Assessment of

Ameren Illinois Company's

Annual Reliability Report and

Electric Reliability Performance

For Calendar Year 2014

Pursuant to 83 Ill. Adm. Code 411.140

February 19, 2016

1. Executive Summary

Section 16-125(d) of the Public Utilities Act requires the Commission to assess the annual report of each jurisdictional entity and evaluate its reliability performance at least every three years. The Commission's most recent assessment and evaluation of AIC's annual report and reliability performance covered calendar year 2011.

This report provides Staff's assessment of Ameren Illinois Company's ("AIC") Annual Reports filed pursuant to Section 16-125 of the Act and 83 Illinois Administrative Code, Part 411 ("Part 411") for calendar years 2012, 2013, and 2014.

Section 411.140(b) specifically requires that the Commission evaluation:

- Assess AIC's historical performance relative to established reliability targets (Sections 6 and 7)
- Identify trends in AIC's reliability performance (Section 8),
- Evaluate AIC's plan to maintain or improve reliability (Section 9),
- Include specific identification, assessment, and recommendations pertaining to any potential reliability problems and risks (Section 10), and
- Include a review of the jurisdictional entity's implementation of its plan for the previous reporting period (Section 11).

For calendar year 2014, AIC's system average interruption frequency index ("SAIFI") and customer average interruption frequency index ("CAIFI") improved when compared to 2013. Additionally, the interruptions that AIC's customers experienced were, on average, shorter in duration during 2014 than in either 2012 or 2013. AIC's improvement in Customer Average Interruption Duration Index ("CAIDI") during calendar year 2014 is noteworthy because AIC's CAIDI has historically been higher than average when considering the CAIDI values submitted by all reporting utilities.

Section 9 of this report explains that AIC is taking effective steps to improve the performance of its distribution circuits - especially distribution circuits and/or portions of distribution circuits where multiple interruptions have occurred. AIC implemented several reliability programs and initiatives intended to improve not only the reliability performance of its distribution system as a whole, but that also improve service for single customers, or small groups of customers, who are experiencing multiple interruptions each year.

During the summers of 2013, 2014, and 2015, Staff inspected some of AIC's distribution circuits that supplied customers who experienced a higher than average number of interruptions during the prior calendar year. During these inspections, Staff noted that AIC had done a good job keeping vegetation clear of its primary conductor along most, but not all, of the distribution circuits inspected. There are a few circuits (i.e., Circuit 307-004) for which AIC needs to re-assess the timing and frequency of its vegetation clearing. During the inspections, Staff also found some locations with damaged/deteriorated poles and crossarms, loose hardware, and National Electrical Safety Code violations. Such problem locations were isolated from one another and reasonably few in number, so that, based solely upon the circuits that Staff inspected, Staff concluded that, overall, AIC has

been doing a good job maintaining its distribution facilities since the time of the Commission's prior assessment.[1]

Staff recommends that to improve or maintain reliability, AIC should continue completing work associated with its reliability programs and initiatives, as identified on pages 5 to 26 of its 2014 Annual Report. In addition, Staff suggests that AIC:

- Ensure that its distribution circuit inspectors are adequately trained to identify reliability threats and NESC violations.
- Complete corrective actions on distribution facilities promptly following discovery of problems.
- Continue to identify and improve the reliability of service to individual customers who experience multiple interruptions.
- Continue efforts to reduce the duration of the interruptions that occur (CAIDI).
- Identify and repair gaps in or beneath perimeter fencing at substations to minimize the risk of animal intrusion that could result in substation equipment outages that affect large numbers of customers.
- Continue installing animal protection on unprotected distribution facilities, including substations, to minimize animal-caused interruptions.
- Evaluate whether certain circuits require more frequent or more aggressive vegetation clearing.
- Limit the number and scope of intentional interruptions to the extent practicable.

[1] The Commission's prior assessment, covering 2011, was the subject of Docket No. 13-0384.

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2. Introduction

Beginning with the year 1999, and at least every three years thereafter, Section 16-125(d) of the Public Utilities Act ("Act") and 83 Ill. Adm. Code 411.140 ("Section 411.140") require the Commission to assess the annual reliability report of each jurisdictional entity ("utility") and evaluate its reliability performance. Specifically, Section 411.140 requires the Commission to:

A) *Assess the jurisdictional entity's historical performance relative to established reliability targets.*

B) *Identify trends in the jurisdictional entity's reliability performance.*

C) *Evaluate the jurisdictional entity's plan to maintain or improve reliability.*

D) *Include specific identification, assessment, and recommendations pertaining to any potential reliability problems and risks that the Commission has identified as a result of its evaluation.*

E) *Include a review of the jurisdictional entity's implementation of its plan for the previous reporting period.*

This document assesses the annual reliability reports that Ameren Illinois Company ("AIC") filed with the Commission for calendar years 2012, 2013, and 2014, and evaluates AIC's reliability performance during these years. In producing this document, Staff relied upon AIC's annual reliability reports, the requirements found in the Act and Part 411, AIC's responses to discovery, and Staff's own observations during field inspections of AIC's distribution facilities.

3. AIC's Customers and Service Territory

During the period 2012-2014, AIC provided electric service to approximately 1.2 million customers in central and southern Illinois. AIC's service area consists of the combined service areas of AIC's three legacy utilities: Central Illinois Light Company ("AmerenCILCO"), Central Illinois Public Service Company ("AmerenCIPS"), and Illinois Power Company ("AmerenIP"). AIC formed in October of 2010 when these three legacy utilities merged. Most of AIC's service area is rural, but AIC also supplies electricity in urban areas, including areas in and around Peoria, Galesburg, Quincy, Bloomington-Normal, Champaign-Urbana, Decatur, Danville, Mattoon, Belleville, Alton, Marion, and Carbondale.

4. Description of Electric Distribution System

AIC's distribution facilities include approximately 2,400 distribution circuits, comprised of about 46,000 miles of distribution lines operating between 600 volts and 69,000 volts. Approximately 85% of AIC's distribution lines are overhead and 15% are underground.

Section 411.120(b)(3)(G) requires AIC to annually report on the age and condition of its distribution and transmission facilities. Table 1 summarizes information that AIC provided in its annual reports about the age of its distribution investments within four specific categories. AIC's data illustrates that, since 2008:

- The average age of AIC's investments in substation equipment has decreased significantly
- The average age of AIC's investments in underground conductors and devices has increased significantly.
- The average age of AIC's investments in poles, fixtures, and transformers has increased slightly.

Table 1: AIC's Average Age of Investments for Various Categories of Distribution Equipment

Category of Distribution Equipment Investment	Average Age - Years						
	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Substation Equipment	20.4	19.7	19.6	19.7	19.5	18.9	18.3
Poles and Fixtures	17.0	16.8	17.2	17.4	17.7	17.7	17.6
UG conductor and devices	13.3	13.6	14.3	15.0	15.4	15.9	16.3
Line Transformers	19.1	19.5	20.0	20.3	20.7	21.0	21.2

5. Assessment of Company's Reliability Reports

83 Illinois Administrative Code Section 411.120(b) requires each non-exempt jurisdictional entity to file an annual reliability report for the previous calendar year by June 1 of the current year ("annual report"). AIC's annual reports, which it filed by the required date, each contained all the information Subsection 411.120(b)(3) requires.

