EXHIBIT NO. _____

BEFORE
THE PUBLIC UTILITIES COMMISSION OF OHIO

| | | |
|---|---|---|
| In the Matter of the 2016 Review of the Distribution Investment Rider Contained in the Tariff of Ohio Power Company | ) ) ) | Case No. 17-38-EL-RDR |
| In the Matter of the 2017 Review of the Distribution Investment Rider Contained in the Tariff of Ohio Power Company | ) ) ) | Case No. 18-230-EL-RDR |

DIRECT TESTIMONY OF
THOMAS A. KRATT
ON BEHALF OF
OHIO POWER COMPANY

Filed: May 17, 2019

INDEX TO DIRECT TESTIMONY OF
THOMAS A. KRATT

BEFORE
THE PUBLIC UTILITIES COMMISSION OF OHIO
DIRECT TESTIMONY OF
THOMAS A. KRATT
ON BEHALF OF
OHIO POWER COMPANY

**PERSONAL DATA**

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

A. My name is Thomas A. Kratt. My business address is 700 Morrison Road, Gahanna, Ohio 43230.

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

A. I am employed by Ohio Power Company ("AEP Ohio" or the "Company") as Vice President – Distribution Operations.

**Q. PLEASE DESCRIBE YOUR EDUCATIONAL AND PROFESSIONAL BACKGROUND.**

A. I received a Bachelor of Science degree in electronics engineering technology from the Ohio Institute of Technology in 1983. I joined AEP Ohio affiliate Indiana Michigan Power Company ("I&M") in 1986 as a design engineer for I&M's Cook Nuclear Plant, where I worked in various capacities for 13 years. In 2000, I joined I&M Distribution, where I eventually became the Manager of Distribution Systems for I&M's Michigan District. In 2010, I became the Manager of Distribution Dispatching for I&M, where I was responsible for the operation of the electrical distribution grid. In July 2013, I was named Vice President of Distribution Operations for I&M. I joined AEP Ohio in March 2019. In addition, I was a four year working member of the Nuclear Utility Group on Equipment Qualification, and a contributing member to the EPRI Cable Aging and

Management white paper. Prior to joining AEP, I spent five years as an engineer in the robotics industry.

**Q. WHAT ARE YOUR RESPONSIBILITIES AS VICE PRESIDENT – DISTRIBUTION OPERATIONS FOR AEP OHIO?**

A. I am responsible for overseeing the planning, construction, operation, and maintenance of the distribution system. My duties include the safe and reliable delivery of service to our customers, the oversight and management of service extension to new customers, and the restoration of service when outages occur. My responsibilities also include overseeing AEP Ohio's distribution system, reliability programs, and vegetation management program. I report directly to AEP Ohio's President, Raja Sundararajan.

**Q. HAVE YOU PREVIOUSLY TESTIFIED OR SUBMITTED TESTIMONY BEFORE A STATE COMMISSION?**

A. Yes. I have previously submitted testimony in distribution rate case proceedings before the Indiana Utility Regulatory Commission and the Michigan Public Service Commission.

**<u>PURPOSE OF TESTIMONY</u>**

**Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

A. The purpose of my testimony is to respond to comments that the Office of the Ohio Consumers' Counsel filed in this proceeding regarding AEP Ohio's service reliability since the implementation of the Company's Distribution Investment Rider (DIR). Specifically, I explain why reliance upon reliability metric results alone is an incomplete view of the DIR's reliability benefits and discuss other reliability challenges that, while

impacting reliability metric results, are outside of the Company's control and not indicative of DIR program performance.

**DISTRIBUTION INVESTMENT RIDER SERVICE RELIABILITY BENEFITS**

**Q. DO YOU AGREE WITH OCC'S CONTENTION THAT THE DIR HAS NOT IMPROVED SERVICE RELIABILITY?**

A. No. OCC's claim that service reliability has not improved as a result of the Company's implementation of programs under the DIR, is predicated on OCC's comparison of the Company's 2012 System Average Interruption Frequency Index ("SAIFI") and the Customer Average Interruption Duration Index ("CAIDI") performance with 2017 SAIFI and CAIDI results. OCC contends that the DIR is not providing reliability benefits to customers because the average duration of outages in AEP Ohio's distribution system, as measured by CAIDI, was longer in 2017 than before the DIR was implemented, and the number of interruptions, as measured by SAIFI, was about the same.

