter flame as compared to natural gas. The ignition point for propane is  
15        lower than that for natural gas. In a liquid state, propane can cause frostbite upon  
16        contact with skin.

17  **Q.    AS THE COMBINED NATURAL GAS AND PROPANE TRAVEL**  
18  **THROUGH THE DISTRIBUTION SYSTEM AND UTLIMATELY REACH**  
19  **CUSTOMERS, ARE THERE ANY IMPLICATIONS TO CUSTOMERS?**

20  A.    Technology, equipment, manufacturing processes have undeniably evolved since  
21        the propane-air peaking plants were placed in service more than fifty years ago.  
22        Some of today's technology, equipment, and processes cannot properly perform  
23        when propane is injected into the system. Consequently, when Duke Energy Ohio



1 is relying upon the propane-air peaking plants to maintain service to customers, it  
2 is necessary that certain customers temporarily discontinue or alter their operations  
3 until such time as their equipment can accept supply.

4 **Q. WHAT IS YOUR OPINION OF THE OVERALL USEFULNESS OF THE**  
5 **DUKE ENERGY OHIO PROPANE-AIR PLANTS TO DUKE ENERGY**  
6 **OHIO'S PROVISION OF NATURAL GAS SERVICE TO ITS**  
7 **CUSTOMERS?**

8 A. These facilities have been very useful in the past in providing system support for  
9 meeting seasonal and, more recently, peak day demands on our system. They are,  
10 however, aging and in some respects antiquated and in general more complicated  
11 to operate than modern natural gas pipeline delivery systems that might be used in  
12 their place.

13 **Q. DOES DUKE ENERGY OHIO INTEND TO RETIRE THE PROPANE-AIR**  
14 **PEAKING PLANTS AND RELATED STORAGE FACILITIES?**

15 A. Yes. The Company believes these plants, and the associated storage facilities,  
16 should be retired. Although the Company continues to maintain these plants and  
17 they do function safely at the present time, they are at or near the end of their useful  
18 lives. As it is not possible to maintain or update the caverns, Duke Energy Ohio  
19 must proactively plan for their retirement. Furthermore, even assuming the lives of  
20 the plants and storage facilities could be extended, such an alternative does not  
21 allow the Company to address other critical objectives related to the balance of  
22 supply and the replacement of other aging infrastructure.

### **III. SYSTEM DESIGN AND THE PROPANE PLANTS**

1   **Q.   CAN YOU DESCRIBE HOW DUKE ENERGY OHIO'S SYSTEM IS**  
2       **DESIGNED?**

3   A.   Yes. Duke Energy Ohio's natural gas distribution system is designed to receive  
4       natural gas from interstate pipeline providers from the north and the south of the  
5       greater Cincinnati area. In the south, our pipeline providers are TransCanada via  
6       KO Transmission. In the north, we rely on Texas Gas, Texas Eastern Transmission,  
7       and ANR Pipeline. Natural gas flows through these interstate pipelines into our  
8       primary transmission and larger distribution lines that run north and south and then  
9       into our smaller distribution lines. I have provided a map of our system as  
10      Attachment AL-1, which illustrates this physical configuration of our system. Due  
11      to the history of our system's development and Cincinnati's growth over the  
12      decades, our system facilities currently are designed to receive supplies of natural  
13      gas from the north and south with an approximate 45% North - 55% South split.  
14      The southern interstate facilities are limited in the amount of natural gas and  
15      pressure they can deliver into our system. Therefore, on very cold days, we must  
16      ensure that approximately 45 percent of natural gas deliveries are brought onto our  
17      system from the north.

18   **Q.   WHAT IS SYSTEM PLANNING?**

19   A.   System planning is a methodology employed to ensure that a local distribution  
20      company's facilities can meet the requirements of its customers even under the  
21      most extreme conditions. As I will explain in more detail below, system planning  
22      includes the assessment of facilities for safety as well as reliability. The Company

1 is continually assessing the state of its facilities, as well as the current and  
2 prospective demand of its customers. Given that there is a significant time lag  
3 associated with identifying the need for new facilities and actually placing those  
4 facilities into service, Duke Energy Ohio is consistently looking forward to  
5 determine the most safe, reliable and prudent way to provide the natural gas service  
6 needed by our customers.