6. Historical Performance Relative to Established Reliability Targets

Subsection 411.140(b)(4)(A-C) establishes electric service reliability targets that each electric utility must strive to meet. These targets, which are provided in Table 2, specify the number and duration of controllable interruptions that each electric utility must strive not to exceed for any customer.[2]

Table 2: Customer Service Reliability Targets

Immediate primary source of service operation voltage	Maximum number of interruptions for any customer in each of the last three years	Maximum hours of total interruption duration for any customer in each of the last three years
69kV or above	3	9
Between 15kV & 69kV	4	12
15kV or below	6	18

[2] Section 411.20 defines "controllable interruption" as an interruption caused or exacerbated in scope and duration by the condition of facilities, equipment, or premises owned or operated by a jurisdictional entity, or by the action or inaction of persons under a jurisdictional entity's control and that could have been prevented through the use of generally accepted engineering, construction, or maintenance practices."

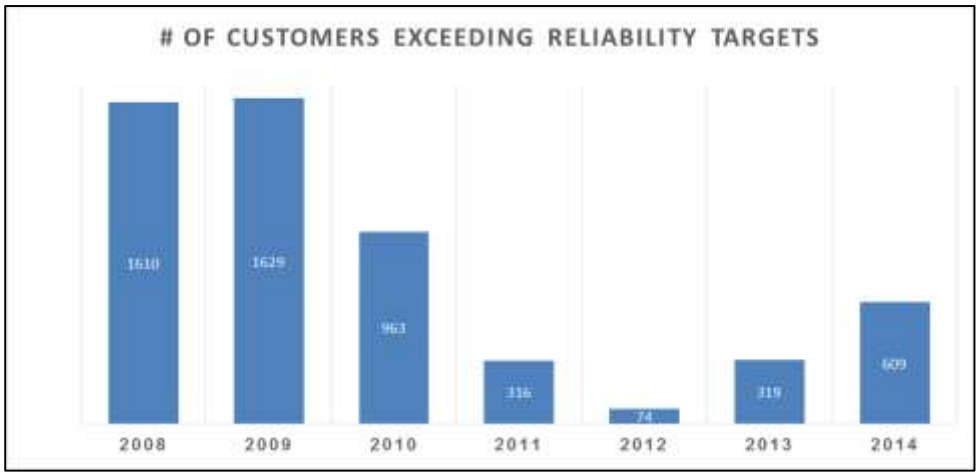
Lines that operate at 69 kV or above typically directly supply only large electric loads, such as large industrial customers. Lines that operate between 15 kV and 69 kV directly typically supply very large commercial and/or medium to large industrial customers. Distribution facilities operating at 15 kV or lower directly supply the majority of an electric utility's customers, including residential, commercial and industrial customers.

Reporting utilities agreed to include all interruptions (controllable and uncontrollable) when determining the service reliability targets, and to include in their annual reports any specific actions, taken or planned, to address the reliability concerns of individual customers. Subsection 411.120(b)(3)(L) requires each utility to provide a list of every customer, identified by a unique number, who experienced interruptions in excess of the service reliability targets during the prior calendar year. For each of the customers who experienced interruptions that exceed the reliability targets, the utility must provide:

- the number of interruptions that the customer experienced in each of the three preceding calendar years (the calendar year that the annual report covers plus the two prior calendar years),
- the total interruption durations that the customer experienced in each of the three preceding calendar years (the calendar year that the annual report covers plus the two prior calendar years), and
- the number of consecutive years in which the customer experienced interruptions in excess of the reliability targets shown in Table 2.

Data provided within AIC's annual reports and illustrated by Figure 1 indicates that, during 2012 – 2014, an increasing number of AIC's distribution customers who are supplied at 15 kV or below experienced interruptions in excess of reliability targets. The number of AIC's customers who experienced interruptions in excess of reliability targets has been increasing since reaching a minimum of 74 in 2012.[3]

Figure 1: Number of AIC Customers Experiencing Interruptions in Excess of Reliability Targets



[3] The values shown in Figure 1 for the years 2008 - 2010 are the combined values from AIC's three legacy utilities. For all years, the values shown may not exactly match the values in AIC's annual reports because Figure 1 eliminates double-counting customers who experienced interruptions that exceeded both the frequency and duration targets and/or customers that have multiple meters at a premises.

Each year, more of AIC's customers experienced interruptions that exceeded the duration target (18 hours of interruption duration during each of three consecutive calendar years) than the frequency target (six interruption during each of three consecutive calendar years). For example, in its 2014 annual report, AIC's data indicates that 608 customers experienced at least 18 hours of interruption duration during each of the calendar years 2012 - 2014, whereas only 2 customers experienced more than 6 interruptions during each of these calendar years. For 2013, 319 customers experienced at least 18 hours of interruption duration during each of the 3 consecutive calendar years (2011 – 2013), and no customers experienced more than 6 interruptions during each of these same calendar years.

Subsection 411.140(b)(4)(D) requires the Commission's assessment to determine if AIC has a process in place to identify, analyze, and correct service reliability for customers who experienced interruptions that exceeded reliability targets. Staff concludes that AIC does have such a process. Specifically, AIC has three programs in place that are intended to identify and improve reliability for customers who experience interruptions in excess of reliability targets. First, AIC's Multiple Device Interruptions Program initiates review and remedial action when the same distribution facilities experience three or more outages during the previous 12-months. Second, AIC's Customers with Repetitive Outages Program identifies customers who experienced five or more outages for three consecutive years, and initiates remedial actions to improve the service reliability for those customers. Third, as part of its CAIDI Initiatives Program, AIC installs fault indicators on its distribution facilities to aid its system operator and field personnel to more quickly locate the cause of an outage after it occurs, thus minimizing the duration of the interruption to customers.

AIC's process to identify, analyze and correct service reliability can be illustrated through review of an example. Appendix A to AIC's 2014 annual report indicates that 581 customers who are supplied by AIC's Circuit J79304 experienced more than 18 hours of total interruption duration time during each of the calendar years 2012 - 2014. AIC attributed most of the interruptions to severe storms. AIC explains that interruptions on this circuit are lengthy due to its location and size, which causes increased travel time for repair crews, and longer times for patrols. To improve reliability, during 2015, AIC installed a protection scheme on Circuit J79304 that will automatically restore service to parts of the circuit not directly impacted by an outage. Additionally, AIC installed additional fuses to minimize the number of customers affected when outages occur. AIC's actions to address interruptions to customers supplied by Circuit J79304 appear to be logical and appropriate given its assessment of problems that occurred on that circuit. Appendix A to AIC's annual reports provides similar information about AIC's other circuits that supply customers who experienced interruptions in excess of reliability targets.

7. Analysis of Reliability Performance

A. Reliability Indices:

Reliability indices can be used to compare the reliability performance of different utilities. Reliability indices can also provide an indication of whether an individual utility's performance is improving or degrading over time. Since each reporting utility uses its own reporting and recording methods, and because severe storms, or other major events,

may not affect all electric utilities in the state equally, direct reliability index comparisons between utilities do not provide a complete picture of relative reliability performance, but can still be informative.

