OCC EXHIBIT_____

BEFORE
THE PUBLIC UTILITIES COMMISSION OF OHIO

In the Matter of the 2016 Review of the Distribution Investment Rider Contained in the Tariff of the Ohio Power Company.	)))	Case No. 17-0038-EL-RDR
In the Matter of the 2017 Review of the Distribution Investment Rider Contained in the Tariff of the Ohio Power Company.	)))	Case No. 18-0230-EL-RDR

DIRECT TESTIMONY
OF
JAMES D. WILLIAMS
IN OPPOSITION TO THE JOINT STIPULATION AND RECOMMENDATION

On Behalf of
The Office of the Ohio Consumers' Counsel
65 East State Street, 7th Floor
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ATTACHMENTS

I. INTRODUCTION

Q1. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND POSITION.

A1. My name is James D. Williams. My business address is 65 East State Street, 7th Floor, Columbus, Ohio 43215. I am employed by the Office of the Ohio Consumers' Counsel ("OCC") as a Utility Consumer Policy Expert.

Q2. PLEASE BRIEFLY SUMMARIZE YOUR EDUCATION AND PROFESSIONAL EXPERIENCE.

A2. I am a 1994 graduate of Webster University, in St. Louis, Missouri, with a Master of Business Administration, and a 1978 graduate of Franklin University, in Columbus, Ohio, with a Bachelor of Science, Engineering Technology. My professional experience includes a career in the United States Air Force and over 23 years of utility regulatory experience with the OCC.

Initially, I served as a compliance specialist with the OCC and my duties included the development of compliance programs for electric, natural gas, and water industries. Later, I was designated to manage all of the agency's specialists who were developing compliance programs in each of the utility industries. My role evolved into the management of OCC's consumer hotline, the direct service provided to consumers to resolve complaints and inquiries that involved Ohio utilities. More recently, following a stint as a Consumer Protection Research Analyst, I was promoted to a Senior Utility Consumer Policy Analyst. In this

role, I am responsible for developing and recommending policy positions on utility issues that affect residential consumers.

I have been directly involved in the development of comments in various rulemaking proceedings at the Public Utilities Commission of Ohio ("PUCO") and the Ohio Development Services Agency. Those comments included advocacy for consumer protections, affordability of utility rates, service quality, reliability, and the provision of reasonable access to essential utility services for residential consumers. I have assisted in the development of OCC policies and positions in a number of proceedings involving the Ohio Electric Service and Safety Standards,[1] distribution system reliability standards,[2] evaluation of smart grid proposals,[3] and the provision of quality utility services and consumer protections for residential consumers, including low-income Ohioans.

[1] *In the Matter of the Commission's Review of Chapter 4901:1-10, Ohio Administrative Code, Regarding Electric Companies,* Case No. 12-2050-EL-ORD. *In the Matter of the Commission's Review of Chapters 4901:1-9, 4901:1-10, 4901:1-21, 4901:1-22, 4901:1-23, 4901:1-24, and 4901:1-25 of the Ohio Administrative Code*, Case No. 06-653-EL-ORD.

[2] Including AEP Ohio reliability standard cases (*In the Matter of the Application of the Establishment of 4901:1-10-10(B) Minimum Reliability Performance Standards for Ohio Power Company,* Case No. 16-1511-EL-ESS; *In the Matter of the Establishment of 4901:1-10-10(B) Minimum Reliability Performance Standards for Ohio Power Company,* Case No. 12-1945-EL-ESS; *In the Matter of the Establishment of 4901:1-10-10(B) Minimum Reliability Performance Standards for Columbus Southern Power Company and Ohio Power Company*, Case No. 09-756-EL-ESS).

[3] *In the Matter of the Application of Ohio Power Company to Initiate Phase 2 of Its gridSMART Project and to Establish the gridSMART Phase 2 Rider,* Case No. 13-1939-EL-RDR, Application (September 13, 2013).

In this proceeding, I reviewed the Compliance audit reports filed on August 10, 2017 and August 23, 2018. I also assisted in the preparation of OCC's Initial Comments,[4] Reply Comments,[5] and discovery requests. In addition, I have reviewed multiple PUCO filings pertaining to the Distribution Investment Rider ("DIR"), annual Ohio Power Company ("AEP") reliability reports and System Improvement Plan Reports, other AEP riders that are supposed to improve customer reliability, comments by the PUCO Staff and AEP, and the direct and supplemental testimony filed by AEP in this proceeding and in Case No. 17-1914-EL-RDR.[6] Finally I reviewed the Joint Stipulation and Recommendation ("Settlement") that was agreed upon by AEP and the PUCO Staff[7] and supporting testimony.

Q3. HAVE YOU PREVIOUSLY SUBMITTED TESTIMONY OR TESTIFIED BEFORE THE PUBLIC UTILITIES COMMISSION OF OHIO?

A3. Yes. The cases that I have submitted testimony and/or have testified before the PUCO can be found in Attachment JDW-1.

[4] October 26, 2018.

[5] November 16, 2018.

[6] *In the Matter of the Application of Ohio Power Company to Update Its Enhanced Service Reliability Rider*, Case No. 17-1914-EL-RDR, Direct Testimony of Andrea Moore and Thomas Kratt, (April 18, 2019). Supplemental Testimony (July 15, 2019).

[7] *In the Matter of the Review of the Distribution Investment Rider Contained in the Tariff of Ohio Power Company*, Case 17-38-EL-RDR, et al, Joint Stipulation and Recommendation (July 2, 2019).

II. PURPOSE/RECOMMENDATIONS

Q4. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A4. The purpose of my testimony is to oppose a Settlement that was reached between AEP and the PUCO Staff that allegedly resolves all issues in the 2016 DIR audit and the 2017 DIR audit. The proposed Settlement does not meet the three-prong test that the PUCO uses to evaluate settlements. I also provide support and background for the comments and recommendations that were filed by OCC in this proceeding specific to the DIR and the impact on AEP's reliability performance for consumers.

Q5. CAN YOU PROVIDE A BRIEF DESCRIPTION OF THE AEP DIR RIDER AND ITS RELATIONSHIP TO DISTRIBUTION RELIABILITY?

A5. Yes. AEP's DIR Rider was originally proposed as part of an Electric Security Plan ("ESP") under R.C. 4928.143(B)(2)(h) that serves as an infrastructure modernization initiative to replace aging infrastructure and to maintain and improve distribution reliability.[8] The DIR has been continued and expanded in Case Nos. 13-2385-EL-SSO and 16-1852-EL-SSO.

[8] *In the Matter of the Application of Columbus Southern Power Company and Ohio Power Company for Authority to Establish a Standard Service Offer Pursuant to Section 4928.143, Revised Code, in the Form of an Electric Security Plan., Case 11-346-EL-SSO, Opinion and Order (August 8, 2012) at 42 – 47.*

The DIR enables AEP to benefit from single-issue ratemaking, at the expense of consumers, by earning a return on and of investments that it makes in distribution infrastructure, all without the filing of a rate case. From a customer standpoint, AEP has spent over a billion dollars on distribution investment that it has or will charge to customers since the inception of the DIR in 2012. In 2016 and 2017 alone, the DIR spending was capped at levels of $146.2 million and $170 million, respectively.[9] In 2018, the DIR revenue cap was $215 million which than increases to $240 million in 2019, $265 million in 2020 and $290 million in 2021.[10]

Q6. HAS THE AEP DIR RIDER IMPROVED ITS DISTRIBUTION RELIABILITY?

A6. No. Despite the fact that the DIR was approved as a distribution infrastructure modernization program (and the massive amount of spending made by AEP) intended to improve customers' distribution reliability, AEP's reliability has actually declined to the point where its customers are receiving substandard reliability in 2018. By "substandard reliability" I am referring to the fact that AEP

[9] *In the Matter of the Application of Ohio Power Company for Authority to Establish a Standard Service Offer Pursuant to 4928.143, Revised Code, in the Form of an Electric Security Plan*, Case No. 13-2385-EL-SSO, et al., Opinion and Order (February 25, 2015) at 47.

[10] *In the Matter of the Application of Ohio Power Company for Authority to Establish a Standard Service Offer Pursuant to 4928.143, Revised Code, in the Form of an Electric Security Plan*, Case No. 16-1852-EL-SSO, et al., Opinion and Order (April 25, 2018) at 18.

failed to meet both of the minimum reliability performance standards established by the PUCO.

The minimum reliability performance standards currently used by the PUCO are the System Average Interruption Frequency Index ("SAIFI") and the Customer Average Interruption Duration Index ("CAIDI"). As I explain in this testimony, AEP's reliability for consumers, as measured by these indices, has declined consistently since the DIR was initiated and approved in 2012. AEP's distribution reliability has declined so far that it failed to meet either the SAIFI or the CAIDI standards in 2018. But more importantly, AEP's failure to meet the minimum PUCO reliability standards means that customers are at risk of receiving unsafe and unreliable service.[11] This unfortunate situation is exacerbated by the fact that customers are paying extra and substantial charges on their monthly electric bill for the DIR, *which was intended to improve reliability*, over the last seven years after the DIR was approved. AEP's customers are also paying extra charges on their bills for an Enhanced Service Reliability Rider ("ESRR" or "tree-trimming rider") and for its smart grid program ("gridSMART rider"). Like the DIR, these other two riders are also supposed to (but are not) contributing to improved reliability.

My testimony will demonstrate conclusively that AEP's reliability has not improved for consumers since the DIR was approved. In fact, it has actually

[11] Contrary to state law. *See* Ohio Revised Code 4928.02(A).

declined. My testimony will also respond to numerous assertions that are made in the Direct Testimony and Supplemental Testimony of AEP Witness Thomas Kratt that attempts to minimize the impact of the degraded reliability that AEP is providing customers.[12]

Q7. WHAT ARE YOUR RECOMMENDATIONS REGARDING THE PROPOSED SETTLEMENT, THE AEP DIR RIDER, AND THE DISTRIBUTION RELIABILITY OF AEP?

A7. My recommendation is that the PUCO reject the Settlement between PUCO Staff and AEP. The PUCO should direct that any future DIR spending, if the DIR is allowed to continue,[13] to focus on programs that demonstratively improve the SAIFI and CAIDI reliability performance for consumers. Approval for any charges on consumers for DIR spending should be conditioned on AEP demonstrating continual annual improvement in its SAIFI and CAIDI reliability performance for consumers starting in 2019.

Further, I recommend that the PUCO require AEP (as it has done in the past) to spend shareholder dollars (as necessary) to augment the vast amount of customer-funded tree-trimming efforts to reduce the supposed number of tree-caused

[12] Direct Testimony of Thomas Kratt at 6.

[13] Under the current ESP (Case 16-1852-EL-SSO), the DIR will end on December 31, 2020 if AEP Ohio does not file a distribution rate case by June 1, 2020, Opinion and Order (April 25, 2018) at 18. But this does not preclude the PUCO from protecting consumers by ending the DIR (or at least at a minimum) establishing stricter performance guidelines now.

service outages.[14] AEP Ohio is statutorily required to provide safe and reliable service to its customers regardless of all the additional revenue sources it has created through riders for collecting charges from customers.[15] Despite having spent over a billion dollars of customer provided funds collected through the DIR, ESRR, and other riders over the last 10 years, the reality is AEP has failed to improve its distribution service reliability. Now is the time for the PUCO to order AEP to spend its own money to incentivize a more concerted effort to improve its service reliability.

Lastly, I recommend that the PUCO to enforce its current minimum reliability performance standards already in place. Reliability standards are important measures in assessing the service quality that AEP is providing its customers. The PUCO is required to establish standards for the minimum service quality, safety, and reliability requirements and has the authority to enforce the standards.[16] Failure to meet the same reliability performance standard for two years in a row constitutes a violation of Ohio Adm. Code 4901:1-10-10(E). If (and when) AEP fails to meet either the CAIDI or SAIFI standard in 2019, I would urge the PUCO to protect consumers by enforcing the rules as provided in Ohio Adm. Code 4901:1-10-30. O.A.C. 4901:1-10-30 authorizes the PUCO to

[14] *In the Matter of the Self-Complaint of Columbus Southern Power Company and Ohio Power Company Regarding the Implementation of Programs to Enhance Distribution Service Reliability,* Case 06-222-EL-SLF, Entry (May 16, 2007). The Commission required AEP Ohio to spend $10 million of shareholder funds for incremental vegetation management activities.

[15] R.C. 4928.02

[16] R.C. 4928.11.

impose forfeitures of up to ten thousand dollars per day against AEP for failure to comply with minimum service standards. In addition, the PUCO can order AEP to pay restitution to protect customers from the damages that are incurred as a result of unreliable service.

III. ANALYSIS OF THE SETTLEMENT UNDER THE THREE-PRONG TEST USED BY THE PUCO FOR EVALUATING SETTLEMENTS

Q8. WHAT CRITERIA DOES THE PUCO USUALLY RELY UPON FOR CONSIDERING WHETHER TO ADOPT A SETTLEMENT?

A8. It is my understanding that the PUCO will adopt a settlement only if it meets all of the three criteria below. The PUCO must analyze the Settlement and decide the following:

1. Is the settlement a product of serious bargaining among capable, knowledgeable parties?[17]
2. Does the settlement, as a package, benefit customers and the public interest?
3. Does the settlement violate any important regulatory principle or practice?[18]

[17] The PUCO takes into account the "diversity of interests" as part of the first part of the stipulation assessment. *See: In the Matter of the Application of Ohio Edison Company, The Cleveland Electric Illuminating Company, and The Toledo Edison Company for Authority to Establish a Standard Service Offer, Case No. 10-388-EL-SSO*, Opinion and Order at 48 (August 25, 2010).

[18] *Consumers' Counsel v. Pub. Util. Comm'n.* (1992), 64 Ohio St.3d 123, 126.

Q9. DOES THE SETTLEMENT BENEFIT CUSTOMERS AND THE PUBLIC INTEREST?

A9. No. The proposed settlement does not benefit customers and the public interest because it results in customers paying for tree-trimming costs that should not be collected through the DIR. The potential for double or triple collection of the very same costs from consumers is highly likely because vegetation management costs are collected through base rates and other riders. In addition, the proposed Settlement provides AEP practically carte blanche approval to charge customers through the DIR for tree-trimming costs that are typically the responsibility of property owners. The proposed Settlement contains no special documentation requirements to substantiate the reasons why affected trees are categorized as "danger trees", quantification of the risk to the distribution system if the trees are not removed, methods to demonstrate the costs were prudently incurred, and supporting reason why the trees were not previously trimmed or removed consistent with the PUCO approved vegetation management plan.

Q10. ARE THERE OTHER REASONS WHY THE PROPOSED SETTLEMENT DOES NOT BENEFIT CUSTOMERS OR THE PUBLIC INTEREST?

A10. Yes. Under the proposed Settlement, the capitalization of certain tree-trimming costs (which should be expensed under accounting rules) if at all, may also be used just to circumvent the annual O&M cap on the ESSR rider and transfer the

collection of these costs to the DIR[19] or future base distribution rates (this issue is discussed in OCC witness Jeff Hecker's testimony). AEP's expanded use of the DIR to create yet another tree-trimming revenue source has now resulted in more distribution equipment caused outages. Ironically, the purpose of the DIR was to proactively replace aging distribution equipment and infrastructure. Despite the significant infusion of customer money into AEP's pocket, customers are now experiencing more tree caused outages **and** more equipment failure caused outages. Consumers deserve more accountability and regulatory oversight of AEP's spending so that they can be assured that their hard-earned money will actually be used to improve service quality and reliability. The Settlement contains no such accountability or regulatory oversight so it should not be approved because it fails to protect consumers and the public interest.

Q11. CAN YOU ASSESS THE IMPACT THAT AEP'S IMPLEMENTATION OF THE DIR HAS HAD ON THE RELIABILITY THAT CUSTOMERS ARE RECEIVING?

A11. Yes. DIR has not resulted in improvements in AEP's reliability. AEP is required to meet the minimum reliability performance standards established under Ohio Adm. Code 4901:1-10-10. The two minimum performance standards in Ohio are SAIFI and CAIDI. SAIFI measures the average number of outages that customers experience in a year. CAIDI measures the average duration of outages

[19] AEP Ohio response to OCC STIP INT-1-018 (attached herein as JDW-2).

(i.e., the average restoration time). Lower SAIFI and CAIDI values indicate better reliability performance and service quality for customers.

Before 2013, reliability performance standards were measured separately for each of the two AEP distribution utilities, Columbus Southern Power and Ohio Power Company. Beginning in 2013, the reliability performance standards were consolidated as a single distribution utility under Ohio Power Company.

To demonstrate the lack of effectiveness of the DIR, Table 1 provides a comparison of the pre-DIR SAIFI and CAIDI performance for 2009 through 2012 with the post-DIR SAIFI and CAIDI performance from 2013 through 2018. This table demonstrates that DIR has not helped improve customer reliability and, in fact, reliability as measured by SAIFI and CAIDI is in decline (outage frequency and outage duration numbers are trending in an increasing direction which is bad for consumers).

Table 1: AEP Ohio Reliability Performance Pre-DIR/ Post DIR (2009 – 2018)

Year	SAIFI	CAIDI
PRE-DIR PERFORMANCE[20]		
2009	1.09	129.67
2010	1.10	138.83
2011	1.19	142.9
2012	0.98	144.2
POST-DIR PERFORMANCE		
2013	1.03	140.97
2014	1.13	146.61
2015	1.13	139.03
2016	1.08	143.45
2017	1.15	146.02
2018	1.30	150.32

Using AEP's average SAIFI performance level for 2009 through 2012 of 1.09, the SAIFI performance has been worse each year since the DIR was initiated in 2012 (with the exception of 2013). Using AEP's average CAIDI performance level of 138.9 minutes for 2009 through 2012, the CAIDI performance has been declining in each of the last six years. These SAIFI and CAIDI values represent worse reliability because the frequency and duration of outages are increasing.

[20] *In the Matter of the Establishment of 4901: 1-10-10(B) Minimum Reliability Performance Standards for Ohio Power Company.,* Case No. 12-1945-EL-ESS, Application (June 29, 2012).

Q12. DID AEP PROVIDE SUBSTANDARD RELIABILITY TO CUSTOMERS IN 2018?

A12. Yes. According to AEP's 2018 reliability performance report,[21] AEP was required to maintain minimum performance standards for SAIFI of 1.19 and for CAIDI of 149.00 minutes.[22] AEP's actual performance for 2018 was a SAIFI of 1.3 and a CAIDI of 150.32 minutes. This demonstrates that AEP failed to maintain minimum reliability performance for 2018. This means that customers experienced more outages and for much longer periods of time than permitted by the PUCO minimum distribution reliability performance standards. Failure to meet the minimum reliability performance standards demonstrates that in 2018, despite customer funding for the DIR, AEP's customers were at risk of receiving unsafe and unreliable service.[23]

Based on the 2018 reliability performance, the very expensive AEP DIR that was intended to proactively modernize distribution infrastructure and avoid outages has proven to be ineffective.[24] And it is even worse than that for consumers. In addition to millions of dollars they pay through the DIR, AEP's customers pay approximately $26 million annually through the ESRR for maintaining a four-

[21] Ohio Adm. Code 4901:1-10-10.

[22] *In the Matter of the Annual Report of Electric Distribution System Reliability Pursuant to Rule 4901:1-10-10(C)*, Case No. 19-992-EL-ESS, Annual Report (March 29, 2019) at 2. (Attached herein as JDW-3).

[23] Contrary to state law. *See* Ohio Revised Code 4928.02(A).

[24] *In the Matter of the Application of Columbus Southern Power Company and Ohio Power Company for Authority to Establish a Standard Service Offer Pursuant to Section 4928.143, Revised Code, in the Form of an Electric Security Plan*, Case No. 11-346-EL-SSO, Opinion and Order (August 8, 2012) at 47.

year cycle-based tree-trimming program that the PUCO has concluded would improve reliability.[25] On top of that, the PUCO has approved a $560 million smart grid program, which includes the deployment of smart meters, Volt-Var Optimization, and Distribution Automation Circuit Reconfiguration ("DACR") to help improve reliability.[26] The benefits of the smart grid program were largely attributed to cost savings through avoided outages. Yet as was shown in Table 2, AEP's actual reliability performance has declined.

As a result of the AEP Ohio failure to meet its 2018 reliability standards, the Utility submitted an Action Plan to the PUCO Staff.[27] The action plans shows substantial increases in vegetation caused outages and in distribution equipment caused outages. Interestingly, AEP Ohio has control over preventing outages for both of these causes through adherence with its vegetation management plan and in preventing equipment caused outages by using the DIR for its intended purpose.

[25] *In the Matter of the Application of Columbus Southern Power Company for Approval of an Electric Security Plan; an Amendment to its Corporate Separation Plan; and the Sale or Transfer of Certain Generating Assets*, Case 08-917-EL-SSO, Opinion and Order (March 18, 2009), at 31-34.

[26] *In the Matter of the Application of Ohio Power Company to Initiate Phase II of its gridSMART Project and to Establish the gridSMART Phase 2 Rider*, Case No. 13-1939-EL-RDR, Opinion and Order (February 1, 2017) at 25. DACR technology was deployed on seventy circuits during an earlier deployment and should be contributing to improved reliability performance today.

[27] AEP Ohio Rule 10 Action Plan (attached herein as JDW-4).

Q13. HAS EQUIPMENT FAILURE CONTRIBUTED TO THE COMPANY'S FAILURE TO MEET THE MINIMUM RELIABILITY PERFORMANCE STANDARDS?

A13. Yes. Table 2 provides a comparison of the impacts on customers from equipment failures on its distribution system.[28]

Table 2: Equipment Failures (2009 – 2018)

Equipment Failure, excluding Major Events and Transmission Outages				
			Customer	Average
Year	Outage	Customer	Interruption	Interruption
Pre-DIR	Events	Interruptions	Minutes	Duration (Min)
2009	8,884	487,792	56,311,814	115
2010	9,479	506,251	65,533,898	129
2011	10,048	528,224	70,689,041	134
2012	8,557	409,944	56,659,404	138
4 Yr Ave	9,242	483,053	62,298,539	129
DIR				
2013	8,466	458,533	61,732,503	135
2014	9,230	535,319	74,014,048	138
2015	9,642	556,400	75,850,668	136
2016	8,338	507,202	68,462,876	135
2017	8,038	518,029	74,033,978	143
2018	9,573	558,385	75,964,835	136
6 Yr Ave	8,881	522,311	71,676,485	137
Ave. Increase	-361	39,259	9,377,945	8
Ave. % Increase	-3.90%	8.13%	15.05%	6.41%

Table 2 compares the number of outage events caused by equipment failure on distribution circuits and in distribution substations, and their impact on customer

[28] See the Company's response to OCC STIP INT-1-035 (attached herein as JDW-5). Table 2 reflects the sum of outages on distribution lines and in distribution stations.

electric service reliability in the years before DIR implementation, i.e. 2009 through 2012, with their impacts on reliability since DIR implementation. Table 2 excludes any outages occurring during major events or service outages caused by events on the transmission system.

Table 2 shows that, while the number of outage events caused by equipment failure on distribution facilities has decreased by about 4% since DIR implementation, the effects of these outage events on electric customers, i.e. the number of customer interruptions (CI) and the number of customer interruption minutes (CIM), have both increased under DIR. Under DIR, there are an annual average of more than 39,000 additional customer interruptions than prior to DIR representing an annual average increase of 8.13%, and an annual average of more than 9.3 million additional customer interruption minutes than prior to DIR, representing an annual average increase of more than 15%. The increase in customer interruptions results in an increase in SAIFI, while the increased customer interruption minutes result in an increase in CAIDI.

Table 2 also reflects how the average interruption duration in minutes of each customer interruption increases from an average of 129 minutes prior to DIR to an average of 137 minutes under DIR, an increase of 6.41%.

The net results from DIR are increased annual customer interruptions and increased annual customer interruption minutes due to equipment failures.

Yet the proposed Settlement between Staff and AEP Ohio does nothing to mitigate outages caused by equipment failures (which is the supposed purpose of the DIR).

Q14. IS AEP IN COMPLIANCE WITH ITS PUCO APPROVED FOUR-YEAR CYCLE-BASED VEGETATION MANAGEMENT PLAN, INCLUDING THE REMOVAL OR PRUNING OF TREES INSIDE AND OUTSIDE THE ROW?

A14. No. AEP's vegetation management plan[29] requires the vegetation across the entire distribution system to be maintained on a four-year cycle (attached hereto as JDW-6). The plan requires removal or pruning of trees inside and outside of the right-of-way and pruning mature trees not in power lines but that could be within a four-year period.[30] In addition, the vegetation management plan requires monitoring and mitigating the ash trees outside the cleared right-of-way to proactively reduce outages.[31]

AEP is required by Ohio Administrative Code 4901:1-10-26 to file an Annual System Improvement Plan Report that contains compliance reporting for the particular inspection, maintenance, repair, and replacement programs that are

[29] In the Matter of the Report – Update to Ohio Power Company's program for maintenance, repair, and inspection of transmission and distribution line as required by 4901:1-10-27(E) of the Ohio Administrative Code, Case No 15-2071-EL-ESS, (December 14, 2015).

[30] *Id.*

[31] *Id.*

required by Ohio Administrative Code 4901:1-10-27.[32] These reports are required to be filed by March 31st of each year based on the program implementation from the previous year.[33] Table 3 provides a summary between 2013 (after the DIR was approved) and 2018 showing the years that AEP complied with the four-year cycle-based vegetation management program and the years it did not.

Table 3: Four-year Cycle-based Tree-Trimming Program (2013-2018)

Year	Compliance with ESRR Requirements[34]
2013	Yes
2014	Yes
2015	No
2016	No
2017	No
2018	No

During 2013 and 2014, AEP complied with the proactive four-year cycle-based tree trimming program. But since 2015 AEP has not complied with the proactive four-year cycle tree trimming program. Performing vegetation management in

[32] Ohio Adm. Code 4901:1-10-26(B)(3)(f).

[33] *Id.*

[34] System Improvement Plan Reports filed pursuant to Ohio Adm. Code 4901:1-10-26 in Case Nos. 10-996-EL-ESS, 11-996-EL-ESS, 12-996-EL-ESS, 13-996-EL-ESS, 14-996-EL-ESS, 15-996-EL-ESS, 16-996-EL-ESS, 17-996-EL-ESS, 18-996-EL-ESS, and 19-996-EL-ESS.

accordance with the approved AEP vegetation management plan (that is being paid for by customers) was supposed to result in improvements in AEP's reliability performance. This table indicates that the reason why customers are having more tree-caused outages is because AEP is not performing the vegetation management that it is supposed to perform to prevent outages.

Q15. CAN YOU PROVIDE ADDITIONAL BACKGROUND ABOUT THE INCREASE IN THE NUMBER OF TREE-CASED OUTAGES AND THE IMPACT ON RELIABILITY PERFORMANCE?

A15. Yes. Based on my assessment of AEP annual reliability reports, trees can be one of the leading causes of outages that impact AEP customers. Customers pay for AEP tree trimming through base rates, the ESRR, and the DIR. Yet, despite the millions of dollars in customer money that AEP supposedly collects from customers and spends on vegetation management, tree-caused outages continue to increase. Table 4 provides a comparison of the number of tree-caused outages since the DIR was initiated.

Table 4: Tree-Caused Outages (2013 – 2018)

Year	Interruptions	Customers Interrupted	Customer Interruption Minutes	Average Interruption Duration[35] (Minutes)
2013[36]	4,844	213,615	46,441,700	217
2014[37]	4,568	201,806	46,548,810	231
2015[38]	4,851	222,811	45,067,131	202
2016[39]	5,083	257,540	51,219,163	199
2017[40]	6,449	313,173	68,222,667	218
2018[41]	7,387	411,100	97,681,526	238

As shown in Table 4, there has been a significant increase in the number of outage events caused by trees since 2013. Additionally, between 2013 and 2017, there were almost 100,000 more customers interrupted in 2017 due to tree-caused outages. There were almost 200,000 more customers interrupted in 2018 compared to 2013. The number of customer interrupted minutes increased by over 46% between 2013 and 2017 and by over 110% between 2013 and 2018.