7 **Q. WHAT TO DO YOU MEAN BY TIME LAG?**

8 A. When considering whether to construct new pipelines to replace older facilities,  
9 Duke Energy Ohio's system planners must monitor the current age of the facilities  
10 and their useful life, decide whether they are repairable, and, if not, determine  
11 whether new facilities will be needed upon retirement. If new facilities are needed,  
12 the siting of those facilities may need to be approved by the Ohio Power Siting  
13 Board prior to construction. If approved, the new facilities will need to be  
14 constructed and, depending upon the size and scope of the project, the construction  
15 could take months to finish. Therefore, the time lag between when the Company  
16 identifies the need and when the new facilities are actually in-service can be  
17 considerable. For example, in this case, the Company's system planners identified  
18 the need to retire the propane caverns in 2014 and determined that the central  
19 corridor project would address the impact of the retirements and meet the needs of  
20 customers. The Company is now hoping to build the proposed pipeline and start to  
21 retire the caverns after the winter of 2020-2021.

1   **Q.   HOW DOES DUKE ENERGY OHIO DETERMINE ITS SYSTEM**  
2       **REQUIREMENTS?**

3   A.   Duke Energy Ohio's system planning is premised upon the safe and reliable  
4       provision of natural gas services to its customers, most of whom are residential  
5       customers. From a safety perspective, Duke Energy Ohio must ensure that its  
6       facilities are assessed for integrity on a periodic basis, that all essential portions of  
7       the system are controllable and appropriately monitored, that they meet all  
8       applicable regulatory safety requirements, and that they are constantly overseen by  
9       qualified operators. In addition, Duke Energy Ohio system planning takes into  
10      account facility upgrades and replacements based upon regulatory requirements  
11      and applicable industry standards. From a reliability perspective, Duke Energy  
12      Ohio operational and supply planning is focused on ensuring that its distribution  
13      system can meet customer demands for natural gas in the most extreme conditions.  
14      Duke Energy Ohio planners assess current and prospective system supply  
15      requirements and also determine whether system facilities can provide  
16      uninterrupted service to firm customers on the coldest day of the year. That day is  
17      projected based upon a review of historic winter weather. System planners then  
18      determine whether current facilities can meet these requirements, taking into  
19      account projected load growth. If facilities are nearing the end of their useful life,  
20      Duke Energy Ohio must determine how to replace those facilities and ensure  
21      consistent and reliable service to its customers.

1   **Q.     WHAT IS SYSTEM SUPPLY?**

2   A.     Duke Energy Ohio contracts with suppliers and interstate transportation providers  
3           to ensure that it has procured sufficient natural gas to be delivered onto its system  
4           on a daily basis. As discussed, the Company obtains its natural gas deliveries from  
5           the north and south. When I refer to system supply, I am not only discussing the  
6           supply that is delivered into our system at those points; I am also focusing on how  
7           that natural gas supply flows and is distributed within the Company's own pipeline  
8           facilities. In other words, the Company may contract for sufficient upstream natural  
9           gas deliveries but its own facilities also must effectively flow that supply to various  
10          regions within the system. That flow occurs based on the system's hydraulics and  
11          pressure requirements.