OCC's position fails to recognize that many improvements in service reliability are not measurable using SAIFI and CAIDI metrics. One example of this is pole replacements. If the Company does not replace a rotting pole, there is a strong likelihood that the pole may fail in the near term, likely causing an outage and increasing SAIFI. By proactively replacing the rotting pole, the Company may avoid an outage altogether. While this may not result in an immediate improvement to SAIFI or CAIDI, it does improve service reliability for AEP Ohio's customers.

Other examples include underground cable rehabilitation and out of right-of-way hazard tree removal. Through these programs, the Company is proactively addressing emerging challenges to customer reliability. Although no one can predict which segment

of cable or tree will fail next, it will happen as some point given the age and condition of the Company's infrastructure and the condition of certain danger trees. Proactive mitigation of these risks reduces the likelihood of outages over time. Again, these investments may not be immediately evident in the Company's system-level reliability metrics, but they nonetheless are important and effective. As these examples show, SAIFI and CAIDI metrics are not always a useful measurement to evaluate the reliability benefits of the DIR, especially with a short-term view.

**Q. IS IT APPROPRIATE TO REVIEW ONLY SAIFI AND CAIDI PERFORMANCE TO DETERMINE THE RELIABILITY BENEFITS ACHIEVED UNDER THE DIR?**

A. No, it is not. First, OCC selects varying years for separate reliability metrics when making point-to-point comparisons to illustrate what it claims in various documents submitted in these proceedings to be degrading reliability. OCC is choosing the best year for each metric as its "baseline" and then comparing to recent performance. OCC's argument regarding performance based upon reliability metrics, utilizing the lowest index in the period as a starting point for comparison, is thus overstated in addition to being incomplete, as set forth above. Comparing single years to one another also ignores the fact that reliability metrics fluctuate annually due to events like weather, outages caused by vehicle accidents, third-party dig-ins, and trees outside of right-of-way, that are not predictable or under the Company's control. Significantly, OCC's point comparisons of single years also fails to isolate specific causes and effects or otherwise account for a myriad of factors that may have affected reliability during the time between those years. For example, while DIR programs A, B, and C have positive reliability impacts between

two years being compared, adverse factors X, Y, and Z may have developed and created a negative reliability impact during the intervening period.

It is also important to consider the average service availability, which is the percentage of time a customer has received power. AEP Ohio customers can access electricity twenty-four hours a day, seven days a week, and fifty-two weeks of each year with very few interruptions. Although SAIFI and CAIDI metrics do play an important role to identify the events and causes of service interruption, which aids in the Company's effort to identify opportunities for improvement and potentially may result in programs that are funded through the DIR, SAIFI and CAIDI are not definitive indicators of service availability.

It is also important to note that that while reliability indices can provide useful information, the usefulness of any particular index for any particular purpose depends upon the nature of the index and its suitability to the purpose. Many of the DIR programs impact SAIFI and the cumulative duration of outages as reflected in SAIDI. CAIDI, however, since it reflects only the average duration of outages that do occur, is generally not addressed. Average outage duration (CAIDI) reflects many factors that some of the DIR activities have little ability to control, even though those same activities do yield positive reliability impacts. When an outage occurs, it takes a certain amount of time for personnel to travel to the problem site, assess the problem, for a crew to bring equipment and supplies, and to perform the needed restoration. Successful DIR reliability programs will reduce the number of times a crew needs to go out, but the crews still need adequate time and equipment to safely perform a given restoration task – often in rural or remote locations – such as replacing poles and restringing conductor.

A reliance on SAIFI and CAIDI alone also fails to take into account that the Company's investments through the DIR improve grid resiliency, which in turn impacts how storms are reflected in the Company's reliability metrics. The Commission requires the use of IEEE Standard 1366 to determine major event days, which are excluded from the reported reliability metrics. The IEEE 1366 defines a major event as "an event that exceeds reasonable design and or operational limits of the electric power system. A major event includes at least one Major Event Day ('MED')." A MED is defined as "a day in which the daily System Average Interruption Duration Index ('SAIDI') exceeds a threshold value . . . ." Storms that do not meet the MED criteria are classified as non-major storm events and, unlike MEDs, are included in the Company's reliability metrics.