[35] Customer Interruption Minutes/ Customers Interrupted.

[36] *In the Matter of the Annual Report of Electric Distribution System Reliability Pursuant to Rule 4901:1-10-10(C)*, Case No. 14-517-EL-ESS, Annual Report (March 31, 2014) at 6a.

[37] *In the Matter of the Annual Report of Electric Distribution System Reliability Pursuant to Rule 4901:1-10-10(C)*, Case No. 15-627-EL-ESS, Annual Report (March 31, 2015) at 6a.

[38] *In the Matter of the Annual Report of Electric Distribution System Reliability Pursuant to Rule 4901:1-10-10(C)*, Case No. 16-550-EL-ESS, Annual Report (March 31, 2016) at 6a.

[39] *In the Matter of the Annual Report of Electric Distribution System Reliability Pursuant to Rule 4901:1-10-10(C)*, Case No. 17-890-EL-ESS, Annual Report (March 31, 2017) at 6a.

[40] *In the Matter of the Annual Report of Electric Distribution System Reliability Pursuant to Rule 4901:1-10-10(C),* Case No. 18-992-EL-ESS, Annual Report (March 29, 2018) at 6a.

[41] *In the Matter of the Annual Report of Electric Distribution System Reliability Pursuant to Rule 4901:1-10-10(C),* Case No. 19-992-EL-ESS, Annual Report (March 29, 2019) at 6a.

Q16. IS IT REASONABLE TO CONCLUDE THAT AEP'S FAILURE TO IMPLEMENT ITS VEGETATION MANAGEMENT PROGRAM CONSISTENT WITH THE PUCO APPROVED VEGETATION MANAGEMENT PLAN CONTRIBUTED TO ITS FAILURE TO MEET THE MINIMUM RELIABILITY PERFORMANCE STANDARDS?

A16. Yes. Given that AEP has been required to be on a four-year cycle-based vegetation management program since 2009, AEP should have already performed the necessary tree trimming and removal of danger trees both inside and outside the ROW. The Danger Tree Mitigation Program as addressed in the proposed Settlement is merely another expensive way to charge customers for the work that AEP should have already accomplished. According to the AEP Ohio response to OCC STIP-1-024 (attached herein as JDW-7), the Utility plans to remove 135,000 danger trees in 2019 and another 61,000 in both 2020 and 2021 at a cost of $95 million to consumers through the DIR. But many of these trees should have already been removed if AEP Ohio was adhering to vegetation management plan.

Q17. IS THERE ANY VALIDITY IN AEP'S ASSERTION THAT WHILE RELIABILITY APPEARS TO HAVE GOTTEN WORSE, DIR IS ACTUALLY IMPROVING RELIABILITY PERFORMANCE?

A17. No. The reliability performance standards are not just numbers on a piece of paper. The standards are based on methodical consideration of each of the criteria that I explained earlier and are a direct measure of the reliability being provided to consumers. AEP claims that the resiliency of the distribution grid has improved as

a result of the DIR and that while there is an appearance that reliability is getting worse, in reality, reliability is actually improving.[42] But an examination of the impact that equipment failures is having on consumers, shows this is not the case.

There is no evidence that the DIR has resulted in fewer outage events being excluded from the reliability calculations.[43] According to AEP, Major Event Days ("MEDs") have declined such that major weather events that would have previously been excluded from the reliability calculations are now included. For the 1,919,407 customers who experienced power interruptions in 2018 that exceeded a total of 288,522,500 minutes, AEP's reliability has not gotten better.[44] According to the PUCO's rules, MEDs are any calendar day when the system average interruption duration index ("SAIDI")[45] exceeds the major event day threshold using the methodology outlined in section 3.5 of standard 1366-2012 adopted by the Institute of Electrical and Electronics Engineers. "The threshold is calculated by determining the SAIDI associated with adding 2.5 standard deviations to the average of the natural logarithms of the electric utility's daily SAIDI performance during the most recent five-year period."[46] AEP claims that it has fewer MEDs in the past five years than it did prior to the start of the DIR.[47]

[42] *Id.*

[43] Direct Testimony of Thomas Kratt (May 17, 2019) at 6.

[44] Case 19-992-EL-ESS, Annual Report (March 29, 2019).

[45] SAIDI measures the average outage duration for customers served.

[46] Ohio Adm. Code 4901:1-10-01(T).

[47] Kratt Testimony at 6.

But it is more likely that any reduction in MEDs has more to do with the number of major storms and the severity of those storms, which can change year over year.

AEP admits that many of the DIR programs impact SAIFI but have little impact on CAIDI.[48] But the PUCO approval of the DIR called for improvements in both SAIFI *and* CAIDI.[49] Based upon a review of the 2016 and 2017 DIR Work Plan's (attached hereto as JDW-8 and JDW-9), one DIR program (line reclosers maintenance) is actually targeted to reducing outage durations. And in fact, as evidenced in JDW-8 and JDW-9, a large number of the DIR programs have nothing to do with improving reliability.

Q18. CAN YOU SUMMARIZE YOUR RECOMMENDATIONS?

A18. Yes. First and foremost, I urge the PUCO to reject the Settlement because the Settlement fails to meet the second prong of the PUCO's test: that the Settlement benefits the public and the public interest. Consumers deserve more accountability and regulatory oversight of AEP's spending so that they can be assured that AEP's spending of customers' money will actually improve service quality and reliability. DIR should not be used to circumvent the rate caps under the ESRR rider ("tree-trimming" rider) and/or to inflate future base rates. AEP has failed to implement its PUCO approved vegetation management plan. The

[48] *Id* at 5.

[49] Case 11-346-EL-SSO Opinion and Order, (August 8, 2012) at 47.

PUCO should order AEP as it has done in the past, to spend shareholder dollars to catch up on its four-year cycle based tree-trimming program (both within and outside the ROW).

I also recommend that the PUCO end the DIR rider in 2020 and regardless if the Utility files a distribution base rate case. Staff and AEP Ohio should be ordered to file a report within 45 days that described how the DIR will be prioritized in 2020 to reduce the customer impacts of equipment caused outages.

The PUCO should enforce the reliability standards as provided in O.A.C. 4901-10-30 if and when AEP fails to meet either the SAIFI or CAIDI reliability standards in 2019. O.A.C. 4901:1-10-30 authorizes the PUCO to impose forfeitures of up to ten thousand dollars per day against AEP for failure to comply with minimum service standards. In addition, the PUCO can order AEP to pay restitution to protect customers from the damages that are incurred as a result of unreliable service.[50]

[50] Ohio Adm. Code 4901:1-10-30(A)(3).

IV. CONCLUSION

Q19. DOES THIS CONCLUDE YOUR TESTIMONY?

A19. Yes. However, I reserve the right to incorporate new information that may subsequently become available through outstanding discovery or otherwise.

CERTIFICATE OF SERVICE

I hereby certify that a true copy of the foregoing *Direct Testimony of James D. Williams on Behalf of the Office of the Ohio Consumers' Counsel* was served via electronic transmission to the persons listed below on this 20th day of August 2019.

/s/ William J. Michael
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Testimony of James D. Williams
Filed at the Public Utilities Commission of Ohio

1. *In the Matter of the Application of the Cincinnati Gas and Electric Company for an Increase in Its Rates for Gas Service to All Jurisdictional Customers,* Case No. 95-0656-GA-AIR (August 12, 1996).

2. *In the Matter of the Application of the Cincinnati Gas and Electric Company for an Increase in Its Rates for Gas Service to All Jurisdictional Customers,* Case No. 01-1228-GA-AIR (February 15, 2002).

3. *In the Matter of the Commission's Investigation into the Policies and Procedures of Ohio Power Company, Columbus Southern Power Company, The Cleveland Electric Illuminating Company, Ohio Edison Company, The Toledo Edison Company and Monongahela Power Company regarding installation of new line extensions,* Case No. 01-2708-EL-COI (May 30, 2002).

4. *In the Matter of the Application of The East Ohio Gas Company d/b/a Dominion East Ohio for an Increase in Its Rates for Gas Service to All Jurisdictional Customers,* Case No. 07-0829-GA-AIR (June 23, 2008).

5. *In the Matter of the Application of the Columbia Gas of Ohio, Inc. for Authority to Amend Filed Tariffs to Increase the Rates and Charges for Gas Distribution,* Case No. 08-072-GA-AIR (September 25, 2008).

6. *In the Matter of a Settlement Agreement Between the Staff of the Public Utilities Commission of Ohio, The Office of the Consumers' Counsel and Aqua Ohio, Inc. Relating to Compliance with Customer Service Terms and Conditions Outlined in the Stipulation and Recommendation in Case No. 07-564-WW-AIR and the Standards for Waterworks Companies and Disposal System Companies,* Case No. 08-1125-WW-UNC (February 17, 2009).

7. *In the Matter of the Application of the Ohio American Water Company to Increase its Rates for water and Sewer Services Provided to its Entire Service Area,* Case No. 09-391-WS-AIR (January 4, 2010).

8. *In the Matter of the Application of Aqua Ohio, Inc. for Authority to Increase its Rates and Charges in its Masury Division,* Case No. 09-560-WW-AIR (February 22, 2010).

9. *In the Matter of the Application of Aqua Ohio, Inc. for Authority to Increase its Rates and Charges in Its Lake Erie Division,* Case No. 09-1044-WW-AIR (June 21, 2010).

IO. *In the Matter of the Application of The Ohio American Water Company to Increase its Rates/or Water Service and Sewer Service,* Case No. 11-4161-WS-AIR (March 1, 2012).

11. *In the Matter a/Columbus Southern Power Company and Ohio Power Company for Authority to Establish a Standard Service Offer Pursuant to Section 4928.143, Ohio Rev. Code, in the Form of an Electric Security Plan,* Case No. 11-346-EL-SSO, et al (May 4, 2012).

12. *In the Matter of the Application o/The Dayton Power and Light Company for Approval of its Market Rate Offer,* Case No. 12-426-EL-SSO (June 13, 2012).

13. *In the Matter of the Application of Ohio Power Company to Establish Initial Storm Damage Recovery Rider Rates,* Case No. 12-3255-EL-RDR (December 27, 2013).

14. *In the Matter of the Application of Ohio Power Company for Authority to Establish a Standard Service Offer Pursuant to Section 4928.143, Ohio Rev. Code, in the Form of an Electric Security Plan,* Case No. 13-2385-EL-SSO (May 6, 2014).

15. *In the Matter of the Application of Duke Energy Ohio/or Authority to Establish a Standard Service Offer Pursuant to Section 4928.143, Revised Code, in the Form of an Electric Security Plan, Accounting Modifications and Tariffs for Generation Service,* Case No. 14-841-EL-SSO (May 29, 2014).

16. *In the Matter of the Application of Ohio Edison Company, The Cleveland Electric Illuminating Company and The Toledo Edison Company for Authority to Provide for a Standard Service Offer Pursuant to R.C. 4928.143 in the Form of an Electric Security Plan,* Case No. 14-1297-EL-SSO (December 22, 2014).

17. *In the Matter of the Application of Duke Energy Ohio, Inc., to A4just Rider DR- IM and Rider AU for 2013 Grid Modernization Costs,* Case No. 14-1051-EL- RDR (December 31, 2014) and (February 6, 2015).

18. *In the Matter of the Application Not for an Increase in Rates Pursuant to Section 4901:18, Revised Code, of Ohio Power Company to Establish Meter Opt-Out Tariff,* Case No. 14-1158-EL-ATA (April 24, 2015).

19. *In the Matter of the Application of Duke Energy of Ohio, Inc., for Approval of a Grid Modernization Opt-out Tariff and for a Change in Accounting Procedures Including a Cost Recovery Mechanism.,* Case No. 14-1160-EL-UNC and 14-1161-EL-AAM (September 18, 2015).

20. *In the Matter of the Application of Duke Energy Ohio, Inc., for Approval of an Alternative Rate Plan Pursuant to Section 4929.05, Revised Code, for an Accelerated Service Line Replacement Programs,* Case No. 14-1622-GA-ALT (November 6, 2015).

21. *In the Matter of the Complaint of Jeffrey Pitzer, Complainant, v. Duke Energy Ohio, Inc. Respondent.,* Case No. 15-298-GE-CSS (December 30, 2015).

22. *In the Matter of the Application of Ohio Power Company to Initiate Phase 2 of Its gridSMART Project and to Establish the gridSMART Phase 2 Rider,* Case No. 13-1939-EL-RDR (July 22, 2016).

23. *In the Matter of the Application of Columbia Gas of Ohio, Inc. for Approval of Demand Side Management Program for its Residential and Commercial Customers,* Case No. 16-1309-GA-UNC (September 13, 2016).

24. *In the Matter of the Application of the Dayton Power and Light Company for Approval of Its Electric Security Plan,* Case No. 16-0395-EL-SSO (November 21, 2016). Supplemental Testimony, (March 29, 2017).

25. *In the Matter of the Application of Aqua Ohio, Inc. to Increase Its Rates and Charges for Its Waterworks Service.,* Case No. 16-0907-WW-AIR (December 19, 2016).

26. *In the Matter of the Application of Ohio Power Company for Authority to Establish a Standard Service Offer Pursuant to R.C. 4928.143, in the Form of an Electric Security Plan,* Case No. 16-1852-EL-SSO, (May 2, 2017).

27. *In the Matter of the Application of the Ohio Development Services Agency for an Order Approving Adjustments to the Universal Service Fund Riders of Jurisdictional Ohio Electric Distribution Utilities,* Case No. 17-1377-EL-USF, (August 11, 2017).

28. *In the Matter of the Application of Duke Energy Ohio, Inc. to Adjust Rider AU for 2016 Grid Modernization Costs,* Case No. 17-690-GA-RDR, (August 18, 2017).

29. *In the Matter of the Application of Duke Energy Ohio, Inc., for an Adjustment to Rider AMRP Rates,* Case No. 17-2318-GA-RDR, (April 5, 2018).

30. *In the Matter of the Application of Dayton Power and Light Company for an Increase in Electric Distribution Rates,* Case No. 15-1830-EL-AIR, (April 11, 2018).

31. *In the Matter of the Application of Duke Energy Ohio, Inc. for an Increase in Electric Distribution Rates,* Case No. 17-032-EL-AIR, et al, (June 25, 2018).

32. *In the Matter of the Complaint of Citizens Against Clear Cutting, et al., Complainants, v. Duke Energy Ohio, Inc. Respondent,* Case No. 17-2344-EL-CSS (August 27, 2018). Supplemented Direct Testimony (November 9, 2018).

33. *In the Matter of the Application of Vectren Energy Delivery of Ohio, Inc. for Approval of an Increase in Gas Rates,* Case No. 18-0298-GA-AIR (November 7, 2018). Supplemental Testimony (January 22, 2019).

34. *In the Matter of the Application of Ohio Power Company to Update Its Enhanced Service Reliability Rider,* Case No. 17-1914-EL-RDR (May 3, 2019).

35. *In the Matter of the Application of the Review of Duke Energy Ohio, Inc.'s Distribution Capital Investment Rider*, Case No. 18-1036-EL-RDR, (July 8, 2019).

36. *In the Matter of the Review of the Distribution Investment Rider Contained in the Tariff of Ohio Power Company,* Case No. 17-38-EL-RDR (August 20, 2019).

OHIO POWER COMPANY'S RESPONSE TO
THE OFFICE OF THE OHIO CONSUMERS' COUNSEL'S
DISCOVERY REQUEST
PUCO CASE NOS. 17-0038-EL-RDR AND 18-230-EL-RDR
FIRST SET (STIP)

INTERROGATORY

OCC STIP INT-1-018 Referring to the joint Stipulation and Recommendation on page 9, during the transition period, when will outside ROW tree work be capitalized using:
A. Base rate funding;
B. Funding through the Enhanced Service Reliability Rider; and/or
C. Funding through DIR?

RESPONSE

A. None
B. To the extent there is the opportunity to remove danger trees within the cycles of the vegetation management program while adhering to the agreed upon caps through the Stipulation in Case No. 16-1852-EL-SSO.
C. All Outside of ROW danger tree removal less any capital collected through the ESRR associated with danger trees.

Prepared by:

Andrea E. Moore

BEFORE
THE PUBLIC UTILITIES COMMISSION OF OHIO

In the matter of the Annual Report of	)	
Electric Distribution System Reliability	)	Case No: 19 -0992-EL-ESS
Pursuant to Rule 4901:1-10-10(C)	)	

Pursuant to Rule 4901:1-10-10(C) of the Ohio Administrative Code,
Ohio Power Company
hereby submits the attached annual report for the year 2018 .

I certify that the following report accurately and completely reflects the annual report requirements pursuant to Rule 4901:1-10-10 of the Ohio Administrative Code.

Signature	Printed Name
VP Distribution Operations	03.29.2019
Title	Date

Ohio Power Company
Rule 10 Report for 2018

1. 4901:1-10-10(C)(1): CAIDI (Customer Average Interruption Duration Index)

Performance Standard	After Exclusions	Before Exclusions
149.00	150.32	162.35

2. 4901:1-10-10(C)(1): SAIFI (System Average Interruption Frequency Index)

Performance Standard	After Exclusions	Before Exclusions
1.19	1.30	1.57

3. 4901:1-10-10(C)(1): Supporting Data

Customers Served	CI* After Exclusions	CI Before Exclusions	CMI* After Exclusions	CMI Before Exclusions
1,480,292	1,919,407	2,330,724	288,522,519	378,389,208

Notes:

*CI = Customer Interruptions
CMI = Customer Minutes Interrupted

Ohio Power Company
Rule 10 Report for 2018

4. 4901:1-10-10(C)(2): Major Event Outages

Date	Description	CI	CMI	CAIDI	SAIFI
3/1/2018	Major Event Day - Storms	34,853	7,451,108	213.79	0.02
10/20/2018	Major Event Day - Storms	29,955	13,096,226	437.20	0.02
11/15/2018	Major Event Day - Storms	55,095	15,439,791	280.24	0.04
	Totals:	**119,903**	**35,987,125**		

Notes:

Ohio Power Company
Rule 10 Report for 2018

5a. 4901:1-10-10(C)(2): Transmission Outages

Outage Start Date	Transmission Circuit Impacted	Outage Start Time	Circuit kV	Outage Cause	Outage Length (minutes)
1/1/2018	Corner - Wolf Creek	1:44 AM	138	EQUIPMENT FAILURE	13,604
1/1/2018	Glencoe - Somerton	7:01 AM	69	RELAY MIS-OPERATION	447
1/2/2018	Millbrook Park - Pedro Sw.	5:20 AM	69	EQUIPMENT FAILURE	362
1/3/2018	College Corner-Hutchings	1:03 PM	138	EQUIPMENT FAILURE	102
1/10/2018	Delaware - Park	8:54 AM	69	ERROR - FIELD	71
1/10/2018	Lincoln - Park	8:54 AM	69	ERROR - FIELD	71
1/11/2018	Muskingum River - West Cambridge	4:36 PM	138	EQUIPMENT FAILURE	1,316
1/23/2018	Berlin - Sugarcreek Terminal	12:28 AM	69	EQUIPMENT FAILURE	2,126
1/23/2018	Hemlock - Ravenswood	12:38 AM	69	EQUIPMENT FAILURE	114
1/25/2018	Elliott - Lee	2:55 PM	69	ERROR - FIELD	10
1/28/2018	Harpster - North Waldo	9:51 AM	69	EQUIPMENT FAILURE	369
2/7/2018	Crooksville - New Lexington	5:55 AM	69	WEATHER - ICE/SNOW	3,103
2/7/2018	East Logan - New Lexington	6:56 AM	69	TREE OUT OF ROW	2,086
2/7/2018	Speidel - Summerfield	9:43 AM	69	WEATHER - ICE/SNOW	421
2/7/2018	Glencoe - Speidel	11:10 AM	69	TREE OUT OF ROW	1,774
2/7/2018	East Logan - New Lexington	3:17 PM	69	TREE OUT OF ROW	272
2/25/2018	Coopermill - South Fultonham	3:49 AM	69	WEATHER - LIGHTNING	2,374
2/25/2018	Carrothers - Greenlawn	7:08 AM	69	TREE OUT OF ROW	233
2/27/2018	Clark - Strouds Run	3:59 AM	69	WEATHER - FLOOD/SLIDE	19,119
3/13/2018	Huntley - Linworth	9:58 AM	138	ERROR - FIELD	58
3/19/2018	Schroyer Avenue - Timken Mercy	9:16 PM	69	EQUIPMENT FAILURE	254
3/19/2018	Cherry Avenue - Schroyer Avenue	9:16 PM	69	EQUIPMENT FAILURE	236
3/29/2018	East Broad Street - Kirk No. 2	12:11 PM	138	TREE INSIDE ROW	443
4/3/2018	Beatty Road - McComb	5:36 PM	138	WEATHER - TORNADO	9,738

Ohio Power Company
Rule 10 Report for 2018

5a. 4901:1-10-10(C)(2): Transmission Outages

Outage Start Date	Transmission Circuit Impacted	Outage Start Time	Circuit kV	Outage Cause	Outage Length (minutes)
4/3/2018	Beatty Road - White Road	5:36 PM	138	WEATHER - TORNADO	9,706
4/3/2018	Central Portsmouth - North Portsmouth	7:45 PM	69	WEATHER - FLOOD/SLIDE	74,747
4/7/2018	Baltimore - East Lancaster	1:12 PM	69	TREE REMOVAL (NON AEP)	414
4/12/2018	Haviland - Payne	4:00 PM	69	EQUIPMENT FAILURE	1,260
4/16/2018	East Logan - New Lexington	3:38 PM	69	TREE INSIDE ROW	25
4/16/2018	East Logan - New Lexington	5:30 PM	69	TREE INSIDE ROW	385
4/18/2018	Hess Street - Wilson Road	10:35 AM	138	ERROR - FIELD	130
5/2/2018	Hammondsville - South Toronto	9:47 AM	69	EQUIPMENT FAILURE	14,640
5/14/2018	North Newark - West Granville	1:12 PM	69	WEATHER - LIGHTNING	524
5/19/2018	Kaiser Junction Sw. - Newark - Newark Center	1:06 PM	69	TREE OUT OF ROW	4,502
5/21/2018	Lexington - North Bellville - North Liberty Switch	8:50 PM	69	TREE OUT OF ROW	4,127
5/23/2018	Hammondsville - South Toronto	12:31 PM	69	TREE OUT OF ROW	1,640
5/27/2018	Buckskin - Highland (CSP)	6:24 PM	69	EQUIPMENT FAILURE	1,574
5/30/2018	East Cambridge - West Cambridge	7:25 PM	69	TREE OUT OF ROW	1,110
5/31/2018	Seaman - Sardinia	4:38 PM	69	TREE OUT OF ROW	277
6/25/2018	East Beaver - North Portsmouth	1:06 PM	69	TREE OUT OF ROW	1,299
6/27/2018	Crooksville - New Lexington	1:27 PM	69	ERROR - OPERATIONS	63
7/1/2018	Argentum - Millbrook Park - North Haverhill	4:54 PM	69	TREE OUT OF ROW	1,590
7/2/2018	Crooksville - New Lexington	1:11 PM	69	ERROR - FIELD	40
7/20/2018	Glencoe - Robyville	6:37 AM	69	EQUIPMENT FAILURE	63
7/20/2018	Dillonvale - Robyville - South Cadiz	6:37 AM	69	EQUIPMENT FAILURE	474

Ohio Power Company
Rule 10 Report for 2018

5a. 4901:1-10-10(C)(2): Transmission Outages

Outage Start Date	Transmission Circuit Impacted	Outage Start Time	Circuit kV	Outage Cause	Outage Length (minutes)
7/27/2018	Mount Vernon - Pittsburgh Avenue	12:33 AM	69	EQUIPMENT FAILURE	182
7/27/2018	Pittsburgh Avenue - West Mount Vernon	12:33 AM	69	EQUIPMENT FAILURE	747
8/6/2018	George Washington - West Bellaire	11:14 AM	69	EQUIPMENT FAILURE	391
8/26/2018	Harpster - Upper Sandusky	5:40 AM	69	WEATHER - LIGHTNING	265
8/26/2018	Forest - Upper Sandusky	5:40 AM	69	WEATHER - LIGHTNING	231
8/26/2018	Bucyrus Center - Upper Sandusky	5:40 AM	69	WEATHER - LIGHTNING	266
8/26/2018	South Berwick-Upper Sandusky	5:40 AM	69	WEATHER - LIGHTNING	66,645
9/1/2018	Mount Sterling - South Fultonham	1:06 AM	69	TREE OUT OF ROW	808
9/8/2018	Lexington - North Bellville - North Liberty Switch	9:21 AM	69	TREE INSIDE ROW	7,622
9/9/2018	Martin's Ferry - Tiltonsville - Warwood	7:13 PM	69	TREE OUT OF ROW	5,048
9/9/2018	Bellefonte - South Point No. 2	11:37 PM	69	TREE OUT OF ROW	1,097
9/21/2018	Bucyrus - Howard # 2	9:18 AM	69	EQUIPMENT FAILURE	339
9/25/2018	Newcomerstown - South Coshocton	3:05 AM	138	TREE OUT OF ROW	141
9/25/2018	Newcomerstown - West Cambridge	3:05 AM	138	TREE OUT OF ROW	142
9/25/2018	Newcomerstown - West New Philadelphia	3:05 AM	138	TREE OUT OF ROW	142
9/25/2018	Broom Road - Newcomerstown	3:05 AM	69	TREE OUT OF ROW	87
9/25/2018	Newcomerstown - Newport	3:05 AM	69	TREE OUT OF ROW	151
10/4/2018	Harrison - Madison	5:45 PM	69	EQUIPMENT FAILURE	336
10/5/2018	Haviland - Paulding	1:34 PM	69	EQUIPMENT FAILURE	464
10/5/2018	Mark Center - North Hicksville	1:34 PM	69	EQUIPMENT FAILURE	17

Ohio Power Company
Rule 10 Report for 2018

5a. 4901:1-10-10(C)(2): Transmission Outages

Outage Start Date	Transmission Circuit Impacted	Outage Start Time	Circuit kV	Outage Cause	Outage Length (minutes)
10/5/2018	Mark Center - Paulding	1:34 PM	69	EQUIPMENT FAILURE	122
10/5/2018	Continental - Mark Center Switch	1:34 PM	69	EQUIPMENT FAILURE	17
10/9/2018	Carrothers - Greenlawn	7:45 PM	69	EQUIPMENT FAILURE	321
10/15/2018	Gorsuch - Mill Creek	11:56 AM	138	ERROR - FIELD	66
10/19/2018	West Millersburg - Wooster	12:05 PM	138	TREE INSIDE ROW	545
10/21/2018	East Lancaster - Ralston - West Lancaster	12:02 AM	69	EQUIPMENT FAILURE	2,255
10/26/2018	Seaman - Stuart	6:08 PM	69	ANIMAL - BIRD	400
10/27/2018	Lancaster - South Lancaster	10:43 AM	69	EQUIPMENT FAILURE	1,419
10/27/2018	Anchor Hocking - Lancaster	10:43 AM	69	EQUIPMENT FAILURE	371
10/27/2018	East Lancaster - Lancaster - South Lancaster 69kV	10:43 AM	69	EQUIPMENT FAILURE	193
11/16/2018	Glencoe - Speidel	4:07 AM	69	WEATHER - ICE/SNOW	859
11/16/2018	Hammondsville - South Toronto	10:23 AM	69	WEATHER - ICE/SNOW	1,864
12/6/2018	Fort Steuben - South Toronto	10:27 AM	69	UNKNOWN (NON WEATHER)	406
12/21/2018	Muskingum River - West Cambridge	6:46 PM	138	WEATHER - LIGHTNING	9,973
12/27/2018	South Berwick-South Tiffin	8:41 PM	69	EQUIPMENT FAILURE	923

Notes: Excludes Major Event Outages. Transmission outages reported in this table are from the Distribution Reporting System. This data reflects distribution customers affected by Transmission Outages. Transmission outages reported in Rule 27 (C) are from the Transmission Outage Reporting System. That system is based on Transmission circuits and does not reflect Distribution circuits. As such, the Distribution Outage Reporting System does reflect Transmission circuit information. Therefore data variances will exist between data shown in this table and that of Table 6c and in that of Rule 27(C).