12   **Q.     CAN YOU EXPLAIN SYSTEM HYDRAULICS AND PRESSURE**  
13   **REQUIREMENTS?**

14   A.     Yes. A natural gas pipeline, in many ways, is designed very similar to a pipeline  
15          that carries liquids. Physically, incoming pressure from our upstream interstate  
16          pipeline providers "pushes" the natural gas onto our larger facilities and the natural  
17          gas flows through those larger diameter pipelines to our smaller lines and, finally,  
18          to our customers' homes and buildings. As customers use their heaters and  
19          appliances, they maintain the flow of that natural gas. On very cold winter days,  
20          our customers use much more natural gas than usual and at a higher rate. This  
21          causes our system's hydraulic pressure to drop because more gas than usual is being  
22          burned or "pulled off" the system. If hydraulic pressure were to drop too far, the  
23          flow of natural gas would decrease and, at some point, we would no longer be able

1 to provide natural gas deliveries to every part of our system, resulting in outages.  
2 Therefore, system supply can be viewed as a function of both the actual natural gas  
3 and the available pressure to ensure flow to all customers on our system. The  
4 propane caverns historically have been utilized as peaking plants that provide both  
5 additional pressure and additional supply to overcome the high use of our customers  
6 and prevent any outages or interruptions in service.

7 **Q. HOW ARE THE PROPANE PLANTS AND RELATED STORAGE**  
8 **FACILITIES INTEGRATED INTO THE DUKE ENERGY OHIO SYSTEM**  
9 **AND PLANNING?**

10 A. The plants typically are utilized during cold weather events when the customer  
11 demand on the system requires higher than usual supply and operational pressure.  
12 During extremely cold weather in the Cincinnati area, customers utilize more  
13 natural gas for heating their homes and buildings. The propane plants provide  
14 peaking supply and pressure that allow Duke Energy Ohio's overall system to meet  
15 these high demands without any interruptions in service for firm customers. As I  
16 mentioned, when in operation, the propane plants provide approximately 10 percent  
17 of overall system supply requirements. Currently, without the peaking services  
18 provided by the plants, Duke Energy Ohio could not ensure sufficient hydraulic  
19 operational pressure or supply to serve its entire system during cold winter days.

20 **Q. DID DUKE ENERGY OHIO PERFORM LOAD FLOW STUDIES IN ITS**  
21 **SYSTEM PLANNING?**

22 A. Yes, Duke Energy Ohio employed a premier pipeline simulation model called  
23 Synergi. This modeling program is used by hundreds of natural gas and oil

1 companies throughout the world. Simulation models portray the behavior of real-  
2 life systems and permit the testing of experimental changes to the system.

3 **Q. HOW WAS THE PIPELINE SIMULATION MODELING USED?**

4 A. Synergi was used to assist Duke Energy Ohio in the development of its system  
5 planning. The effort identified future infrastructure needs in order to maintain the  
6 ability to provide customers with supply reliability, as well as to provide sufficient  
7 flexibility of the natural gas system to be able to recover from a wide range of  
8 interruption events. Each conceived system expansion or replacement, including  
9 configuration for peaking, was modeled to determine its ability to fulfil these  
10 objectives.

11 **Q. WHAT WAS THE FOCUS OF THE MODELING EFFORTS?**

12 A. Reliability was the highest priority of the model, which took into account the  
13 current dependency on the aged and outdated propane plants and a single gate  
14 station that serves over half of the system's customers. The outcome demonstrated  
15 that facilities capable of bringing natural gas to the central area of Hamilton County  
16 from the northern gate stations would improve overall reliability. The proposed  
17 Central Corridor is a result of our considerable review and system planning.

**IV. PROPANE RETIREMETNTS**

18 **Q. WHY IS DUKE ENERGY OHIO CONSIDERING THE RETIREMENT OF**  
19 **THE PROPANE CAVERN FACILITIES?**

20 A. The caverns are nearing the end of their useful lives. Unlike other facilities, once  
21 a cavern fails, it cannot be repaired and must be retired. Therefore, given Duke  
22 Energy Ohio's historic reliance on the propane peaking caverns to meet its system

1 requirements, viable alternative facilities are required to ensure reliable service in  
2 all conditions, including extremely cold weather. Based upon our thorough  
3 engineering review, the central corridor project meets these requirements and will  
4 also allow Duke Energy Ohio to provide more system supply flexibility.