- System Average Interruption Frequency Index, or SAIFI, is a measure of the average number of interruptions per customers during the year. SAIFI is calculated by dividing the annual sum of all customer interruptions by the total number of customers served.
- Customer Average Interruption Duration Index, or CAIDI, is a measure of the average interruption duration for those customers who experience interruptions during the year. CAIDI is calculated by dividing the annual sum of all customer interruption durations by the total number of customer interruptions that occurred.
- Customer Average Interruption Frequency Index, or CAIFI, is the average number of interruptions experienced by only those customers who experienced interruptions during the year. CAIFI is calculated by dividing the total annual number of customer interruptions by the total number of customers affected by those interruptions –each customer counted only once regardless of the number of interruptions that the customer may have experienced.

Table 3 shows the system SAIFI, CAIDI, and CAIFI indices for each reporting utility for the years 2012 to 2014.

Table 3: Year 2011 Reliability Indices for Reporting Utilities

	SAIFI			CAIDI			CAIFI		
	2012	2013	2014	2012	2013	2014	2012	2013	2014
AIC	**1.05**	**1.44**	**1.36**	**136**	**199**	**130**	**1.71**	**2.13**	**2.06**
ComEd	1.16	0.99	1.01	196	143	196	1.94	1.80	1.82
MidAmerican	2.36	2.24	1.46	84	211	164	2.99	2.88	2.17
Mt. Carmel	3.57	4.01	4.16	93	105	74	4.03	4.12	4.19

$$\text{SAIFI}=\frac{\text{Total \# Customer Interruptions}}{\text{Total \# of Customers Served}} \qquad \text{CAIDI}=\frac{\text{Sum of all Interruption Durations}}{\text{Total \# of Customer Interruptions}} \qquad \text{CAIFI}=\frac{\text{Total \# Customer Interruptions}}{\text{Total \# of Customers Affected}}$$

Comparing AIC's reliability indices to the indices reported by the other utilities:

- SAIFI
  - **2012**: AIC's SAIFI of 1.05 was the lowest (best) reported: 56% lower than the average of values reported by the other three utilities and 10% lower than the next best performer (ComEd's 1.16).
  - **2013**: AIC's SAIFI of 1.44 was the second lowest (best) reported: 40% lower than the average of values reported by the other three utilities, but 45% higher than the best performer (ComEd's 0.99).
  - **2014**: AIC's SAIFI of 1.36 was the second lowest (best) reported: 38% lower than the average of values reported by the other three utilities but 35% higher than the best performer (ComEd's 1.01).

- CAIDI
  - **2012**: AIC's CAIDI of 136 minutes was the 2nd highest (worst) reported: 9% higher than the average of values reported by the other three utilities, and 62% higher than the best performer (MidAmerican Energy Company's 84 minutes).
  - **2013**: AIC's CAIDI of 199 minutes was the 2nd highest (worst) reported: 30% higher than the average of values reported by the other three utilities, and 90% higher than the best performer (Mount Carmel Public Utility Company's 105 minutes).
  - **2014**: AIC's CAIDI of 130 minutes was the 2nd lowest (best) reported: 10% lower than the average of values reported by the other three utilities, but 76% higher than the best performer (Mount Carmel Public Utility Company's 74 minutes).
- CAIFI
  - **2012**: AIC's CAIFI of 1.71 was the lowest (best) reported: 43% lower than the average of values reported by the other three utilities, and 12% lower than the next best performer (ComEd's 1.94).
  - **2013**: AIC's CAIFI of 2.13 was the second lowest (best) reported: 27% lower than the average of values reported by the other three utilities, but 18% higher than the best performer (ComEd's 1.80).
  - **2014**: AIC's CAIFI of 2.06 was the second lowest (best) reported: 24% lower than the average of values reported by the other three utilities but 13% higher than the best performer (ComEd's 1.82).

The number of AIC customers who bought electricity from a different utility or an alternative retail electric supplier ("ARES") increased from 30,353 in 2010, to 134,441 in 2012, to 564,923 in 2014.[4] During the years 2012 – 2014, customers within AIC's operating area who purchased electricity from a supplier other than AIC experienced fewer, but longer, interruptions than AIC's traditional customers. For example, during 2014, on average, AIC's customers who bought electricity from a different utility or an ARES experienced interruptions that were about 15% longer compared to customers buying electricity directly from AIC. During 2014, those same customers, on average, experienced approximately 40% fewer interruptions compared to customers buying electricity directly from AIC. AIC's customers who purchase electricity from another supplier or ARES are scattered throughout AIC's distribution system, and are supplied by the same distribution circuits that supply traditional customers. It would, therefore, be very difficult, if not impossible, for AIC to purposely single out certain customers during interruptions with the intent to treat them differently. Staff found no evidence to suggest that AIC used different restoration practices for customers who purchased electricity from a source other than AIC. Instead, the higher CAIDI for customers who bought electricity from another utility or an ARES is likely the result of circumstances associated with individual interruptions, especially the interruption's location and/or cause.

[4] AIC 2012 Annual Report, page 40; AIC 2014 Annual Report, page39.

B. Customer Satisfaction Survey:

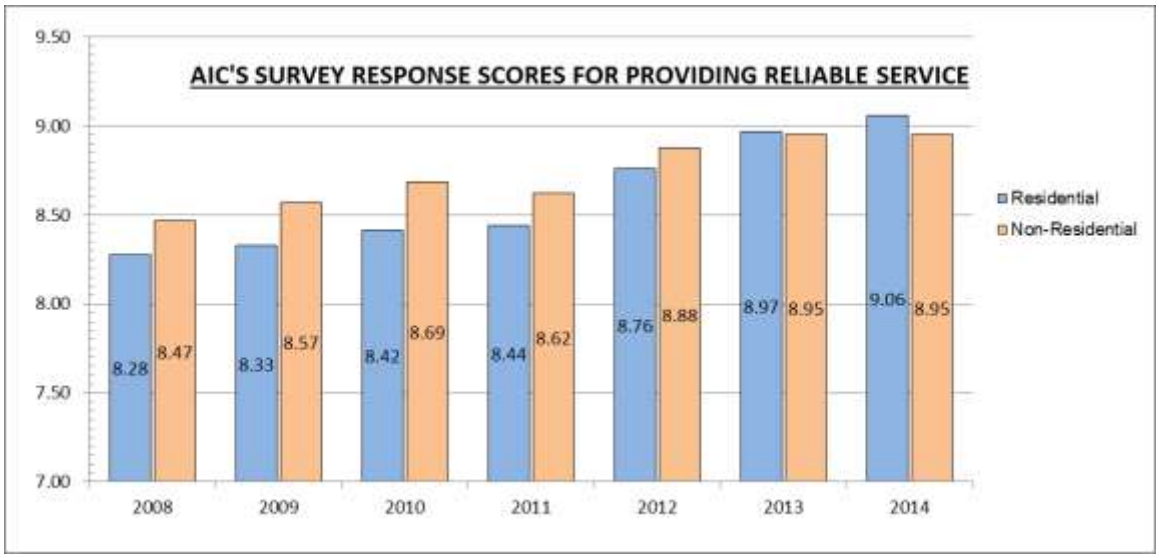
An annual independent survey asks randomly selected residential and non-residential customers to rate several aspects of their electric utility's performance on a scale of 1 to 10. One of the survey question (Question #2) specifically asks customers to rate their utility's performance at providing reliable electric service. Table 4 shows that, while scores for all utilities have been improving, AIC's scores for 2014 are the highest (best) received from both residential and non-residential customers.