Ohio Power Company
Rule 10 Report for 2018

5b. 4901:1-10-10(C)(2): Distribution Circuits Impacted by Transmission Outages

Outage Start Date	CI per Outage	CMI per Outage	# of Impacted Circuits	IDs for Impacted Circuits	CI per Circuit	CMI per Circuit
1/1/2018	3,005	756,935	3	0030472	870	306,450
1/1/2018	3,005	756,935	3	0033671	1,414	298,354
1/1/2018	3,005	756,935	3	0033672	721	152,131
1/1/2018	6,128	1,305,264	6	7500701	457	97,341
1/1/2018	6,128	1,305,264	6	7500702	530	112,890
1/1/2018	6,128	1,305,264	6	7501702	1,341	285,633
1/1/2018	6,128	1,305,264	6	7503101	655	139,515
1/1/2018	6,128	1,305,264	6	7507101	1,923	409,599
1/1/2018	6,128	1,305,264	6	7517001	1,222	260,286
1/2/2018	912	80,712	1	0013401	912	80,712
1/3/2018	763	77,826	1	0030472	763	77,826
1/10/2018	6,443	457,453	5	0021701	10	710
1/10/2018	6,443	457,453	5	0021702	1,218	86,478
1/10/2018	6,443	457,453	5	0021801	888	63,048
1/10/2018	6,443	457,453	5	0021802	2,168	153,928
1/10/2018	6,443	457,453	5	0021803	2,159	153,289
1/11/2018	1,392	300,922	2	7421501	721	159,341
1/11/2018	1,392	300,922	2	7421502	671	141,581
1/23/2018	486	328,536	1	7129001	486	328,536
1/23/2018	4,530	1,860,829	3	0012902	910	103,740

Ohio Power Company
Rule 10 Report for 2018

5b. 4901:1-10-10(C)(2): Distribution Circuits Impacted by Transmission Outages

Outage Start Date	CI per Outage	CMI per Outage	# of Impacted Circuits	IDs for Impacted Circuits	CI per Circuit	CMI per Circuit
1/23/2018	4,530	1,860,829	3	0013102	2,231	1,082,035
1/23/2018	4,530	1,860,829	3	0013101	1,389	675,054
1/25/2018	2,020	20,200	2	0011001	1,167	11,670
1/25/2018	2,020	20,200	2	0011002	853	8,530
1/28/2018	482	80,494	2	7232001	1	167
1/28/2018	482	80,494	2	7234501	481	80,327
2/7/2018	4,581	1,767,573	4	7400501	1,554	637,140
2/7/2018	4,581	1,767,573	4	7400502	1,140	461,700
2/7/2018	4,581	1,767,573	4	7400503	942	399,408
2/7/2018	4,581	1,767,573	4	7412301	945	269,325
2/7/2018	2,298	1,372,047	2	7401203	1,124	815,571
2/7/2018	2,298	1,372,047	2	7401204	1,174	556,476
2/7/2018	3,816	926,835	4	7501502	1,203	312,780
2/7/2018	3,816	926,835	4	7501504	984	231,240
2/7/2018	3,816	926,835	4	7501505	1,020	239,700
2/7/2018	3,816	926,835	4	7515401	609	143,115
2/7/2018	2,237	662,037	2	7361902	885	390,285
2/7/2018	2,237	662,037	2	7361903	676	264,992
2/7/2018	2,237	662,037	2	7361903	676	6,760
2/7/2018	2,081	729,308	2	7401203	907	330,148

Ohio Power Company
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5b. 4901:1-10-10(C)(2): Distribution Circuits Impacted by Transmission Outages

Outage Start Date	CI per Outage	CMI per Outage	# of Impacted Circuits	IDs for Impacted Circuits	CI per Circuit	CMI per Circuit
2/7/2018	2,081	729,308	2	7401204	1,174	399,160
2/25/2018	2,063	90,772	2	7427201	1,678	73,832
2/25/2018	2,063	90,772	2	7427202	385	16,940
2/25/2018	937	79,645	2	7200401	776	65,960
2/25/2018	937	79,645	2	7227501	161	13,685
2/27/2018	1,620	401,076	2	0003501	2	506
2/27/2018	1,620	401,076	2	0022906	1,618	400,570
3/13/2018	12,336	715,488	8	0004801	2,050	118,900
3/13/2018	12,336	715,488	8	0004802	1,259	73,022
3/13/2018	12,336	715,488	8	0004803	2,459	142,622
3/13/2018	12,336	715,488	8	0004804	932	54,056
3/13/2018	12,336	715,488	8	0004805	2,144	124,352
3/13/2018	12,336	715,488	8	0004806	1,395	80,910
3/13/2018	12,336	715,488	8	0004807	1,747	101,326
3/13/2018	12,336	715,488	8	0004808	350	20,300
3/19/2018	2,585	672,412	4	7116401	1,912	497,120
3/19/2018	2,585	672,412	4	7116402	518	134,680
3/19/2018	2,585	672,412	4	7116403	154	40,348
3/19/2018	2,585	672,412	4	7116404	1	264
3/29/2018	6,092	113,968	6	0004532	788	11,032

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5b. 4901:1-10-10(C)(2): Distribution Circuits Impacted by Transmission Outages

Outage Start Date	CI per Outage	CMI per Outage	# of Impacted Circuits	IDs for Impacted Circuits	CI per Circuit	CMI per Circuit
3/29/2018	6,092	113,968	6	0009731	1	463
3/29/2018	6,092	113,968	6	0009732	3,428	71,988
3/29/2018	6,092	113,968	6	0009733	821	11,494
3/29/2018	6,092	113,968	6	0026032	449	6,286
3/29/2018	6,092	113,968	6	7413802	605	12,705
4/3/2018	9,138	5,966,908	6	0027301	1,562	698,214
4/3/2018	9,138	5,966,908	6	0027302	2,589	2,142,524
4/3/2018	9,138	5,966,908	6	0027303	425	205,335
4/3/2018	9,138	5,966,908	6	0027304	516	245,100
4/3/2018	9,138	5,966,908	6	0007402	2,358	1,313,894
4/3/2018	9,138	5,966,908	6	0007407	1,688	1,361,841
4/3/2018	2,890	329,545	4	0016101	259	33,670
4/3/2018	2,890	329,545	4	0016102	211	27,430
4/3/2018	2,890	329,545	4	7432601	905	71,495
4/3/2018	2,890	329,545	4	7432602	1,515	196,950
4/7/2018	1,524	259,080	2	7400201	924	157,080
4/7/2018	1,524	259,080	2	7400202	600	102,000
4/12/2018	395	18,565	2	7206801	238	11,186
4/12/2018	395	18,565	2	7206802	157	7,379
4/16/2018	2,326	773,756	2	7401203	1,130	383,860

3/28/2019

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Outage Start Date	CI per Outage	CMI per Outage	# of Impacted Circuits	IDs for Impacted Circuits	CI per Circuit	CMI per Circuit
4/16/2018	2,326	773,756	2	7401204	1,196	389,896
4/18/2018	9,478	888,109	6	0005403	722	54,150
4/18/2018	9,478	888,109	6	0005404	769	52,292
4/18/2018	9,478	888,109	6	0005406	2,263	165,199
4/18/2018	9,478	888,109	6	0005407	1,803	122,604
4/18/2018	9,478	888,109	6	0005416	2,719	195,768
4/18/2018	9,478	888,109	6	0005418	1,202	298,096
5/2/2018	338	173,351	2	7503701	43	22,016
5/2/2018	338	173,351	2	7503702	295	151,335
5/14/2018	4,379	786,119	3	7423301	2,268	360,612
5/14/2018	4,379	786,119	3	7423302	862	159,470
5/14/2018	4,379	786,119	3	7423303	1,249	266,037
5/19/2018	4,676	785,422	4	7418801	900	140,400
5/19/2018	4,676	785,422	4	7418802	879	137,124
5/19/2018	4,676	785,422	4	7418803	1,974	345,450
5/19/2018	4,676	785,422	4	7418804	923	162,448
5/21/2018	2,951	863,413	3	7403801	875	188,125
5/21/2018	2,951	863,413	3	7403802	267	72,891
5/21/2018	2,951	863,413	3	7408501	1,809	602,397
5/23/2018	338	71,994	2	7503701	43	9,159

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5b. 4901:1-10-10(C)(2): Distribution Circuits Impacted by Transmission Outages

Outage Start Date	CI per Outage	CMI per Outage	# of Impacted Circuits	IDs for Impacted Circuits	CI per Circuit	CMI per Circuit
5/23/2018	338	71,994	2	7503702	295	62,835
5/27/2018	182	80,300	1	0015403	182	80,300
5/30/2018	1,061	105,023	2	7408301	739	80,551
5/30/2018	1,061	105,023	2	7423201	322	24,472
5/31/2018	1,285	365,847	2	0015501	378	107,352
5/31/2018	1,285	365,847	2	0015502	907	258,495
6/25/2018	1,693	375,577	2	7427101	802	164,410
6/25/2018	1,693	375,577	2	7427102	891	211,167
6/27/2018	2,192	208,169	4	7400901	326	27,058
6/27/2018	2,192	208,169	4	7400902	292	24,236
6/27/2018	2,192	208,169	4	7400903	677	55,514
6/27/2018	2,192	208,169	4	7400904	897	101,361
7/1/2018	1,248	454,272	1	7422501	1,248	454,272
7/2/2018	2,193	142,289	4	7400901	326	17,604
7/2/2018	2,193	142,289	4	7400902	291	15,423
7/2/2018	2,193	142,289	4	7400903	678	58,974
7/2/2018	2,193	142,289	4	7400904	898	50,288
7/20/2018	978	61,614	2	7500701	456	28,728
7/20/2018	978	61,614	2	7500702	522	32,886
7/27/2018	2,584	472,872	3	7420401	1,131	206,973

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5b. 4901:1-10-10(C)(2): Distribution Circuits Impacted by Transmission Outages

Outage Start Date	CI per Outage	CMI per Outage	# of Impacted Circuits	IDs for Impacted Circuits	CI per Circuit	CMI per Circuit
7/27/2018	2,584	472,872	3	7420402	179	32,757
7/27/2018	2,584	472,872	3	7420403	1,274	233,142
8/6/2018	23	5,911	1	7511004	23	5,911
8/26/2018	3,912	952,983	3	7201701	1,113	270,459
8/26/2018	3,912	952,983	3	7201702	1,722	421,890
8/26/2018	3,912	952,983	3	7201705	1,077	260,634
9/1/2018	1,253	436,044	1	7416101	1,253	436,044
9/8/2018	3,093	314,805	3	7403801	994	67,592
9/8/2018	3,093	314,805	3	7403802	266	18,088
9/8/2018	3,093	314,805	3	7408501	1,833	229,125
9/9/2018	324	559,548	1	7500402	324	559,548
9/9/2018	769	130,851	2	7411601	553	94,563
9/9/2018	769	130,851	2	7411602	216	36,288
9/21/2018	1,732	196,769	3	7200306	62	8,059
9/21/2018	1,732	196,769	3	7233401	833	94,129
9/21/2018	1,732	196,769	3	7233402	837	94,581
9/25/2018	2,904	431,107	5	7105602	1,116	186,372
9/25/2018	2,904	431,107	5	7105604	53	8,798
9/25/2018	2,904	431,107	5	7105901	387	58,437
9/25/2018	2,904	431,107	5	7105902	941	142,091

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5b. 4901:1-10-10(C)(2): Distribution Circuits Impacted by Transmission Outages

Outage Start Date	CI per Outage	CMI per Outage	# of Impacted Circuits	IDs for Impacted Circuits	CI per Circuit	CMI per Circuit
9/25/2018	2,904	431,107	5	7405601	407	35,409
10/4/2018	3,545	437,874	3	0000801	530	129,320
10/4/2018	3,545	437,874	3	0000802	913	199,947
10/4/2018	3,545	437,874	3	0000801	530	31,270
10/4/2018	3,545	437,874	3	0000802	913	52,954
10/4/2018	3,545	437,874	3	0007406	659	24,383
10/5/2018	4,212	302,068	6	7207101	648	9,720
10/5/2018	4,212	302,068	6	7207102	565	8,475
10/5/2018	4,212	302,068	6	7207401	592	10,064
10/5/2018	4,212	302,068	6	7207402	189	3,213
10/5/2018	4,212	302,068	6	7226201	1,607	196,054
10/5/2018	4,212	302,068	6	7226203	611	74,542
10/9/2018	917	101,787	2	7200401	772	85,692
10/9/2018	917	101,787	2	7227501	145	16,095
10/15/2018	8,012	681,020	16	0030971	135	11,475
10/15/2018	8,012	681,020	16	0030972	224	19,040
10/15/2018	8,012	681,020	16	0031271	629	53,465
10/15/2018	8,012	681,020	16	0031272	433	36,805
10/15/2018	8,012	681,020	16	0031372	5	425
10/15/2018	8,012	681,020	16	0031373	317	26,945

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5b. 4901:1-10-10(C)(2): Distribution Circuits Impacted by Transmission Outages

Outage Start Date	CI per Outage	CMI per Outage	# of Impacted Circuits	IDs for Impacted Circuits	CI per Circuit	CMI per Circuit
10/15/2018	8,012	681,020	16	0031671	116	9,860
10/15/2018	8,012	681,020	16	0031672	543	46,155
10/15/2018	8,012	681,020	16	0031673	1,057	89,845
10/15/2018	8,012	681,020	16	0031674	1,359	115,515
10/15/2018	8,012	681,020	16	0031675	1,237	105,145
10/15/2018	8,012	681,020	16	0031676	1,629	138,465
10/15/2018	8,012	681,020	16	0031687	1	85
10/15/2018	8,012	681,020	16	0031699	1	85
10/15/2018	8,012	681,020	16	0031771	266	22,610
10/15/2018	8,012	681,020	16	0031774	60	5,100
10/19/2018	1,302	365,862	1	7124601	1,302	365,862
10/21/2018	5,914	1,048,387	4	7415701	1,687	298,599
10/21/2018	5,914	1,048,387	4	7415702	1,792	320,768
10/21/2018	5,914	1,048,387	4	7415703	1,945	346,210
10/21/2018	5,914	1,048,387	4	7415704	490	82,810
10/26/2018	5,070	1,697,326	7	0010701	583	212,212
10/26/2018	5,070	1,697,326	7	0010703	1,089	396,396
10/26/2018	5,070	1,697,326	7	0011101	34	9,928
10/26/2018	5,070	1,697,326	7	0011102	1,016	296,672
10/26/2018	5,070	1,697,326	7	0011103	994	290,248

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5b. 4901:1-10-10(C)(2): Distribution Circuits Impacted by Transmission Outages

Outage Start Date	CI per Outage	CMI per Outage	# of Impacted Circuits	IDs for Impacted Circuits	CI per Circuit	CMI per Circuit
10/26/2018	5,070	1,697,326	7	0017701	483	182,665
10/26/2018	5,070	1,697,326	7	0017702	871	309,205
10/27/2018	4,396	963,640	6	7401501	851	187,220
10/27/2018	4,396	963,640	6	7401502	1,914	422,994
10/27/2018	4,396	963,640	6	7401504	764	165,788
10/27/2018	4,396	963,640	6	7401505	409	89,162
10/27/2018	4,396	963,640	6	7401506	3	651
10/27/2018	4,396	963,640	6	7401507	455	97,825
11/16/2018	1,573	520,377	2	7361902	891	375,111
11/16/2018	1,573	520,377	2	7361903	682	145,266
11/16/2018	333	106,227	2	7503701	43	13,717
11/16/2018	333	106,227	2	7503702	290	92,510
12/6/2018	2,812	354,080	3	7507701	222	27,972
12/6/2018	2,812	354,080	3	7507702	2,331	293,706
12/6/2018	2,812	354,080	3	7507703	259	32,402
12/21/2018	1,389	219,462	2	7421501	718	113,444
12/21/2018	1,389	219,462	2	7421502	671	106,018
12/27/2018	1,118	60,372	3	7201201	720	38,880
12/27/2018	1,118	60,372	3	7201202	395	21,330
12/27/2018	1,118	60,372	3	7201203	3	162

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5b. 4901:1-10-10(C)(2): Distribution Circuits Impacted by Transmission Outages

Outage Start Date	CI per Outage	CMI per Outage	# of Impacted Circuits	IDs for Impacted Circuits	CI per Circuit	CMI per Circuit

Notes: Excludes Major Event Outages

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5c. 4901:1-10-10(C)(2): Index values during transmission outages

Outage start date	CAIDI during outage	SAIFI during outage
1/1/2018	252.0000	0.0020
1/1/2018	213.0000	0.0010
1/1/2018	213.0000	0.0030
1/2/2018	89.0000	0.0010
1/3/2018	102.0000	0.0010
1/10/2018	71.0000	0.0040
1/11/2018	216.0000	0.0010
1/11/2018	964.0000	0.0000
1/23/2018	676.0000	0.0000
1/23/2018	411.0000	0.0030
1/25/2018	10.0000	0.0010
1/26/2018	339.0000	0.0000
1/28/2018	167.0000	0.0000
1/30/2018	43.0000	0.0010
1/31/2018	16.0000	0.0000
2/7/2018	386.0000	0.0030
2/7/2018	597.0000	0.0020
2/7/2018	243.0000	0.0030
2/7/2018	296.0000	0.0020
2/7/2018	350.0000	0.0010
2/9/2018	447.0000	0.0010
2/16/2018	190.0000	0.0000
2/25/2018	44.0000	0.0010
2/25/2018	85.0000	0.0010
2/26/2018	92.0000	0.0000
2/27/2018	248.0000	0.0010
3/3/2018	110.0000	0.0000
3/13/2018	58.0000	0.0080
3/19/2018	260.0000	0.0020

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5c. 4901:1-10-10(C)(2): Index values during transmission outages

Outage start date	CAIDI during outage	SAIFI during outage
3/22/2018	253.0000	0.0010
3/29/2018	19.0000	0.0040
3/31/2018	141.0000	0.0000
4/2/2018	105.0000	0.0000
4/3/2018	653.0000	0.0060
4/3/2018	114.0000	0.0020
4/7/2018	170.0000	0.0010
4/12/2018	47.0000	0.0000
4/12/2018	24.0000	0.0020
4/16/2018	333.0000	0.0020
4/16/2018	94.0000	0.0060
4/22/2018	212.0000	0.0000
4/22/2018	129.0000	0.0010
4/26/2018	87.0000	0.0000
4/27/2018	246.0000	0.0000
4/29/2018	466.0000	0.0010
5/1/2018	27.0000	0.0000
5/2/2018	513.0000	0.0000
5/3/2018	7.0000	0.0010
5/4/2018	93.0000	0.0000
5/12/2018	364.0000	0.0000
5/14/2018	180.0000	0.0030
5/15/2018	307.0000	0.0000
5/16/2018	318.0000	0.0050
5/16/2018	21.0000	0.0000
5/19/2018	168.0000	0.0030
5/21/2018	293.0000	0.0020
5/22/2018	140.0000	0.0010
5/22/2018	247.0000	0.0010

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5c. 4901:1-10-10(C)(2): Index values during transmission outages

Outage start date	CAIDI during outage	SAIFI during outage
5/23/2018	213.0000	0.0000
5/24/2018	126.0000	0.0020
5/27/2018	7.0000	0.0060
5/27/2018	113.0000	0.0060
5/27/2018	219.0000	0.0010
5/27/2018	441.0000	0.0000
5/27/2018	13.0000	0.0010
5/28/2018	264.0000	0.0000
5/29/2018	7.0000	0.0000
5/30/2018	99.0000	0.0010
5/31/2018	285.0000	0.0010
6/5/2018	198.0000	0.0010
6/7/2018	227.0000	0.0000
6/7/2018	273.0000	0.0000
6/8/2018	115.0000	0.0010
6/10/2018	174.0000	0.0010
6/10/2018	258.0000	0.0000
6/11/2018	770.0000	0.0000
6/19/2018	30.0000	0.0000
6/23/2018	83.0000	0.0000
6/25/2018	222.0000	0.0010
6/27/2018	95.0000	0.0010
6/27/2018	148.0000	0.0010
6/28/2018	38.0000	0.0010
7/1/2018	364.0000	0.0010
7/2/2018	28.0000	0.0020
7/2/2018	65.0000	0.0010
7/4/2018	205.0000	0.0000
7/8/2018	604.0000	0.0000

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5c. 4901:1-10-10(C)(2): Index values during transmission outages

Outage start date	CAIDI during outage	SAIFI during outage
7/8/2018	216.0000	0.0000
7/10/2018	370.0000	0.0010
7/12/2018	376.0000	0.0010
7/12/2018	176.0000	0.0000
7/15/2018	633.0000	0.0010
7/20/2018	63.0000	0.0010
7/27/2018	183.0000	0.0020
8/1/2018	86.0000	0.0000
8/2/2018	135.0000	0.0000
8/6/2018	257.0000	0.0000
8/13/2018	284.0000	0.0030
8/15/2018	130.0000	0.0000
8/15/2018	96.0000	0.0000
8/26/2018	244.0000	0.0030
9/1/2018	348.0000	0.0010
9/2/2018	119.0000	0.0010
9/4/2018	19.0000	0.0060
9/6/2018	16.0000	0.0010
9/6/2018	16.0000	0.0010
9/6/2018	147.0000	0.0010
9/6/2018	113.0000	0.0000
9/7/2018	97.0000	0.0000
9/7/2018	505.0000	0.0010
9/8/2018	102.0000	0.0020
9/9/2018	1,727.0000	0.0000
9/9/2018	170.0000	0.0010
9/10/2018	65.0000	0.0010
9/10/2018	74.0000	0.0020
9/11/2018	325.0000	0.0000

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5c. 4901:1-10-10(C)(2): Index values during transmission outages

Outage start date	CAIDI during outage	SAIFI during outage
9/12/2018	31.0000	0.0000
9/15/2018	115.0000	0.0020
9/21/2018	114.0000	0.0010
9/21/2018	27.0000	0.0020
9/23/2018	102.0000	0.0010
9/25/2018	148.0000	0.0020
9/25/2018	130.0000	0.0000
9/27/2018	369.0000	0.0000
10/4/2018	228.0000	0.0010
10/5/2018	52.0000	0.0010
10/5/2018	72.0000	0.0030
10/9/2018	111.0000	0.0010
10/14/2018	198.0000	0.0010
10/15/2018	85.0000	0.0050
10/19/2018	281.0000	0.0010
10/21/2018	177.0000	0.0040
10/25/2018	141.0000	0.0010
10/26/2018	335.0000	0.0030
10/27/2018	219.0000	0.0030
11/7/2018	285.0000	0.0000
11/7/2018	74.0000	0.0000
11/12/2018	325.0000	0.0010
11/16/2018	331.0000	0.0010
11/16/2018	310.0000	0.0010
11/16/2018	319.0000	0.0000
11/18/2018	114.0000	0.0020
11/24/2018	99.0000	0.0010
11/29/2018	375.0000	0.0010
12/6/2018	126.0000	0.0020

Ohio Power Company
Rule 10 Report for 2018

5c. 4901:1-10-10(C)(2): Index values during transmission outages

Outage start date	CAIDI during outage	SAIFI during outage
12/13/2018	190.0000	0.0020
12/15/2018	309.0000	0.0010
12/18/2018	210.0000	0.0000
12/18/2018	82.0000	0.0000
12/21/2018	158.0000	0.0010
12/27/2018	54.0000	0.0010

Notes: Excludes Major Event Outages

Ohio Power Company
Rule 10 Report for 2018

6a. 4901:1-10-10(C)(3)(a): Data excluding major events and transmission outages

Outage Cause	Events	Customers Interrupted	Customers Minutes Interrupted
Accidental Ground	196	35,693	1,925,083
Animal/Bird	3,976	132,602	13,911,848
Blast/Explosion/Fire	3	13	1,119
Contamination/Flashover	1	1	125
Corrosion	170	854	111,765
Customer Equipment	81	974	66,070
Distribution Source	30	15,356	2,868,364
Equipment Hardware Failure	9,573	558,385	75,964,835
Facilitation of Work	210	32,234	1,279,813
Fire/Police	92	5,085	366,992
Flooding/Slide	21	3,780	971,006
High Winds	56	9,294	2,512,354
Ice/Sleet/Snow	20	141	31,515
Lightning	762	57,763	9,852,988
Object in Line	105	10,338	875,298
Operations Incident	21	549	22,518
Other	145	48,737	4,981,477
Other Utility	23	3,629	804,088
Overload	129	4,206	585,614
Scheduled/Planned	10,682	152,567	14,215,567
Tree/Vegetation Removal	116	5,569	738,485
Trees Inside RoW	566	21,791	4,257,405
Trees Outside RoW	6,821	389,309	93,424,121

Ohio Power Company
Rule 10 Report for 2018

6a. 4901:1-10-10(C)(3)(a): Data excluding major events and transmission outages

Outage Cause	Events	Customers Interrupted	Customers Minutes Interrupted
UG, Const/Dig-ins	233	11,575	1,775,163
Unbalance	3	4	524
Unknown	3,620	155,931	16,141,344
Unknown By Weather	769	71,379	12,186,218
Vandalism	88	580	59,337
Vehicle Accident/Auto Damage	1,000	191,068	28,591,483
Totals:	**39,512**	**1,919,407**	**288,522,519**

Notes:

Ohio Power Company
Rule 10 Report for 2018

6b. 4901:1-10-10(C)(3)(b): Data for major events only

Outage Cause	Events	Customers Interrupted	Customers Minutes Interrupted
Accidental Ground	2	2	153
Animal/Bird	13	187	12,091
Corrosion	1	1	27
Customer Equipment	1	1	450
Distribution Source	3	1,987	121,207
Equipment Hardware Failure	179	20,080	3,951,454
Facilitation of Work	2	1,077	110,342
Fire/Police	3	13	792
Flooding/Slide	2	119	55,412
High Winds	13	1,251	243,425
Ice/Sleet/Snow	14	238	67,289
Lightning	1	7	5,908
Object in Line	4	66	3,979
Other	18	11,358	4,216,888
Overload	1	12	1,236
Scheduled/Planned	3	1,129	14,837
Tree/Vegetation Removal	2	525	24,683
Trees Inside RoW	54	2,226	670,583
Trees Outside RoW	681	51,903	19,789,921
Unknown	36	2,931	473,383
Unknown By Weather	105	23,621	6,030,702
Vandalism	1	1	297
Vehicle Accident/Auto Damage	7	1,168	192,066

Ohio Power Company
Rule 10 Report for 2018

6c. 4901:1-10-10(C)(3)(c): Data for transmission outages only

Outage Cause	Events	Customers Interrupted	Customers Minutes Interrupted
Accidental Ground	55	47,077	3,227,076
Animal/Bird	12	10,628	3,278,695
Equipment Hardware Failure	105	62,532	12,226,743
Facilitation of Work	7	3,615	166,101
Flooding/Slide	6	4,510	730,621
High Winds	4	660	108,240
Lightning	5	5,068	1,154,127
Operations Incident	8	2,832	328,162
Other	43	32,821	7,387,596
Other Utility	6	1,874	185,696
Scheduled/Planned	53	34,382	4,135,583
Tornado	6	8,827	5,504,566
Tree/Vegetation Removal	5	4,102	1,217,362
Trees Inside RoW	6	5,583	453,062
Trees Outside RoW	32	24,275	5,089,946
Unknown	32	14,497	2,130,117
Unknown By Weather	33	25,186	5,745,037
Vehicle Accident/Auto Damage	7	2,945	810,834
Totals:	**425**	**291,414**	**53,879,564**