5 **Q. HOW DOES THE CENTRAL CORRIDOR PIPELINE ALLOW DUKE**  
6 **ENERGY OHIO TO RETIRE THE PROPANE-AIR PEAKING PLANTS**  
7 **AND RELATED STORAGE FACILITIES?**

8 A. The distribution pipeline proposed in this proceeding will increase the Company's  
9 supply portfolio and allow it to pull enough gas from the north to offset the 10  
10 percent supply presently obtained through the propane-air peaking facilities. The  
11 additional gas supply from the north and added pressure from the central corridor  
12 facilities will allow operators to maintain service to customers on peak days and  
13 also more effectively balance the overall system at all times. Duke Energy Ohio  
14 will still require supply and delivery pressure from the southern interstate facilities  
15 but the additional supply that will flow through the central corridor facilities will  
16 obviate the need for the continued operation and maintenance of the propane  
17 caverns. Without the central corridor project, Duke Energy Ohio will be unable to  
18 retire the propane caverns and also meet its customers' demand requirements. In  
19 such event, our ability to make peak day deliveries to our customers would be  
20 contingent upon the continuing operability of our propane air systems and storage  
21 caverns – caverns that we cannot inspect or repair, and that are likely to fail at an  
22 unpredictable and uncontrollable time. This is not an adequate long-term solution  
23 for peak day demand.



1   **Q.    WILL THE CENTRAL CORRIDOR PROJECT BE SAFER AND MORE**  
2       **RELIABLE THAN THE COMPANY’S PROPANE AIR SYSTEM?**

3    A.    Yes, for several reasons. First, the central corridor project will be constructed using  
4       state-of-the-art materials and enhanced construction techniques. Second, the  
5       operations of the central corridor facilities will be physically less complex than the  
6       operations needed to use the propane-air system. Less complexity in this regard  
7       equates to less potential for failure – particularly considering the age of our  
8       propane-air system. Third, there are no operational complications for our customers  
9       from the peak day pressure and supply solutions provided by the central corridor  
10      project. Finally, the central corridor project allows Duke Energy Ohio greater  
11      flexibility in selecting supply sources for peak day (and non-peak day) service to  
12      its customers and a year-round asset through which it can more flexibly manage its  
13      system.

## **V. CONCLUSION**

14   **Q.    DO YOU HAVE ANY FINAL THOUGHTS ON THE PROPOSAL TO**  
15       **RETIRE THE EXISTING DUKE ENERGY OHIO PROPANE-AIR**  
16       **SYSTEM IN FAVOR OF THE CENTRAL CORRIDOR PROJECT?**

17    A.    Yes. From an engineering perspective, it is necessary for natural gas distribution  
18      companies to retire and replace their facilities periodically. This is often the result  
19      of those facilities becoming outmoded or less safe because of the passage of time.  
20      This reality is why we spend so much time and effort ensuring our systems are safe  
21      and in good operating condition. The proposed replacement of the Company’s  
22      propane-air system with the central corridor project is an example of this type of

1 activity where an older set of facilities may no longer be as reliable as they once  
2 were and need to be replaced. It is our best engineering judgment that this time has  
3 come for our propane-air facilities. That process necessitates construction of the  
4 central corridor project to replace the peak day pressure, supply, and system  
5 balancing capabilities that have previously been provided through the propane-air  
6 system.