Table 4: Comparison of Survey Scores: Response to Question on Providing Reliable Service

	AIC		ComEd		MidAmerican		Mt. Carmel Public Utility	
	Residential	Non-Residential	Residential	Non-Residential	Residential	Non-Residential	Residential	Non-Residential
2011	8.44	8.62	8.03	8.05	8.72	8.75	8.39	8.60
2012	8.76	8.88	8.43	8.51	8.65	8.98	8.40	8.79
2013	8.97	8.95	8.47	8.61	8.79	8.95	8.76	8.82
2014	9.06	8.95	8.79	8.60	8.79	8.92	8.81	8.87

Figure 2 illustrates AIC's steadily improving annual survey scores[5], which are likely attributable to AIC's improved maintenance practices and resulting improved reliability performance.

Figure 2: AIC's Customer Survey Results (2008 – 2014)



C. Customer Complaints:

In 2014, AIC received 21 complaints from its customers relating to frequent outages or damage. AIC received 42 such complaints in 2011, 34 in 2012; and 36 in 2013. As Table 3 on page 8 illustrates, AIC's SAIFI and CAIFI values, which are both measures of interruption frequency, were the lowest among all reporting utilities for the 2012 calendar year, and second lowest for 2013 and 2014.

[5] Ameren Illinois Company formed in 2010. For the years 2008 – 2010, the average of the survey scores for AIC's legacy utilities are shown.

Utilities can and should minimize complaints from customers by attempting to minimize the number of interruptions each customer experiences. One method to minimize the number of interruptions that individual customers experience is for the utility to monitor the interruptions that occur beyond each protective device so that the utility can take corrective action(s) if multiple interruptions occur beyond the same device. A utility can then reduce the total number of interruptions that individual customers experience –and avoid customers experiencing interruptions that are in excess of the Commission's frequency and duration targets - by taking prompt corrective action if interruption repeatedly affect the same customer or group of customers.

In this regard, AIC has taken the right approach by supplementing its Circuit Inspection Program, which provides an inspection of each distribution circuit once every four years, with additional reliability programs. AIC's Vault and Manhole Structural Inspection Program identifies physical issues with manholes and vaults that, if left uncorrected, could result in significantly longer interruptions in underground areas. AIC's Multiple Device Interruptions Program initiates an additional inspection of segments on a distribution circuit that experience three or more outages during a sliding 12-month window. With AIC's Customers with Repetitive Outages Program, AIC reviews outages for customers who have experienced a threshold of five (or more) outages each year for 3 consecutive years, and AIC then identifies ways to improve the reliability of its service for these customers.[6] AIC's CAIDI Initiatives Program includes use of SCADA and fault indicators to shorten outage durations.

Since reducing the number and duration of interruptions that customers experience is the best way to minimize customer complaints, AIC's is taking the right approach by attempting to improve the reliability of its distribution system through specific programs like those listed above.

D. Worst Performing Circuits:

Section 411.20 defines Worst Performing Circuits as follows:

> *"Worst-performing circuits" are those distribution circuits that, for each reliability index, are among the one percent of all circuits in an operating area (or at least one circuit for each reliability index) with the highest achieved values (lowest performance levels) for the reliability index. For the purpose of identifying worst-performing circuits, only distribution circuit interruptions and customers affected by such interruptions shall be considered in calculating the reliability indices*.

Section 411.120 requires utilities to report worst performing circuits, and corrective actions taken or planned to improve the performance of those worst performing circuits. Circuits can be listed as a worst performing circuit for more than one reliability index during the same year.[7] AIC's Annual Reports list 25 circuits per index.

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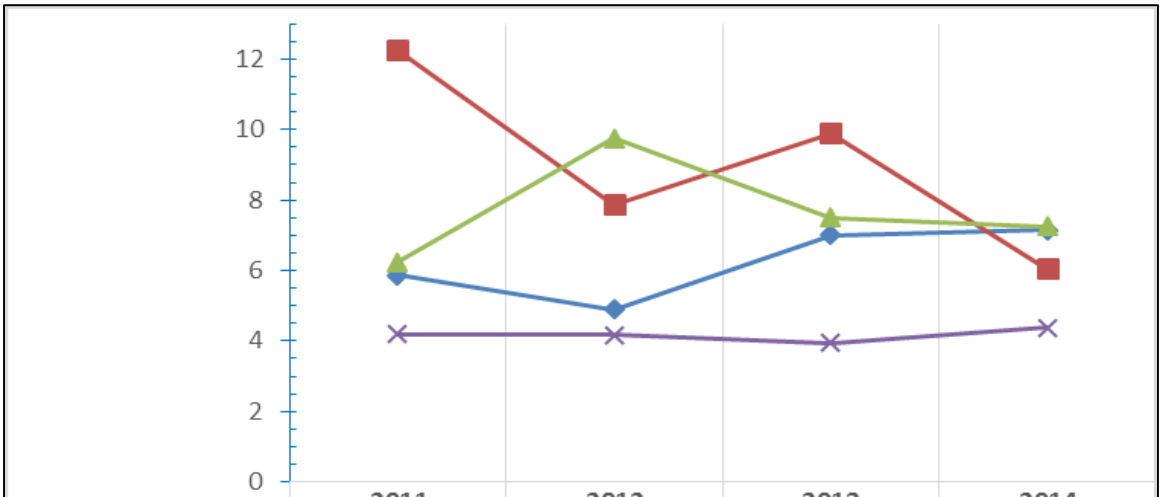
[6] In future years AIC hopes to reduce this program's threshold of 5 outages. AIC 2014 Annual Report, page 22.

[7] In its 2013 annual report, AIC listed Circuits B76001, D48002, and M05368 as worst performing circuits with respect to all three reliability indices.

A utility must report on its worst performing circuits even if all of its circuits performed well during the year: the Part 411 requirement is simply that the utility provide information about its circuits that performed the worst based upon each reliability index. Since designating a circuit as a worst performing circuit does not necessarily indicate that the circuit performed poorly, comparing the index values for worst-case circuits from utility to utility can be useful when attempting to assess the reliability provided by a given utility.

- Figure 3 illustrates that, during the period 2012-2014, the values of SAIFI for worst performing distribution circuits ranged from 3.95 (for Mt. Carmel Public Utility Company ("MCPU") in 2013) to 9.90 (for ComEd in 2013). AIC's highest SAIFI for an individual circuit during this time period was 7.15 for Circuit A91004 (in 2014). Circuit A91004 was also a worst performing circuit during 2008, when it had a SAIFI of 3.82. During 2013, Circuit A91004 had a SAIFI of 2.15.