Notes: excludes major events

Ohio Power Company
Rule 10 Report for 2018

7. 4901:1-10-10(C)(4): Momentary Interruptions

Total Number =

Notes: Data regarding momentary outages is not available

This foregoing document was electronically filed with the Public Utilities

Commission of Ohio Docketing Information System on

3/29/2019 4:27:10 PM

in

Case No(s). 19-0992-EL-ESS

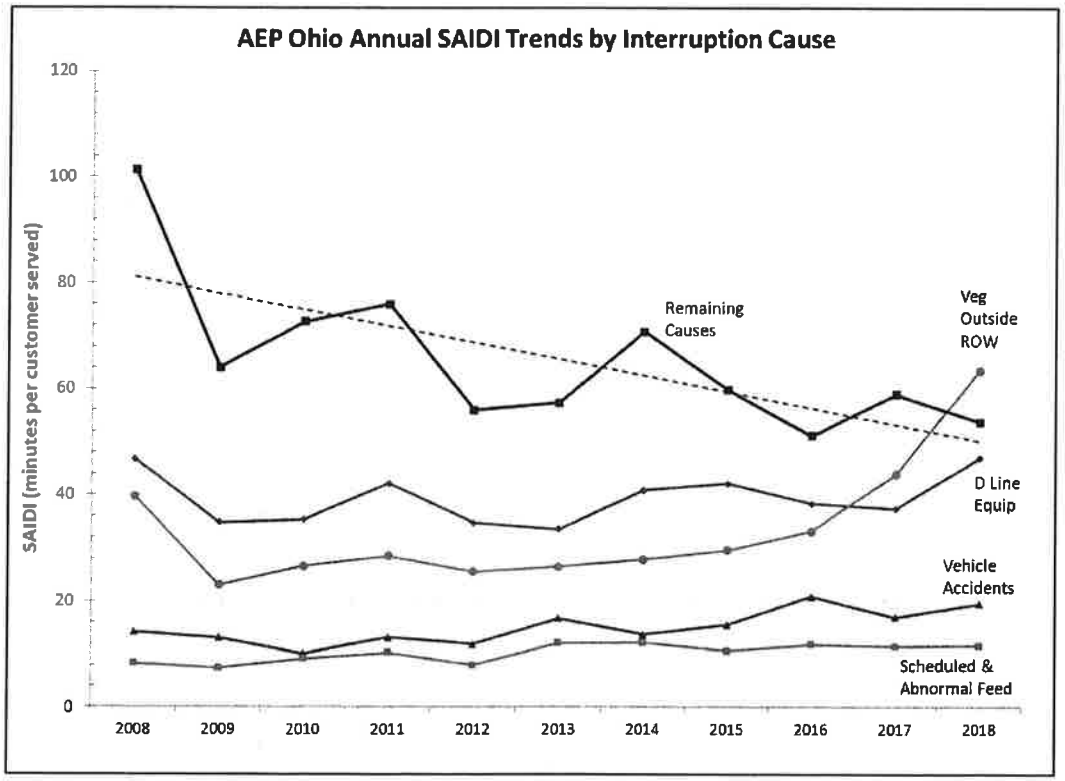
Summary: Report (Rule 10 for 2018) electronically filed by Mr. Steven T Nourse on behalf of Ohio Power Company

AEP OHIO RULE 10 ACTION PLAN

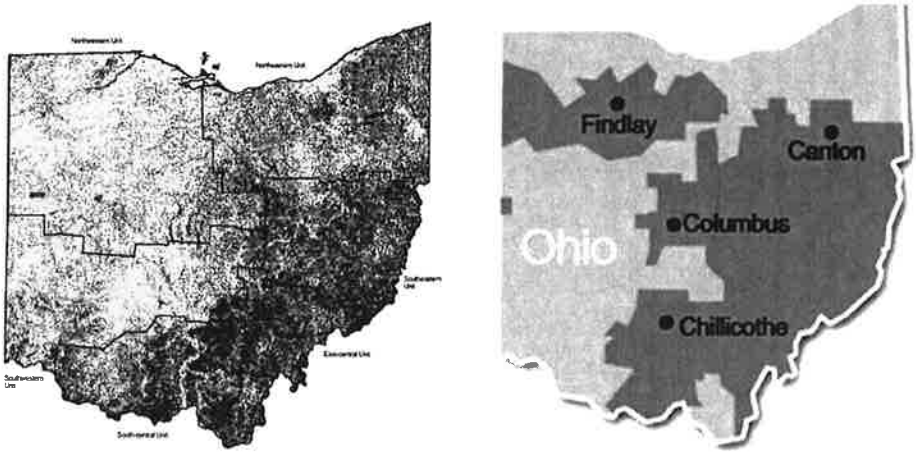
On March 29, 2019, Ohio Power Company (AEP Ohio or The Company) filed the annual Rule 10 Report (Report). As enumerated in the report, AEP Ohio did not meet the 2018 reliability target for CAIDI by 0.88% and for SAIFI by 9%. Based on these metrics, AEP Ohio's customers were in service 99.95% of the time throughout 2018.

While AEP Ohio's performance did not meet the targets established in Case No. 16-1511-EL-ESS, it is important to note that when considering AEP Ohio's total volume of work to improve and maintain reliability, the Company's plan is producing improved reliability impacts. None the less, the Company has experienced trends of increased outage minutes from causes, not completely within the Company's control.

The System Average Interruption Duration Index (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. It can also be calculated as SAIFI multiplied by CAIDI. While SAIDI is not a reliability index reported by the Company, it is another metric to measure performance, reflecting both interruption frequency and duration per event.

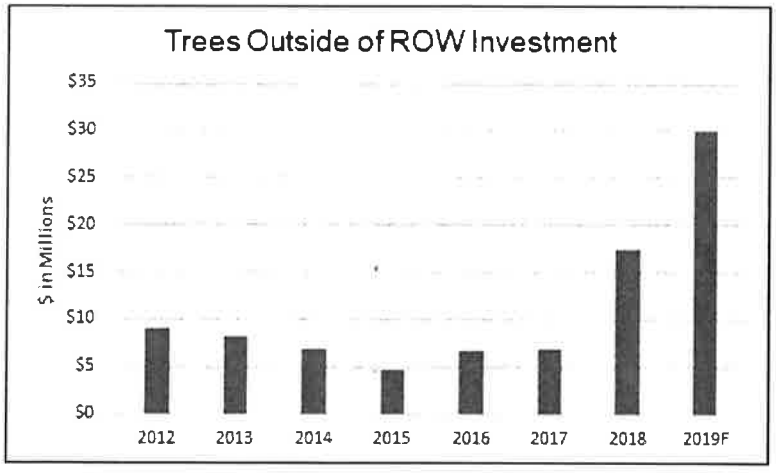


over. AEP Ohio's service territory includes the more mountainous and forested areas of the state. Please refer to the figures below illustrating the forested areas of the state. The green shaded area depicts the forests in Ohio, with significant correlation to the Company's service territory.



The emerald ash borer challenges are contributing to trees falling at an unusual rate. The record rainfall in 2018 was another influence as it created soft soil conditions. In 2015, dead ash trees accounted for approximately 11% of the trees out ROW outages, and in 2017 ash trees accounted for 24% of trees out of ROW outages.

ACTION: The Company significantly increased the priority for addressing the trees outside ROW and increased its budget to $17M for 2018 and $30M for 2019 to fund its trees out of ROW program. The table below demonstrates the increased budget for the trees out of ROW investment.



Upon securing property owners' permission, forestry crews are removing trees that pose a threat to our distribution facilities (danger trees) from outside of our right-of-way. The Company

removed 45,000 danger trees in 2018 and plans to remove more than 100,000 danger trees in 2019.

Vehicle Accidents

In 2018, SAIFI attributed to vehicle accidents was 22% higher than the average of the years considered when establishing the 2018 performance targets. This increased the Company's reported SAIFI by about 0.024, but actually benefited CAIDI. Vehicle accidents have increased SAIDI by about 3 minutes from the 2013 – 2016 average. This increased vehicle accident activity seems to follow the national trend of traffic accidents attributed to distracted driving. While we are working with our communities to help address distracted driving, there are limited actions within AEP Ohio's control to prevent vehicles accidents damaging our equipment.

ACTION: AEP Ohio will continue to work with the communities it serves to educate and raise awareness of the dangers associated with distracted driving. Additionally, the Company will work with Staff to more appropriately reflect Vehicle Accidents in future reliability targets.

Distribution Line Equipment Failure

Distribution line equipment failure was the largest cause contributor to SAIFI and second largest SAIDI contributor in 2018 showing increases from 2017 to 2018 in SAIFI (0.07 interruptions) and SAIDI (9 minutes). This may not be a trend, however, because this cause can vary from year to year and had improved the prior two years. The leading contributors to equipment failure are underground conductor and overhead conductor, connections, and cutouts. AEP Ohio has been utilizing asset programs to combat the perennially high equipment failure cause with relatively small amounts of work (compared to overall system assets).

ACTION: The Company increased its underground residential cable replacement/treatment program in 2018 with 54 miles replaced ($16M) and 48 miles rejuvenated ($3M) and this program will continue in 2019. AEP Ohio will also initiate a Breaker Zone Improvement Program in 2019 that will include robust inspections (including thermography) and repairs to lessen equipment failures.

Scheduled Outages and Abnormal Feeds

As the Company has engaged in system improvements, customers have been subjected to scheduled outages. 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. Outages associated with scheduled distribution line work

(including those impacting customers while they were abnormally fed from alternate sources) accounted for 9% of the annual SAIFI in 2018. There are also outages associated with scheduled work that are not quantifiable. 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 outages for causes that may have cleared under a normal feed condition. The root cause of these now sustained outages is often unknown since facility repair is unnecessary.

ACTION: The Company will work with Staff to more appropriately reflect Scheduled Outages in future reliability targets.

System Storm Hardening

AEP Ohio's asset improvement projects and programs have resulted in the storm hardening of its distribution system. As a result, AEP Ohio has had fewer major events days.

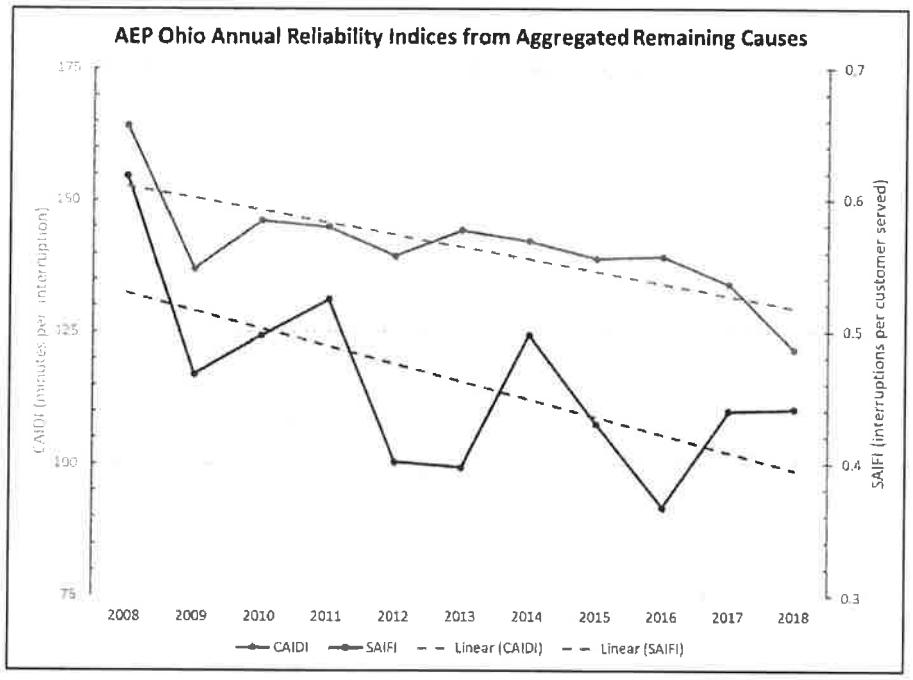
The PUCO uses the IEEE 1366 Standard to determine major event days that will be excluded from the reliability metrics. The Standard defines a major event as "an event that exceeds reasonable design and or operational limits of the electric power system. A major event includes at least one Major Event 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 included in the reported reliability metrics. As the Company makes improvements to the resiliency of the grid, the impact of storms is diminished, which can decrease the number of MEDs. This in turn, can increase the number of days included in the reported reliability indices since similar storm activity no longer results in major event days that are excluded from reporting reliability metrics. This can give 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 Distribution Investment Rider (DIR) programs in 2013. It has averaged 3.6 MEDs during 3.2 events in the past five years.

ACTION: Explore ways to capture the effects of system storm hardening in the Company's future reliability metrics.

Remaining Causes

The Company tracks many other outage causes as shown in Table 6a of its annual Rule 10 report. Reliability trends of the aggregated causes not previously itemized above are shown in the chart below. These causes include animals, distribution station, foreign objects on the line, minor weather (ice, lightning, wind, etc.) underground dig-ins, vegetation inside ROW, and those with unknown cause. Most of these causes are small as individual contributors, but are large when combined. Notable larger contributors are faults within distribution stations and outages for unknown reasons (both during and outside of minor weather events) contributing 19% to SAIFI in 2018.



Note: "Remaining Causes" include all causes in Rule 10, Table 6a except D-Line equipment failure, trees outside ROW, vehicle accidents, and scheduled outages.

ACTION: The reliability measures of the types of outage causes described above have been improving for a number of years based in part by the investment enabled by the Distribution Investment Rider (DIR). AEP Ohio continually reviews its work plans, and will continue its existing programs as the best course of action.

Rule 10 Action Plan Summary

AEP Ohio's Action Plan includes:

- Increase the outside ROW tree removal budget to $30M to remove more than 100,000 danger trees in 2019.
- Breaker Zone Improvement – this program is a holistic approach to assess and repair problems in the worst performing breaker zones. This program should help locate failing distribution line equipment.
- Cutout Replacement Program. AEP Ohio is replacing porcelain cutouts that are cracking and failing because of freeze/thaw cycling with polymer cutouts.
    - While replacing cutouts might require scheduled outages for employee safety, this program will maintain or improve the long-term health of the distribution system.
- Underground (URD) Cable system rehabilitation program. AEP Ohio replaced 54 miles of URD cable during 2018 and plans to replace 48 miles during 2019. Additionally, the Company is "rejuvenating" eligible cable, targeting 67 miles during 2019.
- Smart Grid deployment of DACR. This technology will improve system performance, and limit the number of customers impacted by an outage.
    - Smart Grid programs are in engineering phase and not expected to be commissioned and placed into service before 2020.
- Quarterly indices review. The Company will conduct quarterly reviews of system performance and make adjustments to better align the Company's programs to meet performance targets.
- Review the DIR plan and make appropriate adjustments.

CONCLUSION

The reliability standards are used as tools to identify trends and guard against the potential of system deterioration to make sure that customers are not negatively impacted by interruptions to service and to continue to be proactive and responsive to reliability-impacting causes and trends. The Company submits that its Action Plan is a reasonable and appropriate plan to restore compliance with the reliability targets set in Case No. 16-1511-EL-ESS.

OHIO POWER COMPANY'S RESPONSE TO
THE OFFICE OF THE OHIO CONSUMERS' COUNSEL'S
DISCOVERY REQUEST
PUCO CASE NOS. 17-0038-EL-RDR AND 18-230-EL-RDR
FIRST SET (STIP)

INTERROGATORY

OCC STIP INT-1-035 What is the total number of Equipment/Hardware Failure caused outage events, customers interrupted, and customer minutes interrupted on an annual basis between 2009 and 2018 (excluding major events and transmission outages)?

RESPONSE

The Company objects to the extent the request seeks information which is outside the scope of the case and is neither relevant nor reasonably calculated to lead to the discovery of admissible evidence. Without waiving the foregoing objection or any general objection the Company may have, the Company states as follows. The total number of Equipment/Hardware Failure caused outage events, customers interrupted, and customer minutes interrupted on an annual basis between 2009 and 2018 (excluding major events and transmission outages) is shown in the table below. The Company would like to point out that the data normally contained in its annual "Rule 10" reliability reports summarizes interruptions caused by equipment failure in one category, including both the station and distribution line portions of its delivery system. The data has been split in the table below to better reflect the manner in which construction, maintenance, and restoration activities are normally performed.

	Distribution Line			Distribution Station		
Year	Records	CI	CMI	Records	CI	CMI
2009	8,830	438,717	50,136,333	54	49,075	6,175,481
2010	9,384	431,073	50,974,661	95	75,178	14,559,237
2011	9,959	455,635	60,664,579	89	72,589	10,024,462
2012	8,510	375,072	51,077,878	47	34,872	5,581,526
2013	8,385	395,815	48,348,291	81	62,718	13,384,212
2014	9,133	448,096	59,388,849	97	87,223	14,625,199
2015	9,547	484,009	61,201,971	95	72,391	14,648,697
2016	8,275	447,003	55,935,080	63	60,199	12,527,796
2017	7,917	391,837	54,132,561	121	126,192	19,901,417
2018	9,507	507,255	69,429,450	66	51,130	6,535,385

Prepared by:

Thomas A. Kratt

Ohio Power

Distribution, Station, and Transmission

Rule 4901:1-10-27(E) Programs

Table of Contents

Section A- Distribution Poles

Program Details

The primary objective of AEP Ohio's distribution pole inspection and maintenance program is to maintain the mechanical integrity of its wood pole infrastructure e necessary for the safety of employees and the public under the conditions specified in the NESC and for system r reliability. This objective is accomplished by maintenance treatment to extend the service life of poles, by identifying and mechanically reinforcing weak poles to strengthen them and by identifying and replacing poles that have reached the end of their service life. This program will be performed such that every pole meeting the in service criteria will be inspected and maintained as required on a ten-year cycle based on the initial pole treatment types (i.e., CCA, Penta, and Creosote) for poles in service that were installed 1985 and before (pre-1986) and for Penta and Creosote treated poles in service 15 years and longer.

The majority of AEP Ohio's poles installed during the 1986 through 2003 timeframe were southern yellow pine treated with the wood preservative copper chromate arsenate (CCA). The CCA-treated poles have a projected service life of 60 to 80 years. Poles with treatment other than CCA have an expected service life of 40 to 60 years. However, due to some expressed dissatisfaction with difficulty in climbing, higher incidence of breakage in handling, and some tool and equipment operational savings, it was determined that Penta-treated poles are preferred from a total ownership perspective and have been utilized going forward. Some other pole species types would include Western Red Cedar, Douglas Fir and Western Fir with assorted treatments of Creosote, Penta and Copper Napthenate. AEP Ohio conducts pole and remedial ground-line treatment as required on a 10-year cycle for all poles meeting the in service criteria as mentioned above. The above ground portion of the pole and its attachments are inspected visually and problems such as decayed pole tops and crossarms are noted. However, in a given year, the number of poles in the program may be somewhat greater or less than 10 percent of the total poles in the program depending on the mix of urban, suburban and rural pole locations selected. The electric power industry has not established a recommended inspection cycle schedule for CCA poles because of their superior resistance to decay. However, AEP Ohio continues to monitor early vintage CCA poles for future inspection cycle requirements.

This 10-year cycle program for pole inspection/treatment has proven to adequately maintain the pole assets on an ongoing basis. Shorter or longer inspection cycles have not proven to be warranted or economically justifiable. AEP Ohio's existing pole inspection contractor indicates a 10-year inspection cycle is the average range for pole inspection among US utilities.

Analysis/ Assessment
The contractor who is responsible for pole inspections provides weekly results including information about poles identified for reinforcement or replacement and whether the identified poles need immediate attention. This information is disseminated to the local area office where engineering personnel become involved to prioritize and prepare necessary work orders to take care of any deficiencies noted from the contractor's assessment.

Based on the annual results of the inspection/treatment program regarding the number of poles requiring reinforcement or replacement, the capital budgeting process for the following year is refined to include any changes in the estimated number of poles requiring attention.

The process for reviewing the progress and effectiveness of each program includes a monthly status report that provides inspection units completed. This data is pulled from AEP Ohio's work management system based on job completion dates or from AEP Ohio's work order system based on when facilities were placed in service. Maintaining flexibility within the program to make adjustments enhances the program effectiveness. An example of this would be performing more pole reinforcements versus replacements, as the inspection data results dictate.

Maintenance
The above ground portion of the pole and its attachments are inspected visually and problems such as decayed pole tops and crossarms are noted. Minor work such as repairing broken ground wires and replacing deteriorated guy guards is also included. Replacement of pole location (grid) tags and property ownership tags is performed as needed. When the condition of the above ground portion of the pole is checked to be adequate, then the strength of the wood at the ground line is determined by partial excavation of the pole and by core samples taken from the pole around the ground line. If the pole strength is determined to be adequate, with no internal or external decay present, the pole is reported as satisfactory with no internal treatment applied. If the pole strength is determined to be adequate, with internal or external decay present, the pole would be fully excavated to a depth of 18 inches and the exposed area below ground would receive an application of EPA-registered treatment materials, consisting of a pesticide and preservatives, in a bandage arrangement around the base of the wood pole. Additionally, if the pole meets certain conditions, it is to be internally fumigant treated as appropriate with EPA-registered materials. If the ground line area of the pole does not have sufficient strength, then the pole is evaluated for either pole reinforcement or replacement. Information is compiled regarding the poles inspected, poles treated, the poles needing reinforcement and the poles needing to be replaced. The poles needing reinforcement or replacement are marked with a special tag. Any defects found that pose a safety risk are brought to the attention of the local office and are corrected immediately, if warranted. In rare instances the inspector may be required to guard the site of a safety hazard until qualified personnel arrive to correct the hazard.

Pole replacement priority is established based on the pole's structural integrity as determined by the inspection contractor. Normal reject poles are those that are determined not to be able to last until the next cycle inspection (approximately 10 years) and are a function of insufficient shell thickness at the ground line. Normal reject poles are generally replaced within three years of the inspection. Priority reject poles are defined as those poles with internal decay and an average shell thickness of 1 inch or less or with external decay and with 50% or less of the original circumference remaining. The inspection contractor notifies Company personnel of priority reject poles within 24 hours or sooner as conditions require. Priority reject poles are replaced within one year of the inspection unless they are determined to be an immediate safety risk. Poles determined to be reinforceable are generally reinforced within two years of the inspection.

Records/Reporting

The inspection/treatment contractors collect the data electronically and provide the Company periodic updates during the program. A final electronic file is provided at year-end AEP Ohio maintains and updates a pole database in conjunction with the graphics information and the contractor inspection/treatment results

AEP Ohio has a distribution work management system, DWMS, that is used to schedule and track pole replacements and reinforcements. Orders are created within DWMS for all poles requiring replacement and reinforcement Backlog reports from the system list the orders available for the districts to schedule replacements. Normal reject poles are tracked separately from priority reject poles. Following construction, this work-order information is posted in graphics files, which will also update the pole database. Necessary reports are generated from the database systems to provide program completion statistics as well as analysis/planning information.

Section B- Distribution Circuit and Line Inspections

Program Details

AEP Ohio conducts an overhead circuit inspection based on a 5-year cycle that results in an annual inspection of at least 20% of the overhead distribution facilities. All facilities are inspected at least once every five years. This inspection program overlaps other targeted inspection/maintenance programs such as pole inspections. Coupled with the annual inspections for recloser and capacitor installations, which are scattered across all the distribution circuits and with service upgrades and new extensions, there are many opportunities to view company facilities on a routine basis to identify areas requiring attention. As a result, a 5-year inspection cycle is more than adequate to assess the general condition of distribution circuits. In some cases additional circuit inspections will be performed over and above this program in order to address specific reliability concerns and/or to assess some worst performing circuit mitigation requirements. For example, some Rule 11 worst performing circuits may require an inspection as part of the remedial action plan. Underground cable is not inspected as part of this program per se because it is only visible at terminations. These cable terminations in padmount equipment historically have had a very low failure rate.

Analysis/Assessment

Company or contract employees perform selected overhead circuit inspections on an annual basis for this program and record their findings on Circuit Inspection and Repair Records. The circuit inspection results are recorded electronically and then turned over to the local area offices indicating the findings, any action taken during the inspections, and any follow up work requirements. This would include specific information about materials and/or equipment observations such as missing or blown lightning arresters, detective crossarms, equipment not protected from animal contact, large number of splices in wire spans, or conductor clearance problems that could make the line susceptible to wind-caused outages. Two-pole conditions are also noted during the inspections. Engineering personnel then prioritize and prepare necessary work orders to take care of any deficiencies requiring attention noted during the inspections. This may include follow-up analysis utilizing outage cause codes to determine circuit areas that are prone to animal contacts and lightning strikes and which can be targeted for additional animal and lightning mitigation efforts.

Based on the annual results of the inspection/maintenance program the capital budgeting process for the following year is refined to accommodate any changes in the estimated number of items requiring attention. The local offices maintain the flexibility to schedule individual circuit inspections based on current and historical reliability results, still maintaining the overall guideline of the 5-year cycle program. An example of this would be substituting one circuit to be

inspected for another, based on reliability performance, taking into account the requirement that all distribution circuits and equipment must be inspected at least once every five years.

The process for reviewing the progress and effectiveness of each program includes a monthly status report that provides inspection units completed as well as cost information for a descriptive per unit summary This data is pulled from AEP Ohio's work management system based on job completion dates or from AEP Ohio's work order system based on when facilities were placed in service.

AEP Ohio also evaluates for possible replacement small size (#2 and below) overhead conductor installations based on age, condition and reliability history. The smaller size conductors are more prone to deterioration due to weather and environmental contamination. AEP Ohio also maintains records that indicate when individual underground cable sections may require replacement due to repeated cable faults. Records also show when cable replacement projects are initiated.

Maintenance

Maintenance activities are identified during the circuit inspection process and follow-up work scheduled as appropriate. Situations that pose an immediate safety risk are corrected immediately. Situations that do not pose an immediate risk but are likely to create an outage, such as a floating phase conductor, will be corrected when found or will be referred to local management for priority assignment and scheduling lower priority deficiencies, such as a lightning arrester with a blown isolator, or double-wood conditions, are to be corrected within 12 months of identification.

Records/Reporting

The basic circuit information is maintained as a part of AEP Ohio's facility/graphics database AEP Ohio utilizes its work management system (DWMS) to record inspection results electronically in the field. Circuit inspection results are maintained at the Region and local District/Area offices. This documentation includes what, if any, follow up action was required and when the follow up action was completed.

Section C- Distribution Primary and Secondary Enclosures

Program Details

AEP Ohio conducts underground primary and secondary enclosure inspections based on a 5-year cycle with at least one-fifth of all enclosures inspected annually. The objective of this program is to proactively visually inspect the external, above ground portions of underground facilities on a 5-year cycle to identify and correct deficiencies necessary for the safety of employees and the public under the conditions specified in the NESC and for system reliability. The program consists of an external, visual inspection of the above ground portion of underground systems including pad-mounted equipment (transformers, switches, primary metering enclosures, junction cabinets, etc.), pedestals and the underground associated components of primary riser poles. The inspection is conducted to determine if the equipment is locked and secure, that there are no open appurtenances that might allow access to the interior of the equipment via soil erosion, cabinet or conduit deterioration or by other means such as vandalism. If the enclosure is designed to have both a lock and penta-head bolt for securing the enclosure and the penta-head bolt is missing, the inspector will replace the bolt. If for some reason the inspector is unable to install the penta-head bolt due to misalignment of the enclosures interfaces or some other reason, then the inspector will ensure the unit is secure with a padlock and make a record of this in the inspection record. Oil filled equipment is also checked for any external leaks. Any defects observed that need attention will be identified and the information will be collected so appropriate corrective action can be taken. The 5-year cycle provides a reasonable check for facilities that exhibit minimal change following installation.

Analysis/ Assessment

AEP Ohio and/or contract employees perform the underground primary and secondary enclosure inspections selected on an annual basis for this program. The inspections are maintained by map section on a 5-year cycle. The underground enclosure inspection results are documented electronically.