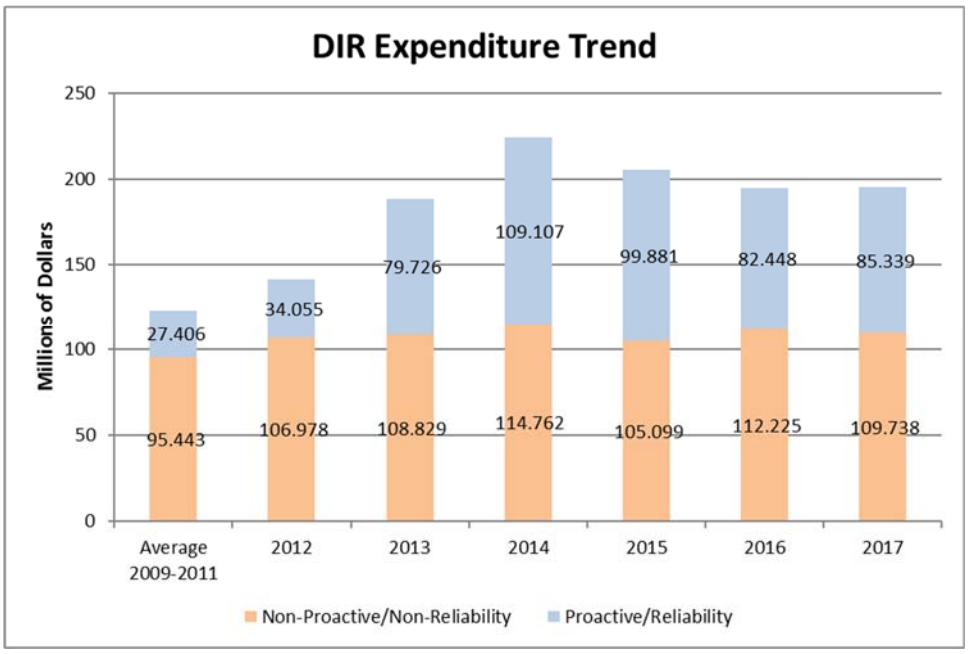
As the Company makes improvements to the resiliency of the grid and improves its facilities' design and operational limits, the impact of storms is diminished, resulting in a decrease in the number of MEDs. Storms that would once have been MEDs and excluded from reliability metrics become sub-MEDs and are included in the reliability metrics calculations, thus increasing the metrics. This leads to the appearance that reliability is getting worse, when in fact, the Company is actually improving overall reliability. The Company averaged 8.6 MEDs during 5.4 annual events for the five years immediately preceding the start of its DIR programs in 2013. It has averaged 3.6 MEDs during 3.2 events in the past five years.

**Q. HOW HAVE THE COMPANY AND THE COMMISSION HISTORICALLY EVALUATED THE DIR'S RELIABILITY BENEFITS?**

A. The Company and the Commission have evaluated the DIR's reliability benefits using multiple methods.

First, current year spending on the DIR plan's programs is compared to the baseline spending prior to the DIR (2009-2011) for each of the program types. The 2009-2011 baseline is set using the average spending for the reliability type programs for the DIR plan as compared to the spending for these same types of programs for the years after implementation of DIR (late 2012). Also, the 2009-2011 baseline proactive versus non proactive spending is compared to each of the other years for the DIR plan. Figure TAK-1 compares the 2009-2011 baseline proactive versus non proactive spending as compared to each of the other years for the DIR plan. The chart further demonstrates the increased spending in proactive programs that the DIR makes possible.

**Figure TAK-1**




The above figure demonstrates that the capital investments recovered through the DIR are for programs and projects that represent only a portion of the Company's overall distribution plant investment. The programs are proactive in nature, and are intended to replace aging infrastructure. The number of assets replaced under programs represents a

small number of assets compared to the total number of system assets that continue to age. Similarly, reliability projects target specific assets with reliability issues that have caused outages in the past. Because these programs and projects involve such a small area of the total distribution system, their reliability impact may not be recognized when examining the net reliability metrics for the entire distribution system. Despite other factors (many of which are outside the Company's control) that have a negative impact on reliability metrics during a given period, these programs and projects have a positive incremental reliability impact for the areas where the programs and projects were completed. This is why these investments and the recovery of these investments through the DIR are so important. Stated differently, while we know the individual DIR investments help maintain and improve reliability, those positive impacts are not always realized in the net reliability metrics due to other dynamic factors.