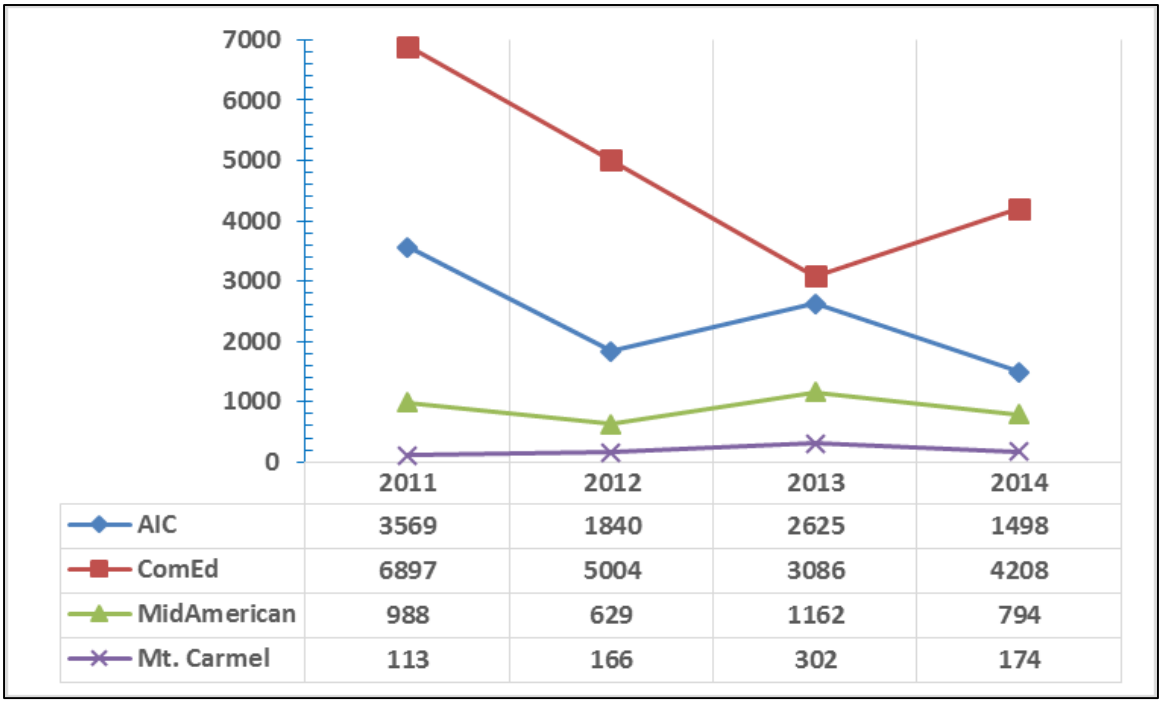
Figure 3: Highest (Worst Case) SAIFI for each Reporting Utility's Distribution Circuits 2011-2014



	2011	2012	2013	2014
AIC	5.86	4.90	7.00	7.15
ComEd	12.26	7.88	9.90	6.05
MidAmerican	6.24	9.76	7.50	7.25
Mt. Carmel	4.19	4.17	3.95	4.38

- Figure 4 illustrates that, during the period 2012-2014, the highest values of CAIDI reported for individual worst performing distribution circuits ranged from 166 minutes (for MCPU in 2012) to 5,004 minutes (for ComEd in 2012). AIC's highest CAIDI for an individual circuit during this time period was during 2013, when Circuit 305132 had a CAIDI of 2625 minutes (nearly 44 hours). During 2014, the CAIDI for Circuit 305132 improved to 123 minutes. AIC's worst case CAIDI in 2014, 1498 minutes for Circuit T46002, was the lowest worst-case CAIDI that AIC reported during the 2012 – 2014 period.

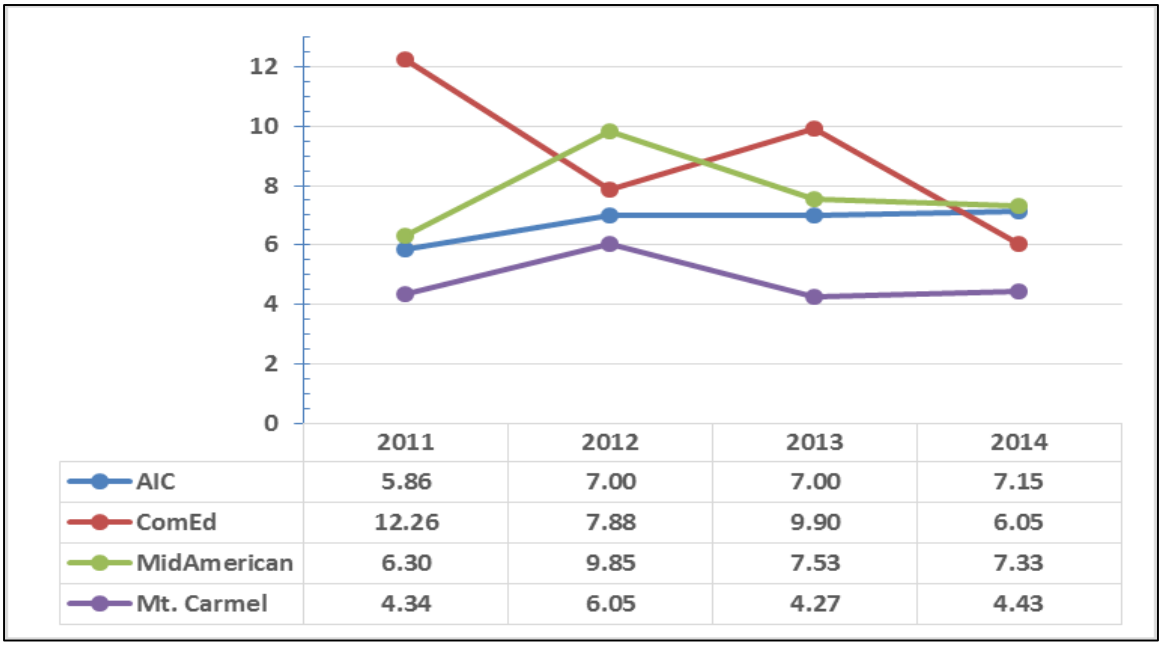
Figure 4: Highest (Worst Case) CAIDI for each Reporting Utility's Distribution Circuits 2011-2014



	2011	2012	2013	2014
AIC	3569	1840	2625	1498
ComEd	6897	5004	3086	4208
MidAmerican	988	629	1162	794
Mt. Carmel	113	166	302	174

- Figure 5 illustrates that, during the period 2012-2014, the highest values of CAIFI for individual worst performing distribution circuits ranged from 4.27 (for MCPU in 2013) to 9.90 (for ComEd in 2013). AIC's highest SAIFI for an individual circuit during this time period was during 2014, when Circuit A91004 had a CAIFI value of 7.15. Circuit A91004 was also a worst performing circuit due to CAIFI during 2008, when it had a CAIFI of 3.83. As was the case with SAIFI, this circuit performed better with respect to CAIFI from 2009 through 2013. For example, during 2013, Circuit A91004 had a CAIFI of 2.15.