Based on the annual results of the inspection/maintenance program regarding the number of items found needing repairs or replacement, the capital budgeting process for the following year is refined to accommodate those changes.

The process for reviewing the progress and effectiveness of each program includes a monthly status report that provides inspection units completed. This data is pulled from AEP Ohio's work management system (DWMS) based on job completion dates or from AEP Ohio's work order system based on when facilities were replaced. Maintaining flexibility within the program for the local areas to make adjustments enhances program effectiveness. An example of this would

include superseding one group of primary and secondary enclosure installations to be inspected for another based on reliability performance, taking into account the requirement that all enclosures must be inspected at least once every five years.

Maintenance

Defects found during the inspection requiring attention are either repaired on-site during the inspection or are turned over to the local area office for corrective action. This may include specific information about the equipment observations such as grading work requirements surrounding the structures and security of the structures and other maintenance. Engineering personnel would then prioritize and prepare necessary work orders to take care of any deficiencies noted during the inspections.

Records/Reporting

The basic primary and secondary enclosure information is maintained as a part of AEP Ohio's facility/graphics database. The inspection details are stored centrally in the Region Office along with the record of inspections and repairs by year and map section. This documentation includes what if any follow up action was required and when the follow up action was completed.

Section D- Line Reclosers

Program Details

AEP Ohio's in-service line recloser inventory ranges in age from 0-50+ years with the newer ones being vacuum interrupting types with electronic controls. The objective of this program is to inspect the in-service recloser units and to maintain/replace those units that meet specific program criteria. An annual inspection is made of both the hydraulic and electronic control type reclosers Six-month battery inspections for the electronically controlled reclosers are also included within this program.

The maintenance cycle for reclosers is based upon the type of recloser (hydraulic or vacuum interruption), number of operations and duty cycle, and as such, this cycle can vary from operating unit to operating unit. The maintenance cycles for line reclosers, based upon type of recloser and number of operations or years is as follows:

Oil-interrupting reclosers (such as 4H, L, DV, WE) **100 Operations or 6 Years**
(since last maintenance or original installation)

Oil-insulated vacuum interrupting reclosers
(such as V4H, V4L, VWE, VXE) **200 Operations or 12 Years**
(since last maintenance or original installation)

Solid dielectric-insulated vacuum interrupting reclosers
Nova **300 Operations or 24 Years****
Viper **200 Operations or 24 Years****
(since last maintenance or original installation)

*** Where operations data is available (via download from unit control) then 90% of the Duty cycle (as determined per manufacturer recommendation) will replace the set number (300) of operations*

Recloser units in known high fault duty locations may require more frequent maintenance.

Annual recloser inspections provide the necessary information to ensure effective scheduling of the maintenance program. The approximate 6+-year cycle for recloser maintenance has proven to adequately maintain the recloser assets on an ongoing basis. The Company also targets some older hydraulic recloser units for replacement with newer vacuum interruption units. The overall average maintenance cycle will be extended as the percentage of vacuum units increases because of their reduced maintenance cycle requirements.

AEP Ohio personnel and contractors inspect line reclosers annually with a visual check and record the counter readings. Electronically controlled recloser units also receive a six-month battery inspection to confirm an acceptable battery status for recloser operability. Batteries are replaced as necessary in conjunction with the inspections. Three-phase electronically controlled units also have their settings verified through a calibration test annually.

The recloser unit inspection documentation is maintained in the PMIS (Preventative Maintenance Inspection System) data base. The PMIS data base is a software tool developed to assist field personnel in scheduling and tracking preventative maintenance inspections on various categories of distribution equipment and facilities. This information details the operational condition of the recloser unit as well as any items found to be deficient and/or defective during the inspections.

Analysis/ Assessment

In addition to addressing specific repairs needed as a result of annual and semi-annual inspections, specific recloser units are selected for maintenance with an overall average maintenance cycle of 6+ years. This cycle basis has been established over time based on the annual maintenance results/findings and the level of repairs required. This program also targets some older hydraulic recloser units for replacement. The newer units with vacuum interruption provide for longer insulating medium life (no carbon build-up in oil), which in turn leads to extended maintenance cycles with a corresponding reduction in life cycle maintenance costs.

Based on the annual results of the inspection/maintenance program regarding the number of recloser units that are approaching the need for maintenance, the capital budgeting process for the following year is refined to accommodate any changes in the estimated number of units that will require attention. The local areas maintain the flexibility to schedule specific recloser units for maintenance, based on current and historical reliability results. This scheduling is done in conjunction with the overall guideline of this inspection/maintenance program.

The process for reviewing the progress and effectiveness of the program includes a monthly status report that provides inspection and maintenance units completed. This data is pulled from AEP Ohio's distribution work management system (DWMS) based on job completion dates or from AEP Ohio's work order system based on when recloser units were replaced in the field for maintenance.

Maintenance

Recloser maintenance normally consists of replacement of the in-service units with similar type units Maintenance of removed units is performed in AEP Ohio's repair facilities where a specific listing of items is checked such as the internal interruption mechanism. The oil is replaced as needed and the calibration of the unit is verified. Once the maintenance work is completed and the

unit meets specifications it becomes available as a replacement for maintenance to be performed on another unit. A few units may not meet the unit specifications during this process and are scrapped.

Records/Reporting

The basic recloser information is maintained as a part of AEP Ohio's facility/graphics database. The line recloser inspection results are documented in AEP Ohio's work management system for field employees (SPECTRUM) which interfaces with PMIS and any problems identified during the inspections are documented in an Internal Work request which is stored in AEP Ohio's work management system (DWMS). The Internal Work requests are reviewed by the local area offices. The Internal Work requests indicate the inspection results on equipment where problems were found and the required repairs needed to return the equipment back to service. This would include specific information about the equipment observations such as ground wire continuity and ground resistance readings, lightning protection issues, battery condition for control units, and other maintenance needs. Engineering personnel would then prioritize and prepare necessary work orders to take care of any outstanding issues noted during the inspections.

Section E- Distribution Line Capacitors

Program Details

The objective of this program is to ensure reliable and accurate capacitor bank operations through inspection and maintenance activities on an ongoing basis. Individual capacitor units are typically 150, 200 or 300 KVAR with the three-phase banks typically 450, 600, 900, 1200 or 1,350 KVAR Capacitor banks can be of either a fixed or switched type. The fixed bank remains in service all the time whereas a switched bank has a control to tum the bank on or off depending on circuit parameters at the bank location. These parameters include such items as current, voltage or power factor. Fixed capacitor banks and switched capacitor banks are inspected annually. Capacitor bank inspections provide the necessary information to ensure effective utilization of the capacitor assets on an ongoing basis.

The line capacitor inspection results are documented in AEP Ohio's work management system for field employees (SPECTRUM) which interfaces with PMIS and any problems identified during the inspections are documented in an Internal Work request which is stored in AEP Ohio's work management system (DWMS). The Internal Work requests are reviewed by the local area offices. The Internal Work requests indicate the inspection results on equipment where problems were found and the required repairs needed to return the equipment back to service. Engineering personnel would then prepare necessary work orders to take care of any unresolved deficiencies noted during the inspections and this work is prioritized based on the documented observations.

Inspection documentation is maintained in PMIS. This information details the operational condition of the capacitor bank as well as any items found to be deficient and/or detective during the inspections.

Analysis/ Assessment

The process for reviewing the progress and effectiveness of each program includes a monthly status report that provides inspection and maintenance units completed as well as associated cost information. This data is pulled from AEP Ohio's work management system (DWMS) based on job completion dates or from AEP Ohio's work order system based on when individual capacitor units were replaced in the field.

Based on the current year results of the inspection/maintenance program regarding the number of capacitor installation deficiencies found requiring correction, the capital budgeting process for the following year is refined to accommodate any changes in the estimated number of units that will need attention. The local offices maintain the flexibility to schedule specific capacitor bank inspections/maintenance based on current and historical reliability results. This scheduling is done in conjunction with the overall guideline of this inspection/maintenance program.

Maintenance
Maintenance activities are identified during the inspection process and in many cases are done in conjunction with the inspection. Maintenance activities would include replacing a defective switch control. Otherwise, the local area offices schedule follow-up work as appropriate.

Records/Reporting
The basic line capacitor bank information is maintained as a part of AEP Ohio's facility/graphics database. The line capacitor inspection results are documented in AEP Ohio's work management system for field employees (SPECTRUM) which interfaces with PMIS. Any problems requiring follow-up identified during the inspections are documented in an Internal Work request which is stored in AEP Ohio's work management system (DWMS). The Internal Work requests are reviewed by the local area offices, The Internal Work requests indicate the inspection results on equipment where problems were found and the required repairs needed to return the equipment back to service. This would include specific information about the equipment observations such as ground wire continuity and ground resistance readings, lightning protection issues and other maintenance needs. Engineering personnel would then prepare necessary work orders to take care of any unresolved deficiencies noted during the inspections and this work is prioritized based on the documented observations.

Section F- Distribution Right-of Way Vegetation Control

Program Details

The objective of AEP Ohio's vegetation management program is to address public safety and service reliability in a cost effective manner. A well-planned vegetation management program should be long-term and should address vegetation issues through three key components. The first component is cyclic right-of way clearing which proactively maintains vegetation on all circuits. Second is a reactive component that addresses immediate outage and safety concerns. The third aspect of the program is a quality of service component that is reliability based and includes breaker zone clearing, remediation of Rule 11 worst performing circuit vegetation issues, and correction of intermediate cycle vegetation issues caused by fast growing tree species, also known as cycle busters.

An effective vegetation management program will prescribe a maintenance plan for each circuit being addressed. The program should utilize best practices and prescriptions should take into account the location of rights-of way, the types of vegetation present, the environmental impact of the work being performed and any restrictions in the program plan. This approach is referred to as an integrated vegetation management plan or IVM. The considerations to be taken into account include, but are not limited to:

- Type of maintenance treatment, i.e. mechanical clearing with mowers or mechanical pruning, manual climbing and pruning, herbicide application, etc., based on right-of way and environmental conditions;
- A priority and schedule of treatment by line/circuit or section within a circuit;
- Cost of treatment

As the plan progresses over time, these work prescriptions will change based on the size and type of vegetation. The initial prescription for clearing an easement may include several types of activity such as: pruning, removing, mowing and herbicide treatment. In four years that same easement's work prescription may only require herbicide treatment. AEP Ohio's Forestry staff and contractors continuously work to insure the appropriate prescription is utilized to increase effectiveness and efficiency.

AEP Ohio Vegetation Management Program Elements

- Forestry's annual work plan
- Rule 11 Worst Performing Circuits
- Unscheduled Work
- New Construction
- Storm Work
- Emerald Ash Borer Hazard Mitigation

Annual Work Plan

With approval in March 2009 of AEP Ohio's Enhanced Vegetation Management Program, AEP Ohio has moved to a 4-year full circuit vegetation clearing program accomplished through the end-to-end clearing of all circuits. End-to-end clearing of circuits involves the clearing of vegetation from all overhead primary lines, from the start of the circuit at the substation to the end of the primary line. AEP Ohio's line clearance guidelines are attached as Exhibit A.

Circuits are prioritized and work plans are developed based on the year that the circuits were previously cleared and grouping of circuits served from the same substation for cost effectiveness. AEP Ohio's work plans consist of removing or pruning trees in and out of right-of-way, pruning mature trees not in the line but that could be within a 4-year period, mowing overgrown right-of-way with a follow up herbicide application and removing overhang above multiphase lines. Overhang above single phase lines is either totally removed or removed to provide 10 feet of hinge or swing clearance above the conductor.

Tree removals are emphasized to promote long-term vegetation control. This requires a collaborative effort with property owners and community leaders. Soft wooded, fast growing tree species are removed where possible. Where removal permission is not obtained, fast growing species are pruned to greater clearances than slower growing varieties. Young trees of any species that have sprouted up naturally, commonly referred to as volunteer trees, are controlled with herbicides. Stump grinding/removal and/or tree replacements are offered on a limited basis as a tool to aid in securing permission for tree removals where there are easement related restrictions.

Once the annual work plan is developed, contractors are provided copies of the necessary detailed circuit maps to be used for the program. In addition, AEP Ohio personnel identify tree conditions through the course of their everyday work.

During planned clearing, each vegetation unit needing to be pruned, removed or other type of treatment is noted during a pre-planning process for each circuit. These units are recorded on circuit maps and assigned to contractor tree crews to perform the work. Copies of the completed work plan maps and time sheets are kept on file at the offices of Forestry staff. AEP Ohio is currently using GIS based mapping in many areas as an electronic planning and data collection tool for work planning.

A third party auditor is currently used in conjunction with on-going AEP Ohio forestry staff inspections to assure work is completed to contract and guideline specifications. These inspections are filed in each forester's office and also entered into CAMPS (Contract

Administration Management Payment System).

Rule 11 Worst Performing Circuits

AEP Ohio annually submits to the PUCO a list of their 8% worst performing circuits. A number of these circuits have had tree-related outages and AEP Ohio Forestry works closely with the districts to develop comprehensive action plans to improve service reliability on these circuits.

Required work may involve extensive end-to-end clearing or isolated Quality of Service clearing (protective zone, one or more laterals, etc.) to address the tree reliability of the circuit. A specific forestry action plan is developed for each circuit in conjunction with the district's remedial plan to improve service reliability for each of these circuits.

Unscheduled Work

AEP Ohio Forestry deals with a dynamic, living system. Variables such as tree species, weather patterns and soil conditions all affect initial tree growth and the re-growth rates of pruned trees. Examples include isolated stands of fast growing trees or vines growing on AEP Ohio poles and hardware that may affect only a portion of the circuit's overall reliability.

Even the most aggressive line clearance program must still make allowances for responding to isolated tree-related outages, reliability issues and customer requests. AEP Ohio Forestry has traditionally dedicated a percentage of its total budget and crew strength for this type of work that is incremental to the work plan.

New Construction Clearing

AEP Ohio Forestry clears easements in advance of new line construction activities. This work is accomplished to establish an initial cleared width and height for the conductors. Subsequent re-clearings on these lines are based on the extent of initial clearing.

Storm Work

AEP Ohio foresters and contract tree crews respond to district requests to clear trees within AEP Ohio easements to restore electrical service during storm restoration efforts or to prevent an imminent outage or safety hazard.

Emerald Ash Borer Hazard Tree Mitigation

AEP Ohio is actively monitoring and mitigating ash trees outside the cleared Right-of-Way areas due to the invasive insect, the Emerald Ash Borer. The insect is firmly established in Ohio and produces a virtual 100% mortality rate to the native ash trees that it infests. AEP Ohio's efforts are directed at proactively reducing outages that could be caused by infested ash trees that are

outside the normally cleared Right-of-Way corridor and which are deemed an outage risk.

Additional Program Basics

Customer Relations & Community Involvement

AEP Ohio values its customer relationships as much as our customers value their trees. Great efforts are made to strike a balance between service reliability and the homeowner's landscaped vegetation. AEP Ohio frequently utilizes telephone messages broadcast to all customers located on a circuit scheduled for vegetation work as a first notification of the work scheduled in the area. The messages notify the customer/landowner that a forestry representative will be in contact in the near future. Contract work planners utilize face-to-face communication and door cards to contact property owners before routine line clearance work is performed. Contact with local community leaders is also made prior to work beginning in many areas to assure trees located on municipal properties are properly maintained.

AEP Ohio has invested time and resources into public education concerning proper tree care and sound environmental practices. AEP Ohio's forestry group participates in many arboriculture organizations such as: National Arbor Day Foundation, Utility Arborist Association, International Society of Arboriculture, and other various state and local vegetation management organizations. Many of the staff are certified arborists and/or licensed by the Ohio Department of Agriculture for herbicide and tree growth regulator application. The AEP Ohio Forestry group has developed and distributes an all-purpose tree care book called 'The Right Tree.' AEP Ohio Forestry also conducts community forum presentations based on the 'The Right Tree' to local and regional groups.

While AEP Ohio Forestry has gone to great lengths to satisfy our customers there are times when a property owner lodges a complaint either directly to the companies or to the Commission. Forestry complaints can be grouped into two simplistic categories: a) a customer wants their tree(s) trimmed and it falls outside the scope of AEP Ohio's responsibility or AEP Ohio is unable to address the concern in a timeframe suitable to the customer; b) AEP Ohio has worked on the property and the end result is undesirable to the customer. Complaints are viewed as inputs as to potential program changes and AEP Ohio works diligently to amicably resolve any differing points of view.

Aerial Saw Pruning

AEP Ohio contracts with Aerial Solutions, Inc and Haverfield Aviation, Inc to remove lateral vegetation growth from our rights-of way using aerial saws. Suspended on a vertical boom beneath a helicopter, and powered by a separate motor, a series of rotary blades quickly, safely, and efficiently prune trees along the edge of the right-of-way. Rights-of-way maintained with the aerial saw normally possess the following characteristics: steep, mountainous terrain; limited

access, and prohibitive costs to trim by conventional means. On readily accessible lines, traditional tree trimming crews use bucket trucks or skidder mounted saws or hand climb each tree individually. In just a few hours the aerial saw can clear remote lines that would take ground crews weeks or months to complete.

The aerial saw eliminates the need for workers to enter private property to reach rights-of way. There is no need to make repeated trips across private property, eliminating the possibility of damaging lands by hauling heavy equipment across a customer's property. The aerial saw also eliminates the need for workers to climb countless trees in close proximity to energized conductors, which reduces the opportunity for personal injury accidents. Slash, brush and other debris from aerial saw operations is left along the edge of the right-of way leaving the center open for line access. This debris would also be left on site were AEP Ohio Forestry to clear these lines using conventional means. Any brush that falls into roadways, waterways, fences or pastures is moved to a wooded edge of the right-of way or is chipped or mowed. Clearing lines with the aerial saw prevents countless numbers of outages. Pilot training, radio contact and ground observers have significantly reduced the number of limb contacts with the line. Finally, brush growing on the floor of the right-of way may be mowed or treated with a herbicide in advance of using the aerial saw to aid in increasing the pilot's visibility. The aerial saw is a powerful, cost effective tool enabling AEP Ohio Forestry to maintain more miles of line each year efficiently and improving overall system reliability.

Tree Growth Regulators

AEP Ohio employs the use of Tree Growth Regulators (TGRs), on a limited basis to control crown growth and reduce the frequency and amount that trees must be trimmed. TGRs control regrowth, allowing a tree to use its reserves to survive disease and insect attacks, and to withstand environmental assaults such as drought and pollution.

A treated tree grows more slowly, and requires less trimming meaning less biomass is removed when they are pruned That results in a healthier, more natural-looking tree, and fewer visits from contract tree crews TGR products reduce tree growth for two to eight years, depending on species, rates of growth and other environmental conditions.

Analysis/ Assessment

A monthly review is conducted to determine if each area is meeting planned right-of way clearing goals. This includes addressing the volume of work for worst performing circuits. Any necessary adjustments are made at this time, which would move work forces onto circuits with tree-related concerns or change the number of crews to solve any problems. Circuit reliability is continually monitored to address tree-related issues. Work force productivity is also reviewed to provide the most cost effective management of these forces. Tree crew sizes or types may be altered and

different equipment or right-of way maintenance techniques employed to insure the work is completed in an efficient manner.

Maintenance
AEP Ohio has adopted clearing guidelines that provide ample clearances from conductors and appurtenances. Costs for right-of way clearing are effectively managed through our sole source contract with Asplundh Tree Expert Company, use of manual and mechanical clearing methods and various chemical applications. Customers are notified of vegetation management to be done in their area. This communication enhances productivity and customer relations.

Records/Reporting
CAMPS is an invoicing and data collection program that AEP Ohio utilizes to collect information and data from the contractors timesheets. Electronic invoicing is available for all contractors for payment through this system and information regarding circuit costs to clear, man-hours per work unit, and costs per work unit are collected. Various reports are available in CAMPS which help to monitor program effectiveness, contractor productivity and costs. The reports are available by distribution circuit, area and district within the program.

Forestry District Division Plan (Start Date 1-1-2015; End Date 12-31-2017)
Effective with the 2015 cycle program year, AEP will begin a Forestry District Division process to transition from one area within the Western Ohio District, to two areas. The Western Ohio District will have an East Forestry Area, and a West Forestry Area. This change will allow for better efficiency and oversight, will provide a better response to customer issues, and will maintain a consistent presence in both the Eastern and Western portions of the Western Ohio District. As part of this process, circuits will be delayed a maximum of one year, and in some cases accelerated one year from the original schedule. This process will be completed at the end of 2017 at which all circuits will be on a four year clearing cycle.

As part of this process, AEP will employ an "Inspect/Maintain" process in the original cycle year for the particular circuit to ensure that the delay in full circuit maintenance does not create undue safety and/or reliability issues. This "Inspect/Maintain" process will include a full circuit patrol by a person knowledgeable in the specifications of AEP's vegetation management program. The patrol of the circuit will identify any vegetation conditions that may result in service interruptions prior to the full circuit maintenance to be performed the following year. These conditions will be mitigated as quickly as possible.

Jun-14

Ohio Distribution Line Clearance Guidelines

	R/W width	TRIMS * side trim	TRIMS * under trim	TRIMS * overhang	REMOVALS **	BRUSH / VINES CUT	HERBICIDE TREATMENT	Tree Growth Regulators
multi phase facilities	30 feet minimum ***	In maintained locations such as yards etc. 10 feet minimum from primary conductors	Minimum 10 foot clearance from primary conductor	All overhanging limbs cut back	Aggressively sought	All woody species are cut and/or mowed. All pole bases cleared for a 5 foot radius of vegetation and area treated with a herbicide. Including guys and supporting /bracing attachments/ poles.	Aggressively sought and used extensively. All stumps treated. No brush height or application restrictions, may be used as a reclearing tool. Re-growth is treated.	Encouraged
All other primary facilities	30 feet or to the existing tree line	In maintained locations such as yards etc. 10 feet minimum from primary conductors	Minimum 10 foot clearance from primary conductor	Overhang removed to a height above the primary for a clear hinge or swing point providing 10 feet of "swing clearance" above the conductor	Highly desired	All woody species are cut and/or mowed. All pole bases cleared for a 5 foot radius of vegetation and area treated with a herbicide. Including guys, supporting /bracing attachments/ poles.	Aggressively sought and used extensively. All stumps treated. No brush height or application restrictions, may be used as a reclearing tool. Re-growth is treated.	Limited Use

* trim/ pruning distances area impacted by location; urban vs. rural and position to the facilities
** removals must also meet species, position to conductors, vigor and completion time & expense considerations
*** variable with construction type and voltage
As noted in section II. C of the AEP Forestry Goals , Procedures & Guidelines for T&D Line Clearance Operations
this is a supporting document specific to AEP Ohio vegetation programs

Section G- Substation

Substation: Station Inspections

Program Details
The Station Inspection Program is critical to safe and reliable operation of both transmission and distribution substations. It provides the necessary information and data concerning the operation and condition of each piece of electrical equipment in the substation in order to properly plan and schedule maintenance. Substation inspections provide a means to keep control system and relay protection serviceable. NERC mandated activities that can be associated with the Station Inspection Program are ideally part of the Station Inspection process. Substation assets such as fences, buildings, and grounding are checked as part of a Mandated Station Inspection to make sure the substation is secure and to ensure the safety of the public.

The Station Inspection Program is broken down into two sub-parts consisting of a Mandated Station Inspection and Comprehensive Station Inspection.

Objective
The objectives of this maintenance program are to:

- Prevent unplanned outages or failures and/or safety hazards by identifying and correcting problems during scheduled inspections; and
- Reduce customer outages and associated call-outs for station problems by detecting problems and correcting them in a timely manner.

Inspection/Collection
The Station Inspection Program consists of two sub-parts – The Mandated Station Inspection and the Comprehensive Station Inspection. AEP Ohio proposes to implement this as a pilot program for 3 years (2016, 2017, and 2018).

Mandated Station Inspection
The Mandated Station Inspection primarily consists of a review of the substation perimeter to make sure the substation is secure and to ensure the safety of the public. Substation assets such as fences, buildings, driveways, and grounding are checked as part of a Mandated Station Inspection. A walk throughout the station is performed during the inspection to check the station equipment grounding and check the transformers, circuit breakers, capacitor banks, and regulators for any obvious damage. The support insulators and bushings are visually checked. Any serious condition is immediately reported to maintenance personnel.

During the Mandated Station Inspection, station grounds are inspected with special attention to the fence and gates to ensure the station is secured. This is called a perimeter check. Any problems with the fence and/or gate are repaired. If permanent repairs cannot be completed at the time the problem is found, it is noted in AEP's facility database. During the Mandated Station Inspection, AEP personnel will perform a walk-through of the station visually inspecting the yard, structures, and equipment for any visible damage

Comprehensive Station Inspection

The Comprehensive Station Inspection consists of tasks performed during the Mandated Station Inspection and further includes data collection. For many pieces of station equipment, portions of this data may be available via SCADA dependent on SCADA availability. Station metering equipment monitors current flow, bus voltages, and power loadings on high voltage equipment. Circuit Breakers, Load Tap Changers, Voltage Regulators, and other Switchgear utilize counters to register the number of operations that have occurred and are used to analyze automatic operations. The data obtained from the Comprehensive Station Inspection is recorded and loaded through AEP's maintenance software into AEP's facility database, which may drive maintenance on that equipment. Any serious condition is immediately reported to maintenance personnel.

The replacement of burned out control panel and equipment lights is accomplished during the Comprehensive Station Inspection. This may also be accomplished during any station switching activities. Station batteries are inspected for corroded terminals and any abnormal cells during the Comprehensive Station Inspection. Battery terminals are cleaned and any abnormalities are reported in the AEP facility database. Battery ground lights are checked which could indicate a possible ground in the DC system, and the overall battery voltage and battery charger voltage and current are taken and recorded, with the battery charger output voltage adjusted as necessary. AEP has a Periodic Battery Inspection Program that prescribes this maintenance as well as an Annual Detailed Battery Inspection Program.

Control house heaters, air conditioning units, or heat pumps are checked to ensure these devices are operating properly. This activity is accomplished as part of the Comprehensive Station Inspection

Analysis/Assessment – Mandated and Comprehensive Inspections

The results and completion of the Mandated and Comprehensive Station Inspections are monitored by querying AEP's facility database. The Mandated Station Inspection results are documented electronically when completed and if there are any abnormal issues found, that is noted. The scheduling of the Mandated and Comprehensive Station Inspection will be such that they alternate on a monthly basis and scheduled within AEP's facility database.

Outcome/Incorporation

Typically the outcome of the Station Inspection Program is the data necessary to develop various equipment maintenance programs or maintenance activities.

Maintenance Activities

There are two corrective options when a problem is discovered during a Mandated Station Inspection or Comprehensive Station Inspection. They are as follows:

1. If the problem is minor in nature, AEP personnel can document and complete the required repair to correct the problem, and/or
2. AEP personnel document and report on more complex problems, in sufficient detail for the maintenance personnel to proceed with repairs.

Typically many of the minor items discovered as part of the Station Inspection Program (Mandated and Comprehensive Station Inspections) can be and are remedied at that time; however, the level of resources required for the corrective action and the severity of the observation determine the scheduling and response in dealing with the situation.

Inspection Frequency

Program	Task Description	Frequency
Station Inspection	Mandated Station Inspection	Not to exceed 40 days after the previous Station Inspection, alternating between a Mandated and a Comprehensive Inspection*– Note these tasks are performed as part of the Comprehensive Inspection when that Task is Performed.*
Station Inspection	Comprehensive Station Inspection	Not to exceed 40 days after the previous Station Inspection, alternating between a Mandated and a Comprehensive Inspection*
Infrared Thermography Scan	Stations > = 230kV	Yearly
Infrared Thermography Scan	Stations < 230kV	Every Two Years

*This monthly requirement is for the PUCO only

Records

The station maintenance history is documented using the AEP facility database. Field maintenance personnel typically identify equipment and stations with recurring problems and

submit those problems into a replacement process where the equipment will be considered for replacement.