7 **Q. IS ATTACHMENT AL-1 TRUE AND ACCURATE TO THE BEST OF YOUR**  
8 **KNOWLEDGE?**

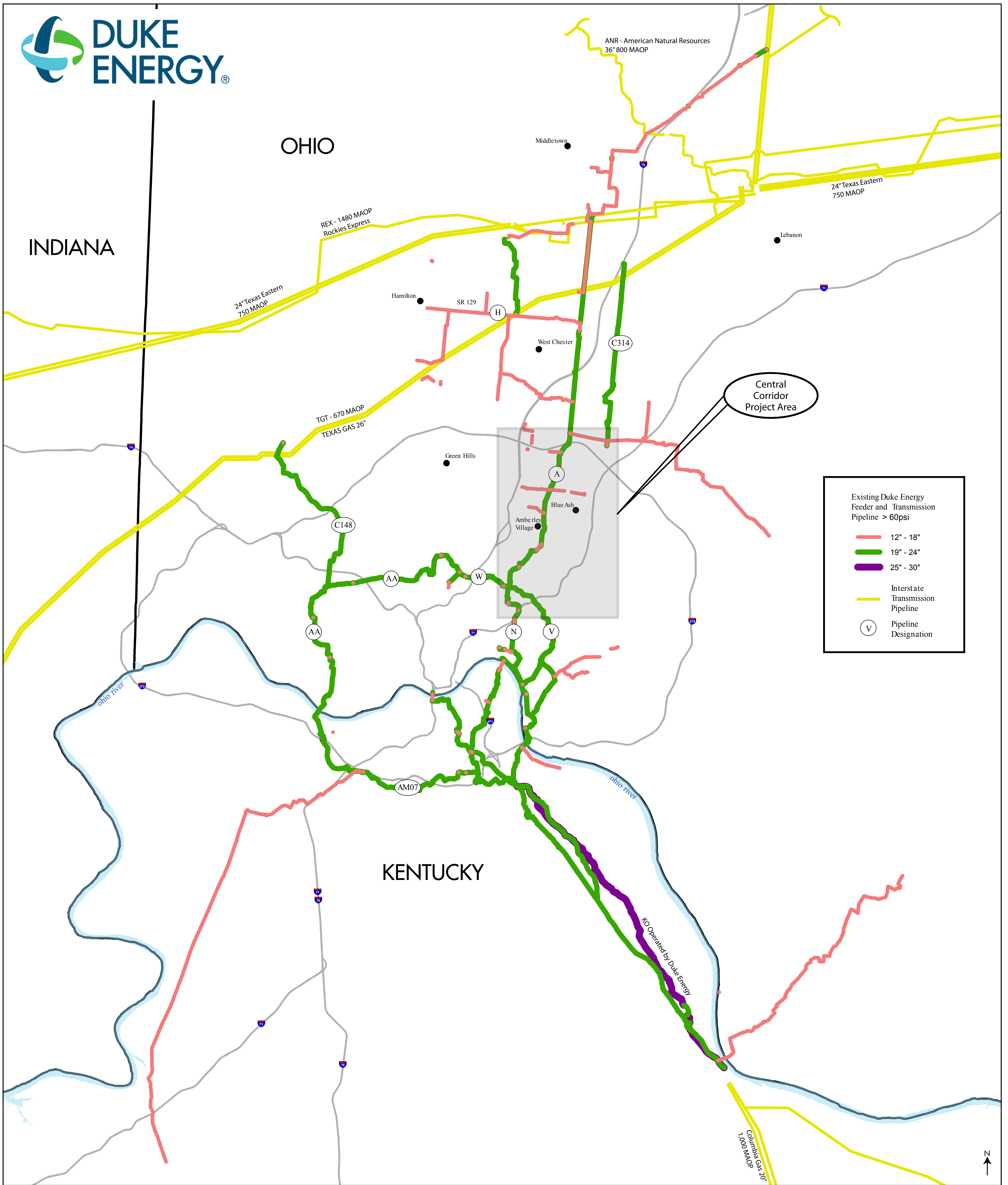
9 A. Yes.

10 **Q. WAS ATTACHMENT AL-1 PREPARED BY YOU OR UNDER YOUR**  
11 **DIRECTION AND CONTROL?**

12 A. Yes.

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

14 A. Yes.



**This foregoing document was electronically filed with the Public Utilities**

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Summary: Testimony Direct Testimony of Adam Long on Behalf of Duke Energy Ohio, Inc.  
electronically filed by Carys Cochern on behalf of Duke Energy