Figure 5: Highest (Worst Case) CAIFI for each Reporting Utility's Distribution Circuits 2011-2014



	2011	2012	2013	2014
AIC	5.86	7.00	7.00	7.15
ComEd	12.26	7.88	9.90	6.05
MidAmerican	6.30	9.85	7.53	7.33
Mt. Carmel	4.34	6.05	4.27	4.43

The above figures illustrate that, though AIC's SAIFI and CAIFI for its worst-case circuits have remained unchanged or worsened from year to year, AIC's CAIDI for its worst-case circuits has shown improvement.

AIC includes information in its annual reports regarding the causes for interruptions on its worst performing circuits, and identifies maintenance activities it has performed or plans to perform, such as capital projects and/or tree trimming, in order to improve reliability. Based upon the information AIC provided about interruptions that occurred, Staff found AIC's corrective actions to be logical.[8]

E. Staff's Circuit Inspections:

Staff inspected several of AIC's distribution circuits during 2013, 2014, and 2015 that were either worst performing circuits during the prior year, or that had a SAIFI higher than AIC's system-wide SAIFI during the prior year. An AIC representative accompanied Staff during each of these circuit inspections. At many locations, Staff noted that AIC had recently taken steps to improve the reliability of the circuits by replacing poles or crossarms, or by

[8] AIC's 2012 Annual Report, pages 64-125; AIC's 2013 Annual Report, pages 69-116; AIC's 2014 Annual Report, pages 62-115.

installing animal protection. Though Staff identified locations where AIC should repair or replace its distribution facilities to improve reliability or to satisfy National Electrical Safety Code requirements, these locations were relatively few in number when compared to locations identified during Staff's inspections prior to AIC's implementation of its own inspection program, in 2007. During its inspections, Staff observed several hundred miles of AIC's distribution circuits, including circuits in each of AIC's six operating divisions. Staff cannot guarantee that the conditions of the circuits inspected represent the conditions everywhere on AIC's distribution system, but Staff included circuits in diverse geographic areas as an attempt to see a broad representation of AIC's distribution system.

During Staff's inspections, Staff pointed out observed problems to the accompanying AIC representative and later conveyed a summary of findings to AIC via email that included a description of each observed problem and its location (see Attachments A). Specific information about each of AIC's circuits that Staff inspected follows:

<u>Circuits that Staff Inspected in 2013</u>:

- *Circuit R10-903 (12kV, 76.5 miles): (In 2012: SAIFI=3.65; CAIDI=103; CAIFI=3.65)*

  Circuit R10-903 supplies 1191 customers in and around the community of Sparta, located in southern Illinois about halfway between St. Louis and Carbondale. Circuit R10-903 was a worst performing circuit due to SAIFI and CAIFI in both 2011 and 2012. To improve circuit performance, in 2012, AIC added animal guards, replaced a recloser, resized a fuse, and relocated 1500' of three-phase primary that supplies the Sparta water plant to make it more accessible. In 2013, AIC installed additional fuses and animal guards, replaced several poles, and replaced a section of underground primary cable. In 2014, AIC straightened a guy and pole, and rebuilt several spans of existing overhead distribution lines. AIC previously completed tree trimming on Circuit R10-903 in July of 2011. AIC conducted its own circuit inspection in 2010, and identified approximately 480 items for replacement or repair, which it completed in early 2011.

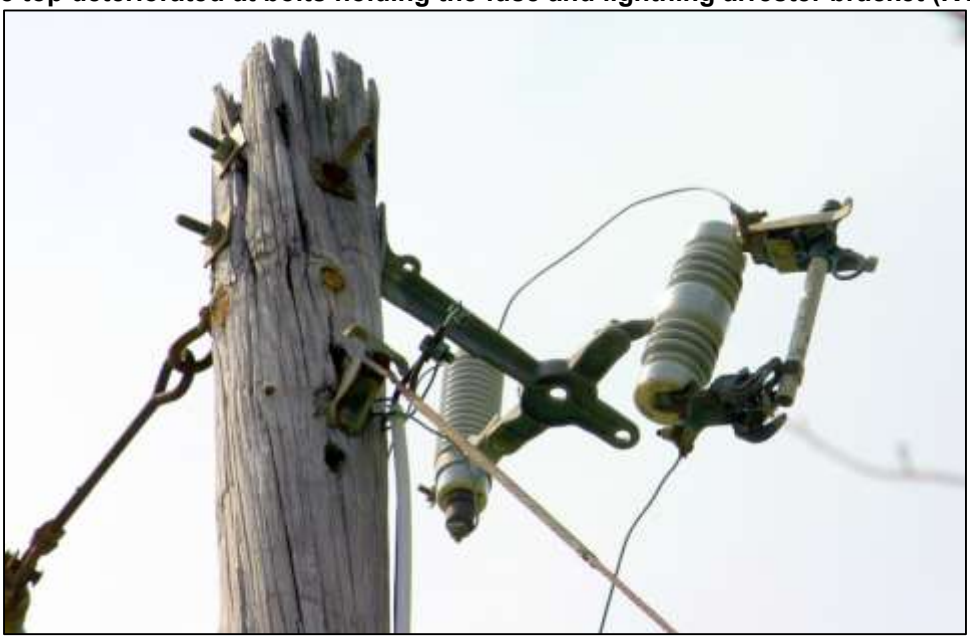
  57 interruptions occurred on Circuit R10-903 during 2012:

  - 23 due to overhead equipment failures
  - 13 due to trees
  - 11 due to weather
  - 3 due to animals
  - 3 due to the public
  - 2 due to underground equipment failures
  - 1 due to operator error
  - 1 due to an unknown cause

  When inspecting Circuit R10-903 on May 28, 2013, Staff found that most of the facilities were in good shape. Staff did note several issues that it recommended AIC address: a broken ground on the substation fence; detached crossarm braces (Photo 1); two damaged/deteriorated pole tops (Photo 2); a tree contacting the primary; and a National Electrical Safety Code ("NESC") violation at a railroad crossing. The 2013 SAIFI for this circuit improved to 0.33.

Photo 1: Both crossarm braces detached from pole (R10-903)

Photo 2: Pole top deteriorated at bolts holding the fuse and lightning arrester bracket (R10-903)



- *Circuit S36-570 (12 kV, 19.5 miles): (In 2012: SAIFI=3.02; CAIDI=133; CAIFI=3.02)*

  Circuit S36-570 supplies 161 customers in the community of Gorham and in rural areas to the south of Gorham, in southwestern Illinois. This area lies close to the Mississippi River - about 30 miles north of Cape Girardeau, Missouri. During 2012, Circuit S36-570 was one of AIC's worst performing circuits due to SAIFI. This circuit's statistically poor performance was due to three interruptions that affected all the customers on the circuit: two of which were the result of farm equipment hitting poles. Circuit S36-570 had also performed relatively poorly in 2011, and was a worst

performing circuit due to SAIFI and CAIFI during 2009. To improve circuit performance, in 2011, AIC added fuses to 7 unfused taps. In 2013, AIC replaced approximately 500-feet of underground cable. AIC completed its scheduled tree trimming in July of 2012. AIC conducted its own circuit inspection in 2010, and identified approximately 120 items for replacement or repair, which it completed in 2011 and 2012.