Information from the Station Inspection Program (Mandated and Comprehensive Inspections) is stored in the in AEP's facility database for the Station Equipment Asset inspected. Information obtained may factor into future scheduling and maintenance plans.

Substation: Circuit Breakers and Reclosers

Program Details
Reliable operation of circuit breakers and reclosers requires that all components of these devices be in serviceable condition. These devices have a large number of mechanical parts that require special attention. The maintenance program for circuit breakers and reclosers includes procedures that provide for monitoring, testing and planned maintenance to assure the integrity of these components and the overall performance of the circuit breaker.

Objective
The objectives of this maintenance program are to:

- prevent misoperations or failures by identifying and correcting problems during scheduled inspections; and
- reduce safety hazards, customer outages and associated call-outs for circuit breaker problems by replacing limited lifetime components in a timely manner.

Traditional time-based maintenance is gradually being replaced with condition-based maintenance. This change often extends the necessary maintenance interval and improves service reliability, while providing operating life extension as an end result.

Inspection/Collection
Circuit breakers and reclosers have counters that register the number of open/close operations that have occurred. During Comprehensive Station Inspections, these counter values are recorded and later loaded into AEP's maintenance software, which drives maintenance on the operating mechanisms. The comprehensive inspection identifies any external problems or problems with low levels of SF6 gas or oil. The bushings are also inspected. Any problems are noted on the inspection report and any serious condition is immediately reported to maintenance personnel.

The Mandated Station Inspection is used to check for any external problems, bushing damage, or oil leaks. The vast majority of Stations in Ohio with SF6 Circuit Breakers are SCADA monitored and low gas levels can be detected in that manner. For the few locations that are not SCADA monitored, the alarm annunciation can provide a visual indication. In the case of no SCADA or alarm panel, the pressure gauge can be checked.

Analysis/ Assessment
The status or progress of the circuit breaker and recloser maintenance program can be monitored by querying the facility database each month to see how many maintenance jobs have been completed and identify which facilities currently require maintenance. This information can be trended from month to month to show how the maintenance is following relative to schedule. If necessary, management can make changes required to achieve the plan.

Outcome/Incorporation

Typically the outcome of the inspection and analysis is the maintenance plan. Occasionally the analysis indicates that equipment should be replaced. The AEP companies' capital plans include funding for replacing equipment that has become unreliable or obsolete. This may have been caused by but not limited to deteriorating components, lack of available parts from vendors, and equipment problems causing repeated customer outages.

Maintenance Activities

Preventive maintenance on circuit breakers and reclosers is evolving from traditional time-based maintenance to Condition Based Maintenance (CBM), which includes time and operations intervals. Some of the principles of Reliability-Centered Maintenance (RCM) are also being applied. RCM focuses on the reliability of components and is triggered by conditions that exist such as:

- the total number of operations that have occurred since the last maintenance, which indicates the amount of duty (or use) the operating mechanism has incurred;
- the fault duty (the number of circuit breaker operations where fault current is involved);
- the length of time since the operating mechanism was last maintained; or
- the length of time since the interrupting modules or tanks were last maintained

CBM also includes intervals and operations counts that are specific to the manufacturer and type of unit. The intervals are determined by considering the manufacturer's original recommendations, past operating experience and industry guidelines. Computer program algorithms, which take into account the items listed above, have been developed to aid in identifying when circuit breaker maintenance is needed. Maintenance engineers review the data and prioritize the circuit breakers requiring maintenance, and then field personnel schedule the work.

Two types of maintenance are typically performed:

- external inspection and maintenance, which includes; insulating liquid tests, electrical tests, cleaning, lubricating and testing mechanisms, and checking operation of heaters
- internal inspection and maintenance, which includes; insulating liquid tests, electrical tests, internal inspection of contacts, interrupters and tanks, checking adjustments and replacing gaskets, servicing compressor, checking compressor pump up times and precharge pressures where applicable, replacing deteriorated gaskets, checking operation of heaters, inspecting and cleaning control valves, performing timing tests, and checking accuracy of gauges and settings of pressure switches.

Other maintenance that is performed on circuit breakers includes the following:

- Predictive diagnostics that are also performed on circuit breakers and reclosers to

determine maintenance requirements. For example, infrared scanning of substations will identify hot spots that may exist on the bushings or connectors, or in control cabinets. These are reported and corrected as soon as practical to minimize equipment failures and customer outages.

- Circuit breakers are operated (opened and closed) periodically to "exercise" them, which keeps the operating mechanisms and mechanical linkages lubricated and free to operate when called upon. This also provides an opportunity to find problems before they cause a misoperation or outage.

Inspection/Maintenance Frequency

Circuit Breakers and Reclosers are scheduled for inspection based on the Mandated or Comprehensive Station Inspection schedule unless extenuating circumstances such as storm recovery efforts preclude the monthly inspection. The maintenance schedule depends upon factors such as the type of circuit breaker or recloser, its voltage class, the time since its last complete inspection, and its operating history. This results in a complete disassembly and inspection with typical frequencies ranging from 2 to 8 years.

Records

Equipment maintenance history is documented in the maintenance software program. Field maintenance personnel typically identify equipment with recurring problems and enter this information into a replacement database. This database is the primary source for information regarding which pieces of equipment should be replaced.

Equipment problems may also be identified by reviewing AEP's equipment outage information and customer outages. Investigating these will uncover problems that may be occurring with specific pieces of equipment. Likewise, this equipment data will be entered into the replacement database.

Typical remediation for bushings that exhibit elevated power factor readings would be an accelerated testing schedule or a scheduled replacement. Gas leaks are addressed based on the severity and the location of the gas leak. If the gas leak is severe, a complete overhaul of the circuit breaker may be required which would be scheduled as soon as practical. Deteriorated oil is typically cleaned and reclaimed by filtering at the time of the circuit breaker/recloser internal inspection, or replaced with new oil if the level of deterioration warrants. Deteriorated or worn internal components are typically replaced or repaired during the circuit breaker/recloser internal inspection, however, judgment is used on continued serviceability and the circuit breaker may be placed on an accelerated inspection schedule. Compressor system problems and mechanism problems are addressed when found as these conditions can affect the timing and operation of the circuit breaker or recloser. Any moisture intrusion is typically corrected at the time of the internal inspection.

Substation: Transformers

Program Details
Reliable operation of transformers requires that all components of these devices be in serviceable condition. These devices have a number of mechanical and electrical parts that require special attention. The maintenance program for transformers includes procedures that provide for monitoring, testing and planned maintenance to assure the integrity of these components and the overall performance of the transformers.

Objective
The objectives of this maintenance program are to:

- prevent unplanned outages or failures by identifying and correcting problems during scheduled inspections;
- reduce safety hazards, customer outages and associated call-outs for transformer problems by replacing limited lifetime components in a timely manner; and
- utilize best practices and technology to achieve optimum loading of all transformers

Traditional time-based maintenance is gradually being replaced with condition-based maintenance. This change often extends the necessary maintenance interval, while improving service reliability and operating life extension.

Inspection/Collection
Transformers have temperature indicators located on the transformer tank to measure insulating fluid and winding temperatures. In addition, transformers are equipped with ammeters and wattmeters to measure loadings. Transformers with Load Tap Changers (LTC's) also have counters that register the number of tap changing operations that have occurred. As a part of the Comprehensive Station Inspections, these values are recorded and later loaded into the AEP maintenance software program, which drives maintenance on the equipment. The comprehensive inspection identifies any external problems or problems such as low levels of insulating fluid. The bushings are also inspected. Any problems are noted on the inspection report and any serious condition is immediately reported to maintenance personnel.

The Mandated Station Inspection is used to check for any external problems, bushing damage, or oil leaks.

Analysis/Assessment
The transformer maintenance program can be monitored by querying the facility database each month to see how many maintenance jobs have been completed and which units are coming

due for maintenance. This information can be trended from month to month to show how maintenance is following relative to the schedule. If necessary, management can make changes required to achieve the plan.

Outcome/Incorporation
Typically the outcome of the inspection and analysis is the maintenance plan. Occasionally the analysis indicates that the equipment should be replaced The AEP companies' capital plans include funding to replace equipment that has become unreliable or obsolete. This equipment may have deteriorating components, parts may not be available from vendors, or other maintenance problems may be causing repeated customer outages.

Maintenance Activities
Preventive maintenance on transformers is evolving from traditional time-based maintenance to Condition Based Maintenance (CBM), which includes time and operations intervals. Some of the principles of Reliability Centered Maintenance (RCM) are also being applied. RCM focuses on the reliability of components and is triggered by conditions that are detected through:

- fluid and gas tests;
- external measurements and monitoring;
- the total number of LTC tap changing operations that have occurred since the last maintenance, which indicates the duty cycle of the tap changing mechanism;
- the loading that has occurred; and
- the elapsed time since the minor maintenance cycle was last performed, or
- the elapsed time since the major maintenance cycle was last performed

CBM also includes intervals and operations counts that are specific to the manufacturer and type of unit. The intervals are determined by considering the manufacturer's original recommendations, past operating experience and industry guidelines Computer program algorithms, which take into account the items listed above, have been developed to aid in identifying when transformer maintenance is needed. Maintenance engineers review the data and prioritize the transformers requiring maintenance, and then field personnel schedule and perform the work.

Two types of maintenance are performed:

- Transformer Minor Maintenance involves external inspection and maintenance, which includes electrical tests, lubrication of fans, cleaning of radiators used to cool the insulating fluid and internal maintenance of the LIC mechanism, where present.
- Transformer Major Maintenance, involving internal inspection and maintenance, begins with a pre-assessment. The maintenance includes filtering and vacuum processing the insulating fluid, replacing the gasket seals, performing electrical tests, and addressing any items which were found during the pre-assessment inspection

and internal maintenance of the LTC mechanism, where present.

Other maintenance that is performed on transformers includes:

- Predictive diagnostics are performed on transformers to determine maintenance requirements. For example, infrared scanning of substations will identify hot spots that may exist on the bushings or connectors, or in control cabinets. These are reported and corrected as soon as practical to minimize equipment failures, safety problems and customer outages.
- Transformer accessories are operated periodically to "exercise" them, which keeps the mechanisms free to operate when called upon, and the electrical contacts are wiped clean of oxidation film. This also provides an opportunity to find problems before they cause a misoperation or outage.

Inspection/Maintenance Frequency

Transformers are scheduled for inspection based on the Mandated or Comprehensive Station Inspection schedule unless extenuating circumstances such as storm recovery efforts preclude the monthly inspection. The maintenance schedule depends upon factors such as the type of transformer, its voltage class, its MVA rating, the time since its last complete inspection, and its operating history. Oil samples are extracted for gas analysis on a schedule ranging from 6 months to 48 months depending upon the specific type of gas analysis performed. Sampling is scheduled more frequently for transformers exhibiting gassing characteristics out of nominal bounds. Minor transformer maintenance frequency is condition based and performed approximately every four years or more or less frequently depending upon diagnostic conditions. Major transformer maintenance frequency is conditioned based and not time based.

Records

The equipment maintenance history is documented in the maintenance software. Field maintenance personnel typically identify equipment with recurring problems and enter the data into a replacement database. This database is the primary source for information regarding which pieces of equipment should be replaced.

Equipment problems are also identified by reviewing AEP's reliability indices and customer outages. Reviewing this data may uncover problems occurring with specific pieces of equipment Likewise, this equipment data will be entered into the replacement database.

Typical remediation for bushings that exhibited elevated power factor readings would be an accelerated testing schedule or a scheduled replacement. Surge arresters found deteriorated based on test results are addressed by an accelerated testing schedule or a scheduled replacement. Typically, most minor oil leaks and minor gas system leaks are addressed as

much as practical on site during preventive maintenance; however, leaks that cannot be easily repaired would be scheduled for repair based on the severity of the condition and the level of resources required. Load Tap Changer contacts exhibiting excessive wear are generally replaced during the L T C inspection process and LTC filtration units are maintained as conditions warrant. Debris in transformer cooling systems (radiators) are typically removed when found. However, transformers with coolers instead of radiators require high-pressure washing which must be scheduled. Defective gauges found are either recalibrated or scheduled for replacement in the normal course of business.

Substation: Voltage Regulators

Program Details
Reliable operation of voltage regulators requires that all components of these devices be in serviceable condition. These devices have a number of mechanical and electrical parts that require special attention. The maintenance program for voltage regulators includes procedures that provide for testing and planned maintenance to assure the integrity of these components and the overall performance of the voltage regulators.

Objective
The objectives of this maintenance program are to:

- prevent unplanned outages or failures by identifying and correcting problems during scheduled inspections; and
- reduce safety hazards, customer outages and associated call-outs for voltage regulator problems by replacing limited lifetime components in a timely manner

Traditional time-based maintenance has been replaced with Condition-Based Maintenance (CBM). This change often extends the necessary maintenance interval, while providing operating life extension as an end result.

Inspection/Collection
Voltage regulators have counters that register the number of tap changing operations that have occurred. As a part of the comprehensive routine substation inspections, these values are recorded and later loaded into the AEP maintenance software program, which drives maintenance on the equipment. The comprehensive inspection identifies any external problems or problems with low levels of insulating fluid. The bushings are also inspected. Any problems are noted on the inspection report and any serious condition is immediately reported to maintenance personnel.

The Mandated Station Inspection is used to check for any external problems, bushing damage, or oil leaks.

Analysis/ Assessment
The voltage regulator maintenance program, which is tied to the transformer minor maintenance program can be monitored by querying the facility database each month to see if any maintenance jobs were required. This information can be trended from month to month to review regulator performance relative to the expectations. If necessary, changes can be made as required to achieve the desired performance.

Outcome/Incorporation

Typically the outcome of the inspection and analysis is a CBM maintenance plan as required. Occasionally the analysis indicates that the equipment should be replaced. The AEP companies' capital plans include funding to replace equipment that has become unreliable or obsolete. This equipment may have deteriorating components, parts may not be available from vendors, or other maintenance problems causing repeated customer outages.

Maintenance Activities

Preventive maintenance on voltage regulators has evolved from traditional time-based maintenance to Condition Based Maintenance (CBM), which includes time and operations intervals. Some of the principles of Reliability-Centered Maintenance (RCM) are also being applied. RCM focuses on the reliability of components and is triggered by conditions that are detected through:

- fluid and gas tests;
- external measurements;
- the total number of tap changing operations that have occurred since the last maintenance, which indicates the duty cycle of the operating mechanism;
- the loading that has occurred; and
- the elapsed time since the minor maintenance cycle was last performed

CBM also includes intervals and operations counts that are specific to the manufacturer and type of unit. The intervals are determined by considering the manufacturer's original recommendations, past operating experience and industry guidelines. Computer program algorithms, which take into account the items listed above, are being developed to aid in identifying when voltage regulator maintenance is needed. Maintenance engineers review the data and prioritize the equipment requiring maintenance, and then field personnel schedule and perform the work. A voltage regulator which is in deteriorated condition will be removed for a pre-assessment evaluation to determine if more extensive major maintenance will be cost effective. The pre-assessment evaluation includes insulating fluid samples, a detailed visual inspection, review of the accessories and their condition and inspection of the control wiring.

T wo types of maintenance are performed:

- Voltage regulators are typically installed for regulation of the main transformer voltage in the substation. Their maintenance is included in the work schedule for the Transformer minor maintenance program, an external inspection and maintenance, which includes electrical tests.
- Voltage regulators found to require Major Maintenance by the pre-assessment inspection are replaced. The deteriorated voltage regulator is removed and placed into the AEP repair shops for complete reconditioning, an internal inspection and maintenance or scrapping. The reconditioning includes replacing the insulating fluid,

replacing the gasket seals, electrical tests, and attending to any items that were found during the pre-assessment inspection and internal maintenance of the tap switch.

Other maintenance that is performed on regulators includes:

- Predictive diagnostics are performed on voltage regulators to determine maintenance requirements. For example, infrared scanning of substations will identify hot spots that may exist on the bushings or connectors, or in control cabinets. These are reported and corrected as soon as practical to minimize equipment failures and customer outages.
- Voltage regulators are operated periodically through neutral to "exercise" them, which keeps the mechanisms free to operate when called upon, and the electrical contacts wiped clean of oxidation film. This also provides an opportunity to find problems before they cause a misoperation or outage.

Inspection/Maintenance Frequency

Station voltage regulators are scheduled for inspection based on the Mandated or Comprehensive Station Inspection schedule unless extenuating circumstances such as storm recovery efforts preclude the monthly inspection. The maintenance frequency is not time dependent but is based upon condition based maintenance.

Records

The equipment maintenance history is documented in the maintenance software. Field maintenance personnel typically identify equipment with recurring problems and enter the data into a replacement database. This database is the primary source for information regarding which pieces of equipment should be replaced.

Equipment problems are also identified by reviewing AEP's reliability indices and customer outages. Reviewing this data may uncover problems occurring with specific pieces of equipment. Likewise, this equipment data will be entered into the replacement database.

Typically AEP has used Load Tap Changers (LTC) units, as opposed to separate voltage regulators, to regulate distribution station bus and system voltages. Since LTC's are an integral part of a transformer, maintenance of these units is addressed as part of the transformer maintenance. In some cases AEP has installed separate voltage regulators either in series with the transformer or on a distribution feeder in order to regulate bus and system voltage. Maintenance on voltage regulators that are connected in series with transformers is planned and scheduled as part of the transformer maintenance. Based on the previous experience and information from scheduled station inspections, no feeder or bus regulator maintenance was planned or performed for regulators in Ohio. Data gathered as part of the station inspection programs was continually monitored and evaluated. If necessary, regulator maintenance will be performed as equipment conditions warrant.

Substation: Capacitor Banks

Program Details
Reliable operation of capacitor banks requires that all components of these devices and their associated switchgear is in serviceable condition. These devices have relatively few mechanical parts that require special attention. The maintenance program for capacitor banks includes procedures that provide for testing and planned maintenance to assume the integrity of these components and the overall performance of the capacitor bank.

Objective
The objectives of this maintenance program are to:

- prevent unplanned outages or failures by identifying and correcting problems during scheduled inspections; and
- reduce safety hazards, customer outages and associated call-outs for capacitor bank problems by replacing limited lifetime components in a timely manner

Traditional time-based maintenance has been replaced with Condition-Based Maintenance (CBM). This change often extends the necessary maintenance interval, while providing operating life extension as an end result.

Inspection/Collection
Switchgear for capacitor banks have counters that register the number of switch operations that have occurred. As a part of the comprehensive routine substation inspections, these values are recorded and later loaded into AEP's maintenance software, which drives maintenance on that equipment. During the comprehensive station inspections, station capacitor banks are visually checked for blown fuses, deformed or ruptured capacitor units. The support insulators and switchgear bushings are also inspected. Any problems are noted on the inspection report and any serious condition is immediately reported to maintenance personnel.

As part of the Mandated Station Inspection, capacitor banks are visually checked for external damage.

Analysis/Assessment
The capacitor bank maintenance program can be monitored by querying the facility database each month to see how many maintenance jobs have been completed. This information can be trended from month to month to show how maintenance is following relative to the schedule. If necessary, management can make changes required to achieve the plan.

Outcome/Incorporation

Typically the outcome of the inspection and analysis is the maintenance plan. Occasionally the analysis indicates that the equipment should be replaced. The AEP companies' capital plans include funding to replace equipment that has become unreliable or obsolete. This equipment may have deteriorating components, parts may not be available from vendors, or other maintenance problems causing customer inconvenience.

Maintenance Activities

Preventive maintenance on capacitor banks has evolved from traditional time-based maintenance to C B M, which is driven by inspections and testing. Some of the principles of Reliability-Centered Maintenance (RCM) are being applied RCM focuses on the reliability of components and is triggered by conditions that exist such as:

- visual and infrared inspections; and
- an unbalance condition in the entire bank

CBM also includes intervals and operations counts that are specific to the manufacturer and type of unit. The intervals are determined by considering the manufacturer's original recommendations, past operating experience and industry guidelines. Maintenance engineers review the information monitored above and prioritize the units requiring maintenance, and then field personnel schedule and perform the work.

Shunt capacitor banks in stations have very few moving parts that require maintenance. Capacitor cans are self-contained units and vacuum switches, used to switch capacitor banks, are typically sealed units requiring minimal maintenance.

Three types of maintenance are performed:

- Capacitor bank switchgear maintenance is coordinated with the circuit breaker external maintenance program specific to that type of switch, an external inspection and maintenance, which includes electrical tests,
- Capacitor banks receive a visual and mechanical inspection, which includes tightening hardware and connections, inspecting for leaks, lubricating any moving parts, inspecting and replacing fluid labels, inspecting and cleaning the fuse holders, and
- Capacitor bank controls are inspected and recalibrated

Other maintenance that is performed on capacitor banks includes the following:

- Predictive diagnostics that are also performed on capacitor banks to determine maintenance requirements. For example, infrared scanning of substations will identify hot spots that may exist on the bushings or connectors, or in control cabinets. These are reported and corrected as soon as practical to minimize equipment failures and customer outages.

Inspection/Maintenance Frequency
Station capacitor banks are scheduled for inspection based on the Mandated or Comprehensive Station Inspection schedule unless extenuating circumstances such as storm recovery efforts preclude the monthly inspection. The maintenance frequency is not time dependent, but is based upon condition based maintenance.

Records
The equipment maintenance history is documented in the maintenance software. Field maintenance personnel typically identify equipment with recurring problems and enter the data into a replacement database. This database is the primary source for information regarding which pieces of equipment should be replaced.

Equipment problems are also identified by reviewing AEP's reliability indices and customer outages. Analyzing this data may uncover problems that may be occurring with specific pieces of equipment. Likewise, this equipment data will be entered into the replacement database.

Since capacitor banks are comprised of sealed units, with essentially no moving parts, minimal maintenance is required. Any maintenance that is required is normally scheduled to coincide with station breaker maintenance. Prior to each peak load season (winter and/or summer) station capacitor banks are checked, typically during a scheduled station inspection, to make sure that the unit is operating properly and will be available when called upon to support system voltages. Should a component failure, such as a capacitor can, fuse or vacuum bottle, be identified as part of the scheduled station inspections the failed unit is simply replaced with a new unit; typically these repairs are made shortly after the condition is identified.

Substation: Protection and Control

Objective
Protection System elements continually monitor the power system and protect lines and station equipment from damage by isolating those facilities from system disturbances. These sophisticated Protection Systems are designed to minimize the number of customer outages, safety issues and pieces of equipment affected. Maintenance is an ongoing program by which Protection System function is proven, and restored, if needed, with the goal of preventing misoperation or failures of station equipment; minimizing customer outages; minimizing maintenance call-outs and maximizing the life of station equipment. This program is structured to comply with requirements of NERC Reliability Standards: PRC-005-1, PRC-008-0, PRC-011-0 and PRC-017-0.

Inspection/Collection
Protection System elements are calibrated on a regular schedule for operating accuracy as well as a functional test of the tripping circuits. The newest generation of microprocessor relays has self-checking features which trigger an alarm when a failure is detected.

Analysis/Assessment
The Protection System maintenance program is designed to be monitored by querying the facility database each month to see how many tests have been completed. This information can be trended from month to month to show how progress is being made relative to the schedule. If necessary, management can make the changes required to achieve the plan.

Outcome/Incorporation
Typically the outcome of the testing is the maintenance plan. Occasionally the testing indicates that equipment should be replaced. Equipment replacement may be due to the fact the manufacturer no longer supports that specific piece of equipment, lack of replacement units or components, or misoperations.

Maintenance Activities
Preventive maintenance on Protection System elements has been primarily dictated by criticality of the facilities that they protect and the historical performance of the relay. The microprocessor-based relay, with self-diagnostic capabilities, has begun to replace the older electromechanical relays. Although the new relays increase the time between maintenance visits, the time it takes to perform the testing has also increased due to the technical complexity of the relay. To offset this, automatic relay testing via laptop computers is being implemented to reduce the testing time.

As maintenance is required, field personnel schedule outages to perform the work. Two types of Protection System maintenance are performed:

- Calibration: Adjustment of the operating threshold or measurement accuracy to meet specifications or applicable accuracy requirements. Electromechanical relays are checked to be free from foreign particles and connections checked for continuity.
- Functional Trip Testing: Application of signals to elements or components removed from service, to observe functional performance or output behavior of the DC circuitry including any incorporated communications-assisted functions. This test involves manually closing the tripping contacts for each schematic component to verify correct operation.

Inspection/Maintenance Frequency
Maintenance intervals vary depending upon the maintenance activity to be performed, such as the maintenance activities described above, the type/style of equipment comprising the Protection System and the associated power equipment's own maintenance schedule.

Records
Equipment maintenance history is documented in the maintenance software. Field maintenance personnel typically identify equipment with recurring problems and enter the data into a replacement database. This database is the primary source for information regarding which pieces of equipment should be replaced.

Reviewing reliability indices and customer outages may also identify equipment problems. Investigation will uncover problems that may be occurring with specific pieces of equipment.

Section H- Distribution Network Systems

Program Details
AEP Ohio operates network electrical systems in downtown Columbus and Canton, Ohio. These systems have been designed for single and double contingency events to provide a premium style service to these downtown areas.

Network inspections are performed annually for vaults and associated equipment to include transformers and network protectors. Network manholes, which typically do not have equipment installations other than underground cables, are inspected once every four years. The development of these guidelines was based on equipment manufacturer recommendations, local environmental conditions and historical data.

Operating data is collected and physical condition noted during the inspections. In addition, oil filled equipment is checked for leaks.

A number of inspection reports are used and maintained locally for network facilities. These include a manhole inspection report, a vault inspection report and a transformer and protector inspection report.

Analysis/Assessment
Local supervision reviews the inspection results to determine corrective action priorities as needed. Data analysis includes a comparison with historical trends. All equipment irregularities are analyzed for any adverse maintenance causes.

Following review of the inspection reports, work is then planned to perform maintenance on the inspected items if warranted. Work is prioritized based upon the nature of the condition found during inspection.

Based upon annual inspection results, the capital budget process is refined to include network improvements. The network systems engineering group combines field inspection results with engineering analysis to identify the effectiveness of each program component. There are periodic reviews of inspection frequencies and inspection tasks.

Maintenance
Maintenance needs identified by the Network Systems inspection program have both a corrective and a preventive component. Inoperative equipment is scheduled for repair or replacement. Through visual inspections and testing, equipment can be scheduled for maintenance to assure continued reliable operation is maintained.

Records/Reporting

The locations, types, identifiers and nameplate information of network facilities are stored in AEP Ohio's UG Network Systems Equipment and Enclosure (NEED) database. AEP Ohio's mapping system (DGIS) also provides information about Network facilities. NEED is used to trigger scheduling of the inspections. Records of inspection and program findings are kept manually. Periodic program status reports are reviewed by supervision to assure the program is on schedule. Copies of the inspection sheets are filed locally for analysis/reporting purposes.

Section I- Transmission Line Inspections

Objective
The intent of line inspections is to check the present condition of a line and determine if any of its components exhibit a near-term potential to fail and cause an outage or a safety problem.

Inspection/Collection
Line patrols are to be performed a minimum of once a year for each line. Inspection methods vary and can be performed from the air, ground, or by climbing a structure. All structures or a few targeted structures in a line may be inspected at a given time utilizing one or more inspection methods. One method of inspection may lead to another to confirm or further define the severity of a detected problem. In general, aerial patrols are performed a minimum of once a year for each line. Foot patrols or climbing inspections are scheduled as needed. Forced line outages usually require an aerial, foot patrol/climbing or combination of all inspections to identify the cause of the outage so the line can be properly repaired and returned to service. It is not unusual for inspections of this nature to detect non-outage-related problems that need attention.

Analysis/Assessment
The data collected during the inspection process is used to develop line maintenance and repair plans. AEP has a prioritization process that categorizes detected problems. The most serious items detected that can lead to line outages and/or safety concerns, such as broken poles or cross-arms, are scheduled for prompt corrective action. Less serious problems, such as loose bolts or broken ground wires, that have little or no chance of causing outages or safety issues are catalogued, prioritized and scheduled for replacement or repair in a timely manner.