The Non-Proactive/Non-Reliability projects are required capital expenditures that relate to the installation of service to new residential and commercial customers, (including the necessary transformers and meters) outage restoration, and public project relocations (PPRs). PPR projects involve the relocation of distribution facilities in or near public road right-of-way to accommodate projects such as road construction, water and sewer line installation, and sidewalk construction.

Second, the Company provides the reliability quantification for both proactive and reliability programs. The reliability quantification for proactive programs shows avoided outages and avoided customer outage minutes for each applicable program. Again, this reliability enhancement is not reflected in CAIDI and SAIFI metrics but it does provide valuable information.

**Q. IS AEP OHIO EXPERIENCING EMERGING CHALLENGES TO CUSTOMER RELIABILITY?**

A. Yes. First, service interruptions due to vegetation falling from outside rights-of-way have increased significantly since the start of the DIR. Given the nature of the largely forested territory, the Company experiences significantly more events impacting reliability caused by trees. Ohio is home to more than 3.8 billion ash trees, and approximately one in every ten trees in Ohio is an ash. The destructive emerald ash borer began in the northwest Ohio in the early 2000s, and spread throughout Ohio and has now been discovered in all of Ohio's 88 counties. When a tree becomes infested with emerald ash borer, it dies within a few years, which makes it much more vulnerable to falling down or being more easily blown over. AEP Ohio's service territory includes the more mountainous and forested areas of the state. Figure TAK-2 below shows the correlation between the forested areas of the state (on the left) and the Company's service territory (on the right).

**Figure TAK-2**


The emerald ash borer challenges are contributing to trees falling at an unusual rate. Dead ash trees accounted for approximately 24% of trees outside of right-of-way outages

in 2017. AEP Ohio has implemented a program to work with property owners and address hazard trees. Upon securing property owners' permission, forestry crews are removing such trees from outside of the Company's rights-of-way.

Second, outages due to vehicle accidents have also increased. This increased vehicle accident activity seems to follow the national trend of traffic accidents attributed to distracted driving. The Company is working with the communities it serves to help address distracted driving, but there are limited actions within AEP Ohio's control to prevent vehicles accidents damaging distribution equipment.