14 interruptions occurred on Circuit S36-570 during 2012:

- 4 due to overhead equipment failures
- 4 due to trees
- 3 due to animals
- 2 due to the public
- 1 due to underground equipment failure

When inspecting Circuit S36-570 on May 29, 2013, Staff found that many line sections are not visible from the roadway. Staff noted no facility issues. Staff's only suggestion following its inspection was that, since many spans of the circuit are located adjacent to a railroad and cannot be easily accessed, additional fault indicators in these areas could help AIC more quickly locate any faults that occur there, reducing interruption duration time for customers. The 2013 SAIFI for this circuit improved to 2.11.

- *Circuit S15-559 (12 kV, 7.3 miles): (In 2012: SAIFI=3.03; CAIDI=136; CAIFI=3.03)*

  Circuit S15-559 which supplies 669 customers in the community of Carbondale, Illinois, was a worst performing circuit due to SAIFI in 2012. As was the case with Circuit S36-570, this circuit's statistically poor performance during 2012 was due to three interruptions that affected all the customers on the circuit. Two of these whole-circuit interruptions were due to underground equipment failures, and one was due to an animal. To improve circuit performance, in 2011, AIC added fuses to 3 unfused taps. In late 2012, AIC completed a study to improve the coordination of protective devices installed on the circuit. In 2013, AIC replaced about 1000' of underground cable and installed animal protection at the substation (Photo 3). In 2014, AIC replaced two overhead transformers. AIC previously completed tree trimming in July of 2009. AIC conducted its own circuit inspection in 2011, and identified 54 items for replacement or repair, which it completed in 2012.

  13 interruptions occurred on Circuit S15-559 during 2012:

  - 3 due to overhead equipment failures
  - 3 due to trees
  - 3 due to animals
  - 2 due to underground equipment failure
  - 1 due to the public
  - 1 due to an unknown cause

  When inspecting Circuit S15-559 on May 29, 2013, Staff found that the circuit was in good condition, and noted no facility issues either at the source substation or out on the circuit itself. The 2013 SAIFI for this circuit improved to 0.97.

Photo 3: Electrified animal fence at Carbondale Wall St. Substation (S15-559)

- *Circuit S02-502 (12 kV, 21.4 miles): (In 2012: SAIFI=3.18; CAIDI=78; CAIFI=3.18)*

Circuit S02-502 supplies 320 customers in the community of Dahlgren (southeast of Mt. Vernon) and rural areas to the west. Circuit S02-502 was a worst performing circuit due to both SAIFI and CAIFI in 2012, and due to CAIDI in 2011. Two of the three interruptions that affected all customers on the circuit occurred on the same day. To improve circuit performance, in 2012, AIC replaced poles, guys, crossarms, insulator pins, and lightning arresters. AIC also changed settings on its overcurrent relay to improve coordination of protective devices. In 2013, AIC replaced additional poles and crossarms, and installed additional animal guards and fuses. In 2014, AIC replaced 2 transformers, 8 grounds, 5 guy guards, 1 lighting arrester, and 3 insulator pins. AIC previously completed tree trimming in March of 2011. AIC conducted its own circuit inspection in 2010, and identified more than 100 items for replacement or repair, which it completed in 2012.

15 interruptions occurred on Circuit S02-502 during 2012:

- 6 due to overhead equipment failures
- 3 due to animals
- 2 due to weather
- 1 due to trees
- 1 due to the public
- 2 due to an unknown cause

When inspecting Circuit S02-502 on June 6, 2013, Staff observed many new poles, and noted that the overall condition of the circuit was good. Staff's only suggestion following its inspection was that, to aid fault finding, AIC might wish to add fault indicators where its distribution line traveled cross-country. The 2013 SAIFI for this circuit improved to 0.37.

- *Circuit P62-138 (12 kV, 97 miles): (In 2012: SAIFI=2.62; CAIDI=199; CAIFI=2.62)*

Circuit P62-138 supplies 1547 customers in Mt. Vernon and the rural areas to the north. Circuit P62-138 was not a worst-performing circuit during 2012, but its 2012 SAIFI was higher (worse) than AIC's system-wide SAIFI, and it had been a worst performing circuit in 2010. To improve circuit performance, in 2012, AIC installed fuses, lighting arresters, and animal guards, and re-sized 6 existing fuses to improve coordination. In 2013, AIC replaced 1000-feet of underground cable and added additional fuses and animal guards. AIC previously completed tree trimming in March of 2010. AIC conducted its own circuit inspection in 2012, and identified more than 190 items for replacement or repair, which it completed in mid-2013.

88 interruptions occurred on Circuit P62-138 during 2012:

- 22 due to overhead equipment failures
- 20 due to animals
- 19 due to weather
- 8 due to trees
- 6 due to underground equipment failures
- 2 due to the public
- 1 due to error
- 10 due to an unknown cause

When inspecting Circuit P62-138 on June 6 and 7, 2013, Staff observed that AIC had installed an electrified animal fence around its distribution equipment within the Mt. Vernon Gaskin Street Substation - the circuit's source substation. Staff noted many new poles, but that more were needed. Problem locations that Staff noted included: substation gates that did not have grounding straps; 7 poles with woodpecker damage (Photos 4-5); 4 locations where trees were close to or contacting the primary conductor; a location where all but one of the strands of the neutral conductor were broken (Photo 6); a missing guy marker; and 2 additional locations with NESC violations – one with improper construction at a railroad crossing, and one with inadequate ground clearance. This circuit did not appear to be maintained as well as the other circuits that Staff inspected during 2013. The 2013 SAIFI for this circuit, at 2.99, actually worsened, and was again higher than AIC's system SAIFI.

Photo 4: Woodpecker damage (P62138)

Photo 5: Woodpecker damage (P62138)

Photo 6: Broken strands on neutral conductor (P62138)

- *Circuit U16-522 (12 kV, 32 miles): (In 2012: SAIFI=3.15; CAIDI=175; CAIFI=3.15)*

  Circuit U16-522 supplies 253 customers in a rural area east of Beardstown, in west-central Illinois. Circuit U16-522 was a worst-performing circuit during 2012 due to both SAIFI and CAIFI, and had a SAIFI during 2011 that was higher than AIC's system average. To improve circuit performance, in 2013, AIC replaced 15 deteriorated poles and an overloaded transformer, re-sized existing fuses, and re-sagged primary conductors. Also in 2013, AIC installed additional fuses, lightning arresters, conductor spacers, animal guards and fault indicators. AIC previously completed tree trimming in July of 2012. AIC conducted its own circuit inspection in 2010, and identified 126 items for replacement or repair, which were completed during 2011 and 2012.