Outcome/Incorporation
The immediate result of a good inspection program is that distinct problems or potential problems are detected before they cause outages or safety problems. A good response program must be in place to allow prompt replacement or repair of serious equipment problems and a systematic maintenance or replacement program must exist to handle less critical matters.

Maintenance Activities
AEP has a solid maintenance program in place that uses inspection data along with analytical processes to develop comprehensive line and right-of way maintenance programs.

Inspection Frequency
Line patrols are to be performed a minimum of once a year for each line.

Records

Inspection data is inventoried for future reference. Records are being stored on paper or electronically. AEP has a computerized record keeping system that enables AEP to track and predict when it is appropriate to perform maintenance on line components.

Section J- Transmission Line Maintenance

Objective
The intent of line maintenance is to avoid line outages and/or safety concerns whenever practical and to minimize the duration of outages when they occur.

Inspection/Collection
Line inspections provide information that is used to develop maintenance or replacement plans.

Analysis/ Assessment
Data collected as part of the line inspection program is analyzed and categorized to establish a work plan. The most serious items detected that can lead to line outages and/or safety hazards, such as broken poles or cross-arms, are scheduled for prompt corrective action.

Less serious problems, such as loose bolts or broken ground wires, which have little or no chance of causing outages or safety issues are catalogued, prioritized and scheduled for replacement or repair in a timely manner. Typically, these problems are corrected as general line maintenance is performed but, in some cases, may become part of a capital line rebuild or rehabilitation program.

Outcome/Incorporation
The number of line outages traceable to failed components measures the success of a line maintenance program. When a component failure occurs, every reasonable effort is made to determine what caused the failure. If the failure is traced to a non-critical problem previously reported during an inspection, similar reported problems at other locations on the line would be reviewed to determine if additional maintenance is required. Causes of outages are noted in AEP's Transmission Outage Reporting System (TORS). Trends in failures of certain line components can be monitored and, if significant, corresponding action will be taken. In cases where problems are significant in quantity/magnitude, line rebuilds or facility replacements may be appropriate. These projects and/or repairs are included as part of AEP's capital plan.

Maintenance Activities
After analysis of inspection data has been performed, repair or replacement of problem parts or components is scheduled. The following items are typical of those requiring repair or replacement: structures, poles, cross-arms, insulators, guy wires, conductors and ground wires. Items simply needing adjustments include loose bolts or conductor clamps.

Maintenance Frequency
Transmission line maintenance frequency is conditioned based and is not performed on a time based frequency schedule.

Records

AEP's TORS database is used to track all outages and their causes. In addition, AEP has developed an Integrated Transmission Information System (ITIS) database that will contain information relative to component replacements on a line. A comparison of TORS data indicating outages caused by component failure with maintenance history data in ITIS can be made. A higher than normal outage rate due to a certain component failure can be noted. If this occurs, line locations where the item was used can be determined and a detailed line inspection scheduled. The purpose of this inspection would be to determine if the item in question should be replaced.

Section K- Transmission Vegetation Control

Objective
The primary objective of the AEP Vegetation Management Program is to safeguard public and worker safety, prevent outages and to minimize reliability events from vegetation located within and adjacent to the rights-of-way in a safe, environmentally friendly, and cost-effective manner. AEP's vegetation management program is compliant with NERC FAC-003-1, which governs vegetation maintenance on lines operating at 200 kV and higher.

Inspection/Collection
AEP foresters conduct aerial patrols, except where the Federal Aviation Administration (FAA) or other ordinance prohibits flight, coveting substantial portions of the transmission system to identify areas where attention may be needed to prevent vegetation from interfering with circuit operation. Where flights are prohibited, foot patrols are used to identify areas requiring maintenance.

Analysis/ Assessment
Circuit criticality, historical data, line voltage, location, vegetative inventory information and land use are among the items considered when developing the annual vegetation management plan.

Outcome/Incorporation
The key measure of success is zero vegetation-related outages or operations on AEP's transmission system with a goal of achieving 25% less vegetation grow-in events over a 3-year period based upon 2005 statistics. AEP has a database called Transmission Operating Reporting System (TORS) that is used to track the operating record for each transmission line. A monthly TORS report is monitored to assess current vegetation reliability conditions or trends that may require mitigation measures.

Maintenance Activities
The AEP System Vegetation Management Program emphasizes tree removal to promote long- term vegetation control and to minimize future maintenance expenditures AEP vegetation maintenance activities may consist of manually or mechanically removing and/or trimming trees in and out of the rights-of-way, selective or broadcast applications of herbicides, either aerially or from the ground, and the application of tree growth regulators.

Maintenance Frequency
Transmission Vegetation Management Program frequency is conditioned based and is not performed on a time based frequency schedule.

Records

A systematic vegetation management work plan is annually entered into Forestry Operation's Contract Administration Management Payment System (CAMPS) software to allow tracking and reporting of each year's progress and expenses. At the end of the calendar vegetation management cycle an annual completion report, including variances, is analyzed to provide guidance toward future plans.

General Discussion

The System Forestry group of AEP manages the vegetation along the transmission rights-of-way in Ohio. This is done through the implementation of a comprehensive, systematic integrated vegetation management (IVM) program designed to ensure that the vegetation along each transmission line is managed at the proper time, and in the most cost-effective and environmentally sound manner. AEP System Forestry is a centralized organization in both reporting and budgeting and primarily employs degreed foresters to oversee this program.

AEP's transmission system is managed on a prescriptive basis. Ongoing evaluation of the system, through comprehensive ground and aerial inspections by both Transmission Line and System Forestry personnel, provides the basic information used by System Forestry to develop its prescriptions. Additionally, line criticality, historical data, line voltage, location, vegetative inventory information and land use are among the items considered when developing management prescriptions. Factors considered by AEP when developing annual prescriptions include, but are not limited to:

- A priority and schedule of treatment by line/circuit;
- Type of treatment (mechanical, manual, herbicide) based on vegetative and environmental conditions;
- Cost of treatment

As succession occurs within the plant communities along the rights-of-way, these work prescriptions will change based on the sizes and types of vegetation present. Prescriptions, therefore, may include several activities such as tree trimming, tree removal, mechanical clearing and ground and aerial herbicide applications. Subsequent prescriptions may address isolated locations requiring "yard tree" trimming, the removal of danger trees outside the maintained rights-of-way or control of fast growing brush, before the line is again maintained in its entirety. AEP's System Forestry staff and its contractors continuously work to ensure the appropriate prescription is utilized to maximize effectiveness and efficiency.

Certified utility line clearance contractors provide the labor force for the ground based clearing and herbicide applications. FAA-licensed aerial contractors provide patrol, side trimming and herbicide application services. Contract work is designated and inspected by AEP foresters to ensure that the work is complete, performed in a timely manner, to AEP and industry standards, at reasonable cost,

and with courtesy to property owners and to the public. Foresters travel throughout their assigned regions of the AEP companies to accomplish these tasks.

AEP Vegetation Management Program Elements

- Inspections
- Annual Work Plan
- Unscheduled Work
- Storm Work

Inspections - In general, 100% of the AEP transmission system is inspected each year by AEP Forestry. The vast majority of these miles are inspected aerially, wherever the FAA or other similar law or ordinance does not prohibit overhead flight, and locations of concern are noted using inspection forms, which are forwarded to AEP foresters. Forestry personnel investigate all observed and reported concerns and take appropriate actions to mitigate any threat to safety or reliability.

Detailed climbing inspections and/or ground patrols are also performed periodically by line maintenance crews on the AEP transmission system. Locations of concern identified during these "walking" inspections are also directed to AEP foresters for investigation and action. AEP foresters check locations of concern and appropriate actions are taken.

Annual Work Plan - Using inspection information and data from AEP asset managers, each line is prioritized based on its potential for tree-caused outages, criticality of the line, voltage, etc. For lines requiring attention, AEP work plans may consist of manually or mechanically removing and/or trimming trees on and off the rights-of-way, selective or broadcast applications of herbicides, either aerially or from the ground, and the application of tree growth regulators. The range of required work may either involve management of the vegetation along the entire line or simply addressing individual locations of concern. Site conditions, growth rates, length of time until the next anticipated maintenance, wind and conductor sag are all taken into consideration when determining which maintenance practices must be applied.

Transmission work plans are normally developed in the fall of the preceding year, and input from asset managers and line maintenance personnel is solicited during development. Finalized plans are normally presented to all interested parties for approval before being initiated.

AEP's program is an integrated vegetation management program utilizing a variety of management techniques depending upon the condition of the vegetation and the management tool to be applied.

Unscheduled Work - Forestry deals with a dynamic, living system. Variables such as tree species, weather patterns and soil conditions all affect tree growth and the regrowth rates of trimmed trees.

Even the most comprehensive line clearance program must make allowances for responding to isolated vegetation-related threats and customer requests. AEP Forestry has traditionally dedicated a portion of its total budget and crew strength to this type of work that is incremental to the work plan. Such work may include isolated stands of fast growing trees, vines growing on AEP poles and hardware, fire or insect damaged stands adjacent to the rights-of-way, or trees located in slips or slide areas.

Storm Work - AEP foresters and contract tree crews respond as required to trim, remove and clear trees within AEP easements to restore electrical service during storms or to prevent an imminent outage or safety hazard.

Additional Program Basics

Customer Relations & Community Involvement

Forestry personnel utilize face-to-face communication and door cards to contact resident property owners before routine line clearance work is done. AEP has invested time and resources into public education concerning proper tree care and sound environmental practices. AEP System Forestry participates in many organizations such as the National Arbor Day Foundation, the Utility Arborist Association, the International Society of Arboriculture, the US Environmental Protection Agency's *Pesticide Environmental Stewardship Program,* and various state and local vegetation management organizations. AEP Corporate Communications in cooperation with Transmission Management has produced a brochure, Transmission Right of Way Clearing and Maintenance, *A Balanced Approach to Vegetation Management,* which is given to landowners and other community groups, outlining general policies for AEP's transmission vegetation management program.

While AEP Forestry goes to great lengths to satisfy our customers there are times when a homeowner lodges a complaint either directly to AEP or to a state commission. Forestry complaints can be grouped into two categories: a) a customer wants their tree pruned and it falls outside the scope of AEP responsibility or AEP is unable to prune it in a timeframe suitable to the customer; and, b) AEP has pruned a tree and the result is unacceptable to the customer. Complaints are viewed as advice on potential program changes, and AEP works diligently to amicably resolve any differing points of view.

Tree Growth Regulators

Caring for trees under power lines requires regular pruning Each new pruning places a tree under stress because it removes leaves and branches, which manufacture and store nutrients. This forces the tree to tap its reserves to grow new wood Tree Growth Regulators (TGRs) control crown growth and reduce the frequency and amount that trees must be trimmed. TGRs control regrowth, allowing a tree to use its reserves to survive disease and insect attacks, and to withstand environmental assaults like drought and pollution.

A treated tree grows more slowly and requires less pruning, meaning fewer branches may be removed when it is re-pruned. That means a healthier, more natural-looking tree, and fewer visits from line clearance crews. TGR products reduce tree growth for two to eight years, depending on species, application rates and other environmental conditions.

Summary

AEP System Forestry continually seeks technological innovations and process improvements to maintain our vegetation management program as one of the best in the industry. AEP System Forestry personnel participate in and/or lead vegetation management organizations such as: the Edison Electric Institute's Vegetation Management Task Force, the International Society of Arboriculture, the Utility Arborist Association, the US EPA's Pesticide Environmental Stewardship Program, numerous state or regional vegetation management associations and numerous state and local urban and community forestry councils.

OHIO POWER COMPANY'S RESPONSE TO
THE OFFICE OF THE OHIO CONSUMERS' COUNSEL'S
DISCOVERY REQUEST
PUCO CASE NOS. 17-0038-EL-RDR AND 18-230-EL-RDR
FIRST SET (STIP)

INTERROGATORY

OCC STIP INT-1-024 Under the joint Stipulation and Recommendation on page 9, how many danger trees does the company expect to remove on an annual basis between 2019 and 2021?

RESPONSE

During 2019, the Company expects to remove approximately 135,000 danger trees. During years 2020 and 2021, the Company expects to remove approximately 61,000 trees each year. These estimates are preliminarily based on current forecasted spend amounts and are subject to change (2019 = $50 million, 2020 & 2021 = $22.5 million).

Prepared by:

Thomas A. Kratt

BEFORE THE PUBLIC UTILITIES COMMISSION OF OHIO

In the Matter of the Commission's Review of the Ohio Power Company's Distribution Investment Rider Work Plan for 2016.	))))	**Case No. 16-024 -EL-UNC**

Notice of Ohio Power Company's Commission-Requested Distribution Investment Rider Work Plan

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On February 25, 2015 the Commission approved an Electric Security Plan for Ohio Power Company ("AEP Ohio" or "Company"), including approval of the Distribution Investment Rider (DIR) in Commission docket 13-2385-EL-SSO et al. ("*ESP III Order*"). As part of the approval of the DIR, the Commission instructed that it is no longer necessary for the Company to work with the Commission Staff while reliability standards are being met, and to file the resulting plan for Commission review in a separate docket.

In case 13-2394-EL-UNC the Commission clarified the filing requirements for the DIR plan outlining expectations for the filings going forward. In case 13-2385-EL-SSO, the Commission denied expansion of the DIR, but approved the DIR at a level similar to those in previous years. AEP Ohio offers the 2016 DIR plan at this time for the entire year, even though the ESP III rehearing is not finalized. AEP Ohio will file an amended document to the extent necessary, if the DIR program is modified in any manner as a result of a final order in the pending electric security plan filing.

The Company followed the previous year's strategy to look at programs in the plan which would have the most impact to both proactive system infrastructure replacement as well as

reliability improvement to customers. In order to develop the 2016 DIR plan, the Company looked at causes of outages on the system, opportunities for proactive replacement, engineering and labor resource availability, and overall impact of each program. The 2016 Plan, as developed, takes into consideration various factors encountered during 2014 and 2015, such as labor resources, and adjusts the 2016 plan accordingly. This comprehensive development of the plan provides the best practice to reach the Commission's goal to help ensure that this and future DIR plans will positively impact reliability performance to customers across the service territory. Overall, the plan is developed to provide a more proactive replacement plan as well as components which will maintain or improve reliability to customers. In section A of the 2016 DIR plan, all the programs listed either proactively replace infrastructure or impact reliability to customers.

AEP Ohio will continue to work with Staff annually to review the accounting accuracy, prudency and compliance with the DIR plan as developed. In order to ensure double recovery does not occur in the DIR, there are two safeguards currently in place. First, the Company tracks assets recovered through other riders by separately identifiable work-orders which allow those charges to be appropriately removed from the DIR rider filing. This process has been reviewed and verified during past audits of the DIR program. Second, an independent audit is conducted of the DIR program expenditures. This audit is completed by an external independent auditor chosen by the Commission to ensure compliance with the financial side of the program expenditures. The auditor sends its findings to the Commission and ensures that the Company follows all guidelines when reporting items charged to the DIR.

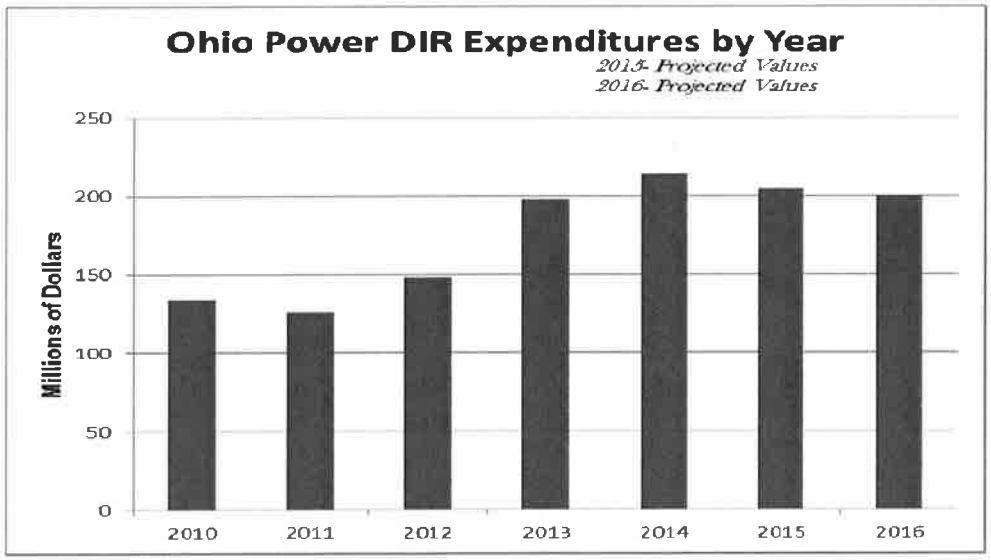
The Company will continue to provide Staff with quarterly updates consistent with Finding 25 of the Commission's order in Case No. 13-2394-EL-UNC. The Company will send

Staff quarterly updates in order to show the progress of each of the programs and agrees to meet in person to discuss any questions when requested. The Company will also continue to provide Staff locations to audit DIR work being performed in the field per Finding 25 in Case No. 13-2394-EL-UNC, unless otherwise ordered by the Commission.

The attached 2016 DIR work plan includes estimates of the work to be proactively performed and the expected spending in each category. As expected, anytime there is a proactive program covering an entire year of spending on items as varied as are covered here, there are likely to be some differences in what is expected and what is performed. However, where possible the Company has provided a good faith estimate of the expected areas to be impacted, proactively maintained, or replaced to provide a guidepost for future interactions with Staff. These estimates may change over the course of the year, and the quarterly updates provided to Staff may reflect these changes as well as an explanation of the change.

Overall, the Company's average capital expenditure has increased significantly in the past years due to the DIR program (Chart 1). This spending will still be audited as outlined by the Commission in the *ESP III Order*. The chart below shows the Capital expenditure by millions prior to the DIR Program implementation (years 2010 – 2012) and after the implementation (years 2013 – 2016). As shown in the chart below, the expenditure levels are greater in the DIR plan years per the approval of the DIR. The values in the charts exclude costs associated with gridSMART and the Enhanced Service Reliability Riders.

Chart 1



While the overall DIR plan will have a positive effect on reliability improvement experienced by customers, inherently there are some components that may not be measured in a quantitative reduction in the amount of outages. Where investments are made in specific asset categories to proactively address known performance needs, the Company will track reliability improvements in that asset subset. Because the work plan components involve a proactive approach focused on the best methods to impact long-term reliability improvements, the goal is to prevent the outages that may occur in the future from happening. This is a proactive approach to ensure that things working now will continue to work and no further degradation of the system will result in further outages.

Reflected in the 2016 DIR plan, the Company has provided a column to show the number of Worst Performing Circuits being addressed by the DIR program. It is important to address worst performing circuits, and the DIR Program is a tool which allows for these circuits to be addressed by the various programs and thereby improve reliability or proactively reduce future outages. A single circuit may be reflected under several programs. It is also important to note

that not all worst performing circuit issues can be addressed by DIR programs because some of those circuits may require non-capital maintenance activities, and O&M spending is not reflected in the DIR Plan.

The Company was able to show positive reliability results based on programs with a reliability impact as shown on the plan for 2014. Reliability improvement values were shared with Staff per the Order in Case No. 12-3129-EL-UNC. The results showed a positive improvement for all reliability programs as well as an estimate for avoided outages. These results reinforce the benefit of the DIR Program.

As ordered in Case No. 13-2394-EL-UNC, the Company has provided Staff the reliability improvements on March 2, 2015 achieved from the 2014 DIR plan, as well as quantification of avoided outages. Although the *ESP III Order* did not specify a date by which the Company needs to provide the same information, the Company recommends providing the data for the 2015 DIR Plan to Staff in writing by April 15, 2016. The reporting of the data in April allows the Company time to adequately review and submit the information and would not overlap with the Company's annual rule reporting efforts for Rule 26, 27, 10 and 9.

Going forward, the Company and Staff will continue to work cooperatively evaluating the progress of the programs outlined in the DIR work plan. Various elements may affect the execution of the plan during 2016, such as storms, resource availability, and mutual assistance to other utilities. These factors will be shared with Staff during the year. The Company provides this filing and attachments detailing the components to satisfy the requirements related to the

DIR review from the May 21, 2014 Finding and Order in Case No. 13-2394-EL-UNC and the February 25, 2015 Finding and Order in Case No. 13-2385-EL-SSO.

Respectfully submitted,

/s/ Matthew J. Satterwhite

Steven T. Nourse
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CERTIFICATE OF SERVICE

I hereby certify that a copy of *the document above* was provided to the Commission Staff and a courtesy copy to the Office of the Ohio Consumers' Counselor, by e-mail upon the following entities on this 8th day of January 2016:

/s/ Matthew J. Satterwhite

Matthew J. Satterwhite

AEP OHIO
A unit of American Electric Power

DIR Component	Program Description	Measures for Reliability Improvements	2015 Filing Rule 11 Work	Expected Reliability Improvements	Measurement Units	Projected 2016
Section A						
Forestry - Emerald Ash Borer Mitigation Ash Trim	There is a growing number of Ash trees that have been affected by the Emerald Ash Borer. On average, an Ash tree will die in 2 to 3 years once affected by this insect. This program is designed to remove targeted Ash trees from outside right-of way. This would be a stand alone program seperate from the ROW Maintenance Program. The Company intends to implement this program utilizing a work force other than the one engaged with the current vegetation management program. No activity is currently targeted in 2016.	This is a proactive preventative program. There is some reliability impact related to the prevention of future outages.		Proactive efforts to maintain system reliability	Trees Removed	$0
Animal Mitigation - Station	This program is designed to install electric fences in targeted stations to help mitigate against animal related outages. Approximately 4 electric fences may be targeted in 2016 for work under this station animal mitigation program.	This should reduce non-avian related animal caused outages inside distribution stations by approximately fifty percent for those stations where mitigation was installed beginning in the year following installation.		Reduced outages	Fences Installed	$100,000
Underground Cable Replacement	This program is to proactively address aging infrastructure based on various factors such as age, previous operational history, cable construction, etc. This would include URD cable, feeder exit cable, network cable, and station cable, such as transformer cables and bus ties. This program will include approximately 500,000 conductor feet of underground cable work in 2016.	This should reduce URD cable failures by approximately fifty percent on those segments addressed beginning in the year following installation. Feeder exit, network and station cable replacements are asset renewal programs and as such, there will be some positive impact to reliability, related to the prevention of future outages.	1	Reduced outages	Span Feet	$26,400,000
Cutout & Arrester Program	This program is to proactively address equipment failure issues by replacing targeted porcelain cutouts and associated equipment. Approximately 2,000 cutouts and their associated arresters are targeted for replacement under this program in 2016.	Proactive asset renewal that will reduce the probability of future outages related to cutout and arrester failures.	2	Proactive efforts to maintain system reliability	Units Installed	$500,000
Distribution Circuit Asset Improvement Includes Small Wire Replacement	This program is designed to address various operational, reliability and asset renewal issues as identified by Distribution Line Operations, Distribution Engineering and customer concerns. This program includes circuit improvement projects such as line relocation, reconductoring, OH to UG, multiphasing, fuse size changes, over current protection upgrades and coordination, circuit reconfiguration, and load balancing. The Small wire replacement portion of this will proactively address equipment failure issues by replacing targeted spans of small and deteriorating overhead conductor. In some cases portions of circuits may be rebossed and/or rebuilt due to accessibility concerns and/or physical conditions.	Reliability improvements vary based on the type of work performed and can be measured on a circuit or line segment basis. The small wire replacement work should reduce outages due to Equipment/Hardware and conductor failure by fifty percent on those line segments addressed beginning in the year following installation. Projects such as line relocation and reconductoring segments should reduce outages due to Equipment/Hardware and conductor failure by fifty percent on those line segments addressed beginning in the year following installation. Load balancing when completed on a circuit will reduce overload outages by fifty percent beginning the following year after installation. Projects which take overhead lines to underground lines will reduce weather related outages, animal outages, and tree related outages on those segments by fifty percent in the year following when work was completed. Upgrading or overcurrent protection devices (changing from hydraulic to electronic protection devices, changing from three phase to single phase isolation and fuse size and coordination changes) can reduce customer outages by impacting fewer customers affected by an outage. Some projects under this program are solely asset renewal projects with only minor reliability impact related to the prevention of future outages, but are intended for proactive equipment replacement.	19	May reduce customer interruptions and outages; varies by work request.	Completed Hours	$27,500,000
Lightning Mitigation	This program is designed to help reduce the number of lightning caused outages on specifically identified circuits. AEP Ohio will target circuits and rank them by lightning caused outages and install lightning mitigation on the highest five percent of circuits with 3 or more lightning caused outages. These circuits will be ranked on a annual basis and may include that year's Rule 11 circuits. Circuits may be added or removed at the Company's discretion. This program will involve approximately 5 circuits in 2016.	This should reduce the aggregate number of lightning caused outages by approximately fifty percent on the circuits addressed beginning in the year following installation.		Reduced outages	Circuits	$30,000
Station Rebuild / Rehab	This program is designed to replace existing distribution station equipment including transformers, breakers, structures underground facilities, etc. AEP Ohio will target equipment which is approaching end of life and becoming difficult to maintain.	Proactive asset renewal program. There is positive impact to reliability, related to the prevention of future station equipment caused outages.	5	Proactive efforts to maintain system reliability	Stations	$2,000,000
Network Rehab	This program is designed to replace and/or upgrade network cable, vaults, transformers, protectors and install fault indicators.	Proactive asset renewal program. There is positive impact to reliability, related to the prevention of future network outages.		Proactive efforts to maintain system reliability	Completed Hours	$7,000,000