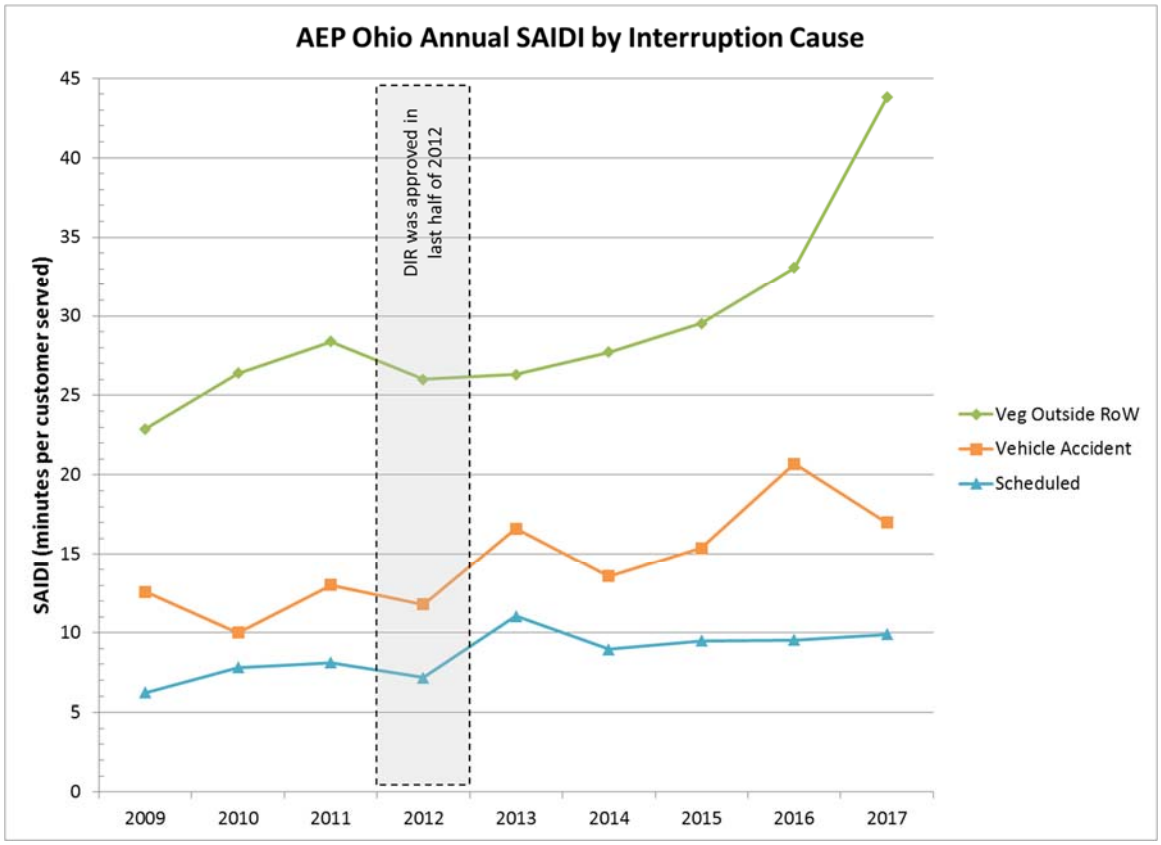
Third, scheduled outages have increased as crews safely implement the DIR work plans and other customer-driven projects. These outages are necessary for employee safety and equipment replacement. An example would be an overhead reconductoring job during which all customers could not be transferred to a neighboring circuit. Added reliability impacts during DIR construction projects include when customers are transferred to alternate sources and faults on the alternate source interrupt the added customers. Protective devices are placed in non-reclose configurations, or even more sensitive settings, for worker safety while line improvements are performed. These safety protections can lead to more sustained outages for causes that may have cleared under a normal feed condition.

**Q. HAS THE COMPANY QUANTIFIED THE RELIABILITY IMPACTS OF EACH OF THESE THREE CAUSES OF OUTAGES?**

A. Yes, annual System Average Interruption Duration Index ("SAIDI") trends for each of those three outage causes are set forth in Figure TAK-3 below. SAIDI represents the total duration of interruption (in minutes) experienced by all customers served by the

distribution system. SAIDI equals the total customer minutes of interruption divided by the total number of customers, and it can also be calculated as SAIFI multiplied by CAIDI. SAIDI is another metric to measure performance, reflecting both interruption frequency and duration per event.

**Figure TAK-3**




**Q. WHAT DOES FIGURE TAK-3 REFLECT?**

A. Comparing the years 2016-2017 to the last three full years (2009-2011) prior to the DIR's implementation reveals SAIDI increases of 13 minutes due to vegetation outside of right-of-way, 7 minutes due to vehicle accidents, and 3 minutes due to scheduled interruptions. In sum, it is incorrect to conclude that AEP Ohio's DIR programs are not having a

positive impact on reliability without fully considering the emerging challenges and the other factors I outlined above.

**Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?**

A. Yes.

## CERTIFICATE OF SERVICE

In accordance with Rule 4901-1-05, Ohio Administrative Code, the PUCO's e-filing system will electronically serve notice of the filing of this document upon the following parties. In addition, I hereby certify that a service copy of the foregoing was sent by, or on behalf of, the undersigned counsel to the following parties of record this 17th day of May, 2019, via electronic transmission.

*/s/ Christen M. Blend*
Christen M. Blend

**E-Mail Service List:**

steven.beeler@ohioattorneygeneral.gov
terry.etter@occ.ohio.gov
william.michael@occ.ohio.gov
christopher.healey@occ.ohio.gov
bryce.mckenney@occ.ohio.gov

Attorney Examiners:

sarah.parrot@puco.ohio.gov
greta.see@puco.ohio.gov

Summary: Testimony - Direct Testimony of Thomas A. Kratt on Behalf of Ohio Power Company electronically filed by Ms. Christen M. Blend on behalf of Ohio Power Company