AEP OHIO
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DIR Component	Program Description	Measures for Reliability Improvements	2015 Filing Rule 11 Work	Expected Reliability Improvements	Measurement Units	Projected 2016
Sectionalizing	This program is designed to enhance the over current protection scheme, operation of Distribution system and reduce the number of customers affected by an outage. It includes the installation/upgrade of sectionalizing devices on circuits, shortening of protection zones and providing additional isolation points. Approximately 35 circuits will be targeted in 2016 for work under this sectionalizing program.	Installation of sectionalizing can reduce SAIFI by impacting fewer customers affected by an outage. There is limited opportunity to continue with a large scale effort.	2	Reduce Customers Interrupted	Circuits	$1,200,000
Distribution Asset Improvement Associated with Transmission Work	AEP Transco plans to rebuild a number of transmission lines of which a portion contain Distribution underbuild. Transfer of Distribution facilities or the replacement of conductors with "like kind" are included with the Transmission project. This component will provide Distribution the opportunity to make Distribution system enhancements, such as building a new tie line or increasing conductor size to create a tie line for reliability purposes. AEP Transco/Transmission will also be rebuilding existing or building new station facilities. The replacement of Distribution station breakers and transformers, Distribution SCADA installations, and relocation or replacement of Distribution feeder exits in conjunction with these projects will also be included in this component as either reliability enhancements and/or asset renewal. (This does not include breaker or underground cable replacement or SCADA installations).	Proactive asset renewal that will reduce the probability of future outages. In some cases, new tie lines may be established to enhance reliability to shorten outage durations following an event. A portion of the circuit that is rebuilt will replace existing equipment identified to be near the end of its life that could reduce future Equipment Failure outages.		Proactive efforts to maintain system reliability	Completed Hours	$4,000,000
Station Breaker Replacement	This program is designed to replace existing distribution station breakers with associated relays, controls, and SCADA when appropriate. AEP Ohio will target equipment which is approaching end of life and becoming difficult to maintain. The existing breakers have limited flexibility to adapt to modern over current protective schemes. Approximately 5 station circuit breakers may be targeted in 2016 for work under this station breaker program.	Proactive asset renewal program. There is positive impact to reliability, related to the prevention of future station breaker outages.	3	Proactive efforts to maintain system reliability	Units Installed, Installations	$1,500,000
Station Regulator Replacements	This program is designed to replace existing distribution station regulators and associated controls. AEP Ohio will target equipment which is approaching end of life and becoming difficult to maintain. No station regulators are targeted in 2016.	Proactive asset renewal program. There is positive impact to reliability, related to the prevention of future station regulator outages.		Proactive efforts to maintain system reliability	Units Installed	$0
Underground Duct and Manhole Facilities Inspection and Replacement	This program is designed to inspect and replace non-network underground duct, manhole and associated cable facilities. This program will identify unsafe conditions and correct deficiencies necessary for the safety of employees and the public under the conditions specified in the NESC.	Proactive asset renewal program. There is positive impact to reliability, related to the prevention of future underground duct and manhole related outages.		Proactive efforts to maintain system reliability	Completed Hours	$5,000,000
OVHD Circuit Inspection Repair Program	This program is designed to visually inspect overhead line facilities and to make the appropriate repairs or replacements (asset renewal) when issues are found. Circuits are inspected at least once every five years. Approximately 285 circuits are targeted for inspection in 2016.	This should reduce equipment caused outages by thirty percent on those circuits addressed beginning in the year following installation.	19	Reduced outages	Completed Work Packets	$2,300,000
Line Reclosers Maintenance	This is an asset renewal program. Approximately 680 reclosers are targeted in 2016.	Proactive asset renewal program. There is positive impact to reliability, related to the prevention of future outages due to recloser failures. There is also an opportunity to enhance the over current protection scheme on the circuit.		Reduced outage duration	Units Installed	$3,500,000
URD Remediation Program	This program is designed to provide a visual public safety inspection of pad mount transformers, switchgear, primary enclosures and secondary pedestals. Each piece of equipment is inspected once every 5 years. Approximately 39,000 units are targeted for inspection in 2016. Repair work is a subset of previously inspected units.	The majority of this work is proactive asset renewal that will reduce the probability of future outages related to pad mounted URD equipment. This is an inspection program used to identify unsafe conditions.		Maintain system safety and reliability	Completed Work Packets	$350,000
Pole Replacement	This is an asset renewal program. The primary objective of this program is to maintain the mechanical integrity of our wood pole infrastructure necessary for the safety of employees and the public under the conditions specified in the NESC. Approximately 5,000 poles are targeted in 2016.	Proactive asset renewal program. There is positive impact to reliability, related to the prevention of future outages due to pole failures.		Proactive efforts to maintain system reliability	Poles Replaced	$10,000,000
Pole Reinforcement	This is an asset life extension program. The primary objective of this program is to maintain the mechanical integrity of our wood pole infrastructure necessary for the safety of employees and the public under the conditions specified in the NESC. No poles are currently targeted in 2016.	Proactive asset renewal program. There is positive impact to reliability, related to the prevention of future outages due to pole failures.		Proactive efforts to maintain system reliability	Pole Locations	$0
					Section A Subtotal:	**$91,380,000**
	Section B					
Network Capacity	This program is designed to install new Distribution network capacity to serve additional load.	There is no reliability impact.		NA	n/a	$250,000
Capacity Additions	This program is designed to install new Distribution station and line capacity to serve additional load.	There is no reliability impact.		NA	n/a	$17,000,000
Integrated Volt Var Systems	This program provides improved efficiency through voltage optimization. The program's primary focus is to reduce electrical demand and/or accomplish energy conservation.	There is no reliability impact.		NA	n/a	$0

AEP OHIO
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AEP Ohio 2016 DIR Work Plan Components

2016 AEP Ohio DIR Project Work Plan.xlsx

DIR Component	Program Description	Measures for Reliability Improvements	2015 Filing Rule 11 Work	Expected Reliability Improvements	Measurement Units	Projected 2016
Customer Service Work	This component is for work necessary for providing customers electric service in AEP Ohio. It includes capital dollars for providing service to new customers, as well as upgrades to existing commercial, industrial and residential customers.	There is no reliability impact.		NA	n/a	$23,000,000
Third Party Work Request	This component involves work requested by a third party. This includes work for customer requested relocates, damage claims made by outside parties, and make ready work which includes replacing AEP Ohio owned poles for others who are attached or proposes to attach to AEP Ohio owned poles.	There is no reliability impact.		NA	n/a	$7,000,000
Public Project Relocation	This component involves work requested by a governmental entity such as a township, city, or the state. Public projects generally consist of work associated with road improvement projects which benefit the public. This involves the capital work AEP Ohio does to accommodate these governmental improvement projects within the service territory.	There is no reliability impact.		NA	n/a	$10,000,000
Service Restoration	This component includes day to day work for service restorations which are excluded from the major event category of outages. This would include capital dollars for such things as equipment replacement from an outage and capital dollars associated with minor storm events.	There is no reliability impact.		NA	n/a	$8,000,000
Forestry	This program includes all capital vegetation management work performed in AEP Ohio. Incremental capital dollars associated with the ESRR filing will be removed from the DIR filing used to establish the rate.	The reliability impact regarding this program is reflected as an adjustment in the current standards and proposed reliability standards.	3	NA	n/a	$4,600,000
Transformer Blanket	This component is for the purchase of Distribution line transformers necessary for providing customers electric service in AEP Ohio. It includes overhead line transformers and pad mounted transformers.	There is no reliability impact.		NA	n/a	$17,000,000
Engineering & Field Line	This component includes Engineering labor, Fleet and Material & supplies.	There is no reliability impact.		NA	n/a	$23,250,000
Customer Meter Blanket	This component is for the purchase of customer meters for providing customers electric service in AEP Ohio. It includes standard and AMR meters.	There is no reliability impact.		NA	n/a	$4,000,000
Other	This component includes AEP Ohio items which are involved in day to day work components of service to existing customers. This would include such items as other capital base operations, capital overheads, Distribution Dispatch support, revenue credits, and contribution in aid to construction credits.	There is no reliability impact.		NA	n/a	($5,400,000)
					Section B Subtotal:	**$106,700,000**
					Grand Total:	**$200,080,000**

This foregoing document was electronically filed with the Public Utilities

Commission of Ohio Docketing Information System on

1/8/2016 4:55:48 PM

in

Case No(s). 16-0024-EL-UNC

Summary: Notice electronically filed by Mr. Matthew J Satterwhite on behalf of Ohio Power Company

BEFORE THE PUBLIC UTILITES COMMISION OF OHIO

In the Matter of the Commission's Review of the Ohio Power Company's Distribution Investment Rider Work Plan for 2017	)))))	**Case No. 17-0045-EL-UNC**

Notice of Ohio Power Company's Commission-Requested Distribution Investment Rider Work Plan

On February 25, 2015, the Public Utilities Commission of Ohio ("Commission") approved an Electric Security Plan of Ohio Power Company ("AEP Ohio" or "Company"), including approval of the Distribution Investment Rider ("DIR") in Commission docket 13-2385-EL-SSO et al. ("ESP III Order"). The DIR spending caps were adjusted by the Commission on May 28, 2016 and November 3, 2016 through rehearing entries. As part of the approval of the DIR, the Commission instructed that it is no longer necessary for the Company to work with the Commission Staff ("Staff") while reliability standards are being met, and to file the resulting plan for Commission review in a separate docket.

In case 13-294-EL-UNC, the Commission clarified the filing requirements for the DIR plan, outlining expectations for the filings going forward. In the ESP III case, the Commission denied AEP Ohio's requested expansion, but approved the DIR at spending caps adjusted and approved by the Commission. AEP Ohio offers the 2017 DIR Plan ("Plan") at this time for the entire year even though the ESP III case is not completely finalized (a Fifth Entry on Rehearing

was just issued on January 4, 2017). AEP Ohio will file an amended document to the extent necessary, if the DIR program is modified in any manner as a result of a final order.

The Company followed the previous year's strategy to review programs in the Plan which would have the most impact to both proactive system infrastructure replacement as well as reliability improvement to customers. In order to develop the Plan, the Company reviewed causes of outages on the system, opportunities for proactive replacement, engineering and labor resource availability, and overall impact of each program. The Plan, as developed, takes into consideration various factors encountered during 2014 through 2016, such as labor resources, and adjusts the Plan accordingly. This comprehensive development of the Plan provides the best practice to reach the Commission's goal to help ensure that this and future DIR plans will positively impact the reliability performance to customers across the Company's service territory. Overall, the Plan is developed to provide a more proactive replacement plan as well as components which will maintain or improve reliability to customers. In section A of the 2017 DIR Plan, all of the programs listed either proactively replace infrastructure or impact reliability to customers.

AEP Ohio will continue to work with Staff annually to review the accounting accuracy, prudency and compliance with the Plan as developed. In order to ensure double recovery does not occur in the DIR, there are two safeguards currently in place. First, the Company tracks assets recovered through other riders by separately identifiable work-orders which allow those charges to be appropriately removed from the DIR filing. This process has been reviewed and verified during past audits of the DIR program. Second, an independent audit is conducted of the DIR program expenditures. This audit is completed by an external, independent auditor chosen by the Commission to ensure compliance with the financial side of the program expenditures.

The auditor sends the findings to the Commission and ensures that the Company follows all guidelines when reporting items charged to the DIR.

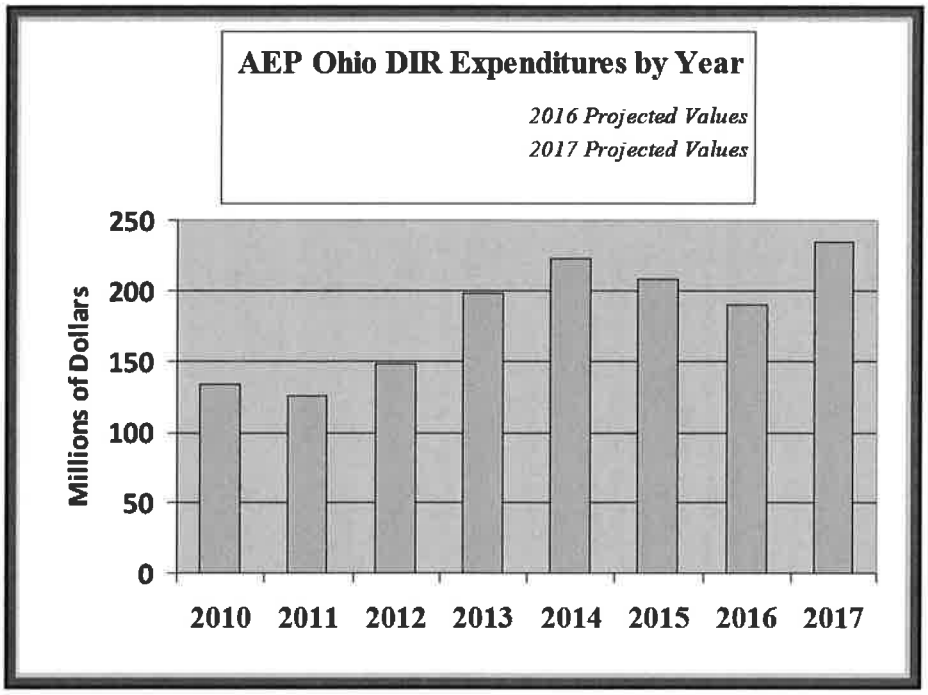
The Company will continue to provide staff with quarterly updates consistent with Finding 25 of the Commission's order in Case No. 13-2394-EL-UNC. The Company will send quarterly updates to Staff showing progress of each of the programs, and, when requested by Staff, the Company agrees to meet in person to discuss any questions regarding the programs. The Company will also continue to provide Staff locations to audit DIR work being performed in the field per Finding 25 in Case No. 13-2394-EL-UNC, unless otherwise ordered by the Commission.

The attached 2017 DIR Work Plan includes estimates of the work to be proactively performed and the expected spending in each category. As expected, anytime there is a proactive program covering an entire year of spending on items as varied as are covered here, there are likely to be some differences between expectations and performance. However, where possible, the Company has provided a good faith estimate of the expected areas to be impacted, proactively maintained, or replaced to provide a guidepost for future interactions with Staff. These estimates may change over the course of the year, and the quarterly updates provided to Staff may reflect such changes as well as explanations for the changes.

Overall, the Company's average capital expenditure has significantly increased in the past years due to the DIR program (Chart 1). This spending will still be audited as outlined by the Commission in the ESP III Order. Chart 1 shows the capital expenditure by the million prior to the DIR Program implementation (years 2010 – 2012) and after implementation (years 2013 – 2017). As shown in Chart 1, the expenditure levels are greater in the DIR plan years per the

approval of the DIR. The values in the charges exclude costs associated with the gridSMART® and the Enhanced Service Reliability Riders.

Chart 1



While the overall DIR plan will have a positive effect on reliability improvement experienced by customers, inherently, there are some components that may not be measured in a quantitative reduction in the amount of outages. Where investments are made in specific asset categories to proactively address known performance needs, the Company will track reliability improvements in that asset subset. Because the work plan components involve a proactive approach focused on the best methods to impact long-term reliability improvements, the goal is to prevent the outages that may occur in the future from happening. This is a proactive approach to ensure that things working now will continue to work and no further degradation of the system will result in further outages.

Reflected in the 2017 DIR Plan, the Company has provided a column to show the number of Worst Performing Circuits being addressed by the DIR Program. It is important to address worst performing circuits, and the DIR Program is a tool which allows for these circuits to be addressed by the various programs and thereby improve reliability or proactively reduce future outages. A single circuit may be reflected under several programs. It is also important to note that not all worst performing circuit issues can be addressed by DIR programs because some of those circuits may require non-capital maintenance activities, and O&M spending is not reflected in the DIR Plan.

The Company was able to show positive reliability results based on programs with a reliability impact as shown on the plan for 2015. Reliability improvement values were shared with Staff. The results showed a positive improvement for all reliability programs as well as an estimate for avoided outages. These results reinforce the benefit of the DIR Program.

As ordered in Case No. 13-2394-EL-UNC, the Company has provided Staff the reliability improvements each year. AEP Ohio provided Staff with the 2015 reliability impacts on April 15, 2016 well as quantification of avoided outages. Although the *ESP III Order* did not specify a date by which the Company needs to provide the same information, the Company recommends providing the data for the 2016 DIR Plan to staff in writing by April 17, 2017. The reporting of data in April allows the Company time to adequately review and submit the information and would not overlap with the Company's annual rule reporting efforts for Rule 26, 27, 10 and 9.

Going forward, the Company and Staff will continue to work cooperatively evaluating the progress of the programs outlined in the DIR work plan. Various elements may affect the execution of the plan during 2017, such as storms, resource availability, and mutual assistance to other utilities. These factors will be shared with Staff during the year. The Company provides

AEP Ohio 2017 DIR Work Plan Components

DIR Component	Program Description	Measures for Reliability Improvements	2016 Filing Rule 11 Work	Expected Reliability Improvements	Measurement Units	Projected 2017
	Section A					
Distribution Circuit Asset Improvement Includes Small Wire Replacement	This program is designed to address various operational, reliability and asset renewal issues as identified by Distribution Line Operations, Distribution Engineering and customer concerns. This program includes circuit improvement projects such as line relocation, reconductoring, OH to UG, multiphasing, fuse size changes, over current protection upgrades and coordination, circuit reconfiguration, and load balancing. The Small wire replacement portion of this will proactively address equipment failure issues by replacing targeted spans of small and deteriorating overhead conductor. In some cases portions of circuits may be relocated and/or rebuilt due to accessibility concerns and/or physical conditions.	Reliability improvements vary based on the type of work performed and can be measured on a circuit or line segment basis. The small wire replacement work should reduce outages due to Equipment/Hardware and conductor failure by fifty percent on those line segments addressed beginning in the year following installation. Projects such as line relocation and reconductoring segments should reduce outages due to Equipment/Hardware and conductor failure by fifty percent on those line segments addressed beginning in the year following installation. Load balancing when completed on a circuit will reduce overload outages by fifty percent beginning the following year after installation. Projects which take overhead lines to underground lines will reduce weather related outages, animal outages, and tree related outages on those segments by fifty percent in the year following when work was completed. Upgrading of overcurrent protection devices (changing from hydraulic to electronic protection devices, changing from three phase to single phase isolation and fuse size and coordination changes) can reduce customer outages by impacting fewer customers affected by an outage. Some projects under this program are solely asset renewal projects with only minor reliability impact related to the prevention of future outages, but are intended for proactive equipment replacement.	19	May reduce customer interruptions and outages; varies by work request	Completed Hours	$22,000,000
Cutout & Arrester Program	This program is to proactively address equipment failure issues by replacing targeted porcelain cutouts and associated equipment. Approximately 3,500 cutouts and their associated arresters are targeted for replacement under this program in 2017.	Proactive asset renewal that will reduce the probability of future outages related to cutout and arrester failures.		Proactive efforts to maintain system reliability	Units Installed	$1,200,000
Animal Mitigation - Station	This program is designed to install electric fences in targeted stations to help mitigate against animal related outages. Approximately 4 electric fences may be targeted in 2017 for work under this station animal mitigation program.	This should reduce non-avian related animal caused outages inside distribution stations by approximately fifty percent for those stations where mitigation was installed beginning in the year following installation.	1	Reduced outages	Fences Installed	$100,000
Lightning Mitigation	This program is designed to help reduce the number of lightning caused outages on identified circuits. AEP Ohio will review circuits by lightning caused outages and install lightning mitigation where needed. These circuits will be reviewed on an annual basis and may include that year's Rule 11 circuits. Circuits may be added or removed at the Company's discretion. This program will involve approximately 2 circuits in 2017.	This should reduce the aggregate number of lightning caused outages by approximately fifty percent on the circuits addressed beginning in the year following installation.	2	Reduced outages	Circuits	$30,000
Underground Cable Replacement	This program is to proactively address aging infrastructure based on various factors such as age, previous operational history, cable construction, etc. This would include URD cable, feeder exit cable, network cable, and station cable, such as transformer cables and bus ties. This program will include approximately 250,000 conductor feet of underground cable work in 2017.	This should reduce URD cable failures by approximately fifty percent on those segments addressed beginning in the year following installation. Feeder exit, network and station cable replacements are asset renewal programs and as such, there will be some positive impact to reliability, related to the prevention of future outages.	2	Reduced outages	Span Feet	$34,000,000
OVHD Circuit Inspection Repair Program	This program is designed to visually inspect overhead line facilities and to make the appropriate repairs or replacements (asset renewal) when issues are found. Circuits are inspected at least once every five years. Approximately 305 circuits are targeted for inspection in 2017.	This should reduce equipment caused outages by thirty percent on those circuits addressed beginning in the year following installation.	20	Reduced outages	Completed Work Packets	$2,500,000
Station Breaker Replacement	This program is designed to replace existing distribution station breakers with associated relays, controls, and SCADA when appropriate. AEP Ohio will target equipment which is approaching end of life and becoming difficult to maintain. The existing breakers have limited flexibility to adapt to modern over current protective schemes. Approximately 6 station circuit breakers may be targeted in 2017 for work under this station breaker program.	Proactive asset renewal program. There is positive impact to reliability, related to the prevention of future station breaker outages.		Proactive efforts to maintain system reliability	Units Installed, Installations	$4,000,000
Distribution Asset Improvement Associated with Transmission Work	AEP Transco plans to rebuild a number of transmission lines of which a portion contain Distribution underbuild. Transfer of Distribution facilities or the replacement of conductors with "like kind" are included with the Transmission project. This component will provide Distribution the opportunity to make Distribution system enhancements, such as building a new tie line or increasing conductor size to create a tie line for reliability purposes. AEP Transco/Transmission will also be rebuilding existing or building new station facilities. The replacement of Distribution station breakers and transformers, Distribution SCADA installations, and relocation or replacement of Distribution feeder exits in conjunction with these projects will also be included in this component as either reliability enhancements and/or asset renewal. (This does not include breaker or underground cable replacement or SCADA installations).	Proactive asset renewal that will reduce the probability of future outages. In some cases, new tie lines may be established to enhance reliability to shorten outage durations following an event. A portion of the circuit that is rebuilt will replace existing equipment identified to be near the end of its life that could reduce future Equipment Failure outages.		Proactive efforts to maintain system reliability	Completed Hours	$14,000,000
Pole Replacement	This is an asset renewal program. The primary objective of this program is to maintain the mechanical integrity of our wood pole infrastructure necessary for the safety of employees and the public under the conditions specified in the NESC. Approximately 4,500 poles are targeted in 2017.	Proactive asset renewal program. There is positive impact to reliability, related to the prevention of future outages due to pole failures.		Proactive efforts to maintain system reliability	Poles Replaced	$9,000,000

AEP Ohio 2017 DIR Work Plan Components

DIR Component	Program Description	Measure for Reliability Improvements	2016 Filing Rule 11 Work	Expected Reliability Improvements	Measurement Units	Projected 2017
Line Reclosers Maintenance	This is an asset renewal program. Approximately 650 reclosers are targeted in 2017.	Proactive asset renewal program. There is positive impact to reliability, related to the prevention of future outages due to recloser failures. There is also an opportunity to enhance the over current protection scheme on the circuit.		Reduced outage duration	Units Installed	$5,500,000
Sectionalizing	This program is designed to enhance the over current protection scheme, operation of Distribution system and reduce the number of customers affected by an outage. It includes the installation/upgrade of sectionalizing devices on circuits, shortening of protection zones and providing additional isolation points. Approximately 96 circuits will be targeted in 2017 for work under this sectionalizing program.	Installation of sectionalizing can reduce SAIFI by impacting fewer customers affected by an outage. There is limited opportunity to continue with a large scale effort.		Reduce Customers Interrupted	Circuits	$1,200,000
URD Remediation Program	This program is designed to provide a visual public safety inspection of pad mount transformers, switchgear, primary enclosures and secondary pedestals. Each piece of equipment is inspected once every 5 years. Approximately 44,000 units are targeted for inspection in 2017. Repair work is a subset of previously inspected units.	The majority of this work is proactive asset renewal that will reduce the probability of future outages related to pad mounted URD equipment. This is an inspection program used to identify unsafe conditions.		Maintain system safety and reliability.	Completed Work Packets	$350,000
Network Rehab	This program is designed to replace and/or upgrade network cable, vaults, transformers, protectors and install fault indicators.	Proactive asset renewal program. There is positive impact to reliability, related to the prevention of future network outages.		Proactive efforts to maintain system reliability	Completed Hours	$14,000,000
Station Regulator Replacements	This program is designed to replace existing distribution station regulators and associated controls. AEP Ohio will target equipment which is approaching end of life and becoming difficult to maintain. No station regulators are targeted in 2017.	Proactive asset renewal program. There is positive impact to reliability, related to the prevention of future station regulator outages.		Proactive efforts to maintain system reliability	Units Installed	$0
Forestry - Emerald Ash Borer Mitigation Ash Trees	There is a growing number of Ash trees that have been affected by the Emerald Ash Borer. On average, an Ash tree will die in 2 to 3 years once affected by this insect. This program is designed to remove targeted Ash trees from outside right-of-way. This would be a stand alone program separate from the ROW Maintenance Program. The Company intends to implement this program utilizing a work force other than the one engaged with the current vegetation management program. No activity is currently targeted in 2017.	This is a proactive preventative program. There is some reliability impact related to the prevention of future outages		Proactive efforts to maintain system reliability	Trees Removed	$0
Pole Reinforcement	This is an asset life extension program. The primary objective of this program is to maintain the mechanical integrity of our wood pole infrastructure necessary for the safety of employees and the public under the conditions specified in the NESC. No poles are currently targeted in 2017.	Proactive asset renewal program. There is positive impact to reliability, related to the prevention of future outages due to pole failures.		Proactive efforts to maintain system reliability	Pole Locations	$0
Underground Duct and **Manhole Facilities Inspection and Replacement**	This program is designed to inspect and replace non-network underground duct, manhole and associated cable facilities. This program will identify unsafe conditions and correct deficiencies necessary for the safety of employees and the public under the conditions specified in the NESC.	Proactive asset renewal program. There is positive impact to reliability, related to the prevention of future underground duct and manhole related outages.		Proactive efforts to maintain system reliability	Completed Hours	$15,000,000
Station Rebuild / Rehab	This program is designed to replace existing distribution station equipment including transformers, breakers, structures underground facilities, etc. AEP Ohio will target equipment which is approaching end of life and becoming difficult to maintain.	Proactive asset renewal program. There is positive impact to reliability, related to the prevention of future station equipment caused outages	4	Proactive efforts to maintain system reliability	Stations	$4,000,000
					Section A Subtotal:	**$124,880,000**
Section B						
Network Capacity	This program is designed to install new Distribution network capacity to serve additional load.	There is no reliability impact.		NA	n/a	$200,000
Capacity Additions	This program is designed to install new Distribution station and line capacity to serve additional load.	There is no reliability impact.		NA	n/a	$19,000,000
Integrated Volt Var Systems	This program provides improved efficiency through voltage optimization. The program's primary focus is to reduce electrical demand and/or accomplish energy conservation.	There is no reliability impact.		NA	n/a	$0
Customer Service Work	This component is for work necessary for providing customers electric service in AEP Ohio. It includes capital dollars for providing service to new customers, as well as upgrades to existing commercial, industrial and residential customers.	There is no reliability impact.		NA	n/a	$24,000,000
Third Party Work Request	This component involves work requested by a third party. This includes work for customer requested relocates, damage claims made by outside parties, and make ready work which includes replacing AEP Ohio owned poles for others who are attached or propose to attach to AEP Ohio owned poles.	There is no reliability impact.		NA	n/a	$8,500,000
Public Project Relocation	This component involves work requested by a governmental entity such as a township, city, or the state. Public projects generally consist of work associated with road improvement projects which benefit the public. This involves the capital work AEP Ohio does to accommodate these governmental improvement projects within the service territory.	There is no reliability impact.		NA	n/a	$16,000,000

AEP Ohio 2017 DIR Work Plan Components

DIR Component	Program Description	Measures for Reliability Improvements	2016 Filing Rule 11 Work	Expected Reliability Improvements	Measurement Units	Projected 2017
Service Restoration	This component includes day to day work for service restorations which are excluded from the major event category of outages. This would include capital dollars for such things as equipment replacement from an outage and capital dollars associated with minor storm events.	There is no reliability impact.		NA	n/a	$5,000,000
Forestry	This program includes all capital vegetation management work performed in AEP Ohio. Incremental capital dollars associated with the ESRR filing will be removed from the DIR filing used to establish the rate.	The reliability impact regarding this program is reflected as an adjustment in the current standards and proposed reliability standards.		NA	n/a	$4,600,000
Transformer Blanket	This component is for the purchase of Distribution line transformers necessary for providing customers electric service in AEP Ohio. It includes overhead line transformers and pad mounted transformers.	There is no reliability impact.		NA	n/a	$17,000,000
Engineering & Field Line	This component includes Engineering labor, Fleet and Material & supplies.	There is no reliability impact.		NA	n/a	$25,500,000
Customer Meter Blanket	This component is for the purchase of customer meters for providing customers electric service in AEP Ohio. It includes standard and AMR meters.	There is no reliability impact.		NA	n/a	$5,000,000
Revenue / Reimbursements	This component includes AEP Ohio items which are involved in day to day work components of service to customers. This would include revenue credits and contributions in aid to construction credits.	There is no reliability impact		NA	n/a	-$15,000,000
Other	This component includes AEP Ohio items which are involved in day to day work components of service to existing customers. The would include such items as other capital base operations and capital overheads.	There is no reliability impact		NA	n/a	$3,100,000
					Section B Subtotal:	$109,900,000
					Grand Total:	$234,780,000

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Case No(s). 17-0045-EL-UNC

Summary: Notice - of Ohio Power Company's Commission-Requested Distribution Investment Rider Work Plan electronically filed by Mr. Steven T Nourse on behalf of Ohio Power Company

Summary: Testimony Direct Testimony of James D. Williams in Opposition to the Joint Stipulation and Recommendation on Behalf of the Office of the Ohio Consumers' Counsel electronically filed by Ms. Deb J. Bingham on behalf of Michael, William J. Mr.