  15 interruptions occurred on Circuit P62-138 during 2012:

  - 5 due to overhead equipment failures
  - 3 due to animals
  - 3 due to underground equipment failures
  - 2 due to trees
  - 1 due to weather
  - 1 due to an unknown cause

  When inspecting Circuit U16-522 on September 12, 2013, Staff noted the installation of many new poles and several sets of fault indicators. In addition, AIC had done a good job installing animal protection throughout the circuit, and the overall condition of the facilities appeared to be quite good. Staff noted only two problem locations: a woodpecker hole near a crossarm mounting bolt, and a nut coming off of a pin insulator bolt. The 2013 SAIFI for this circuit improved to 0.02.

- *Circuit Y24-523 (12 kV, 18 miles): (In 2012: SAIFI=3.16; CAIDI=132; CAIFI=3.16)*

  Circuit Y24-523, which supplies 292 customers in Camargo and Murdock (about 20 miles south of Champaign), and the rural areas between these two communities, was a worst-performing circuit during 2012 due to both SAIFI and CAIFI. To improve circuit performance, in 2012, AIC replaced a switch, installed a recloser, and installed animal protection at the substation. In 2013, AIC replaced several poles and installed a recloser to protect the main part of the circuit from problems that might occur on a 3-phase tap. AIC plans to replace additional poles in 2015. AIC completed tree trimming in May of 2013. AIC conducted its own circuit inspection in 2010, and identified 110 items for replacement or repair, which it completed during 2011.

  11 interruptions occurred on Circuit Y24-523 during 2012:

  - 6 due to overhead equipment failures
  - 4 due to animals
  - 1 due to an unknown cause

  When inspecting Circuit Y24-523 on September 17, 2013, Staff found the circuit appeared to be in good condition, with no vegetation issues noted. Staff did note that a high percentage of distribution transformers did not have animal guards installed. Staff noted only two specific problem locations: a large gap between the entrance gates at the substation (Photo 7), and a down guy wire that was very slack because it was broken where attached to the anchor. The 2013 SAIFI for this circuit improved to 1.13.

Photo 7: Large gap between entrance gates at Murdock Substation (Y24523)

- *Circuit A73-002 (13.2 kV, 58 miles): (In 2012: SAIFI=4.08; CAIDI=115; CAIFI=4.08)*

  Circuit A73-002 supplies 663 customers in and around the communities of Mapleton and Kingston Mines - a rural area along the Illinois River southwest of Peoria. Circuit A73-002 was a worst-performing circuit during 2012 due to both SAIFI and CAIFI. To improve reliability, in 2012, AIC created a tie to an adjacent circuit and replaced several sections of underground conductor. In 2013, AIC replaced 18 poles and installed an underground loop in a residential subdivision. AIC completed tree trimming in September of 2010. AIC conducted its own circuit inspection in 2012, and identified 180 items for replacement or repair, which it completed in 2012.

  45 interruptions occurred on Circuit A73-002 during 2012:

  - 14 due to overhead equipment failures
  - 11 due to trees
  - 11 due to underground equipment
  - 2 due to weather
  - 2 due to the public
  - 1 due to animals
  - 4 due to an unknown cause

  When inspecting Circuit A73-002 on September 19, 2013, Staff found that AIC had installed animal protection at Wheeler Substation. Staff also saw many new poles on this circuit. Staff did note several locations where trees were close to or contacting the primary. In addition to the trees, problem locations that Staff noted included: a failing crossarm, a detached/broken crossarm brace (Photo 8); a pole with a distribution transformer installed that was leaning severely; 2 poles with deteriorated tops; down guys detached from a transmission pole; and 2 NESC violations – one due to inadequate neutral ground clearance and one due to the spacing of stand-off brackets on an underground riser.[9] The 2013 SAIFI for this circuit was 2.60, which, though an improvement over 2012, was still higher than AIC's system average.

Photo 8: Broken/detached crossarm brace (A73-002)

[9] National Electrical Safety Code Rule 217.A.2.c requires that spacing not be less than 8 feet between the lowest bracket and the ground or between the lowest two brackets.

Circuits that Staff Inspected in 2014:

- *Circuit B80-004 (13.2 kV, 20 miles): (In 2013, SAIFI=3.39; CAIDI=581; CAIFI=3.39)*

  Circuit B80-004, which supplies 933 customers in and around the community of Pekin, was a worst-performing circuit during 2013 due to both SAIFI and CAIFI, and was a worst performing circuit during 2012 due to CAIFI. Three interruptions of the entire circuit during 2013 contributed to the circuit's relatively high SAIFI. To improve circuit performance, in 2012, AIC injected[10] approximately one mile of underground cable, and replaced several other sections. In 2013, AIC replaced poles, pole tops, crossarms, guys, and a lightning arrester. AIC completed tree trimming in September of 2010. AIC conducted its own circuit inspection in 2012, and identified 104 items for replacement or repair, which were completed in 2013.

  59 interruptions occurred on Circuit B80-004 during 2013:

  - 18 due to underground equipment failures
  - 17 due to overhead equipment failures
  - 9 were intentional
  - 4 due to weather
  - 3 due to errors
  - 3 due to animals
  - 2 due to the public or a customer
  - 1 due to trees
  - 2 due to an unknown cause

  When inspecting Circuit B80-004 on April 30, 2014, Staff noted no problems with AIC's distribution equipment. Sheridan Substation appeared to be well-maintained, but there was too large gap between the substation gates. The only problems Staff noted out on the circuit were trees close to the primary at two locations. The 2014 SAIFI for this circuit was 1.04.

- *Circuit U33-509 (12 kV, 29 miles): (In 2013: SAIFI=3.17; CAIDI=73; CAIFI=3.17)*

  Circuit U33-509, which supplies 946 customers in and west of the community of Canton, southwest of Peoria, was a worst performing circuit due to both SAIFI and CAIFI during both 2013 and 2008. To improve circuit performance, in 2013, AIC upgraded 6 transformers. In 2014, AIC replaced 2 poles, a crossarm and the recloser at its substation, and added animal guards, fuses, fault indicators and lighting arresters. AIC also upgraded 13 additional transformers in 2014. AIC completed tree trimming in March of 2013. AIC conducted its own circuit inspection in 2011, and identified 133 items for replacement or repair, which AIC completed in 2011 and 2012.

[10] Injecting cable with a silicone substance can be an effective method of extending the life of a section of cable that would be costly to replace. When an underground primary cable is injected, an insulating fluid is pumped through the cable's conductor strands. The insulating fluid fills voids ("trees") that may have developed that diminish the dielectric strength of the cable's original insulation, thus increasing the operating life of the existing cable.

28 interruptions occurred on Circuit U33-509 during 2013:

- 9 due to overhead equipment failures
- 7 were intentional
- 4 due to underground equipment failures
- 2 due to weather
- 2 due to animals
- 2 due to trees
- 1 due to the public or a customer
- 1 due to an unknown cause

When inspecting Circuit U33-509 on April 30, 2014, Staff found the circuit to be in good condition. Staff noted only one problem location: a double-crossarm where both crossarms appeared to be deteriorated at the location of the insulator pins (Photo 9). Staff's only suggestion beyond this crossarm repair was for AIC to consider installing fault indicators where the circuit branches outside of the substation. Since one branch of the circuit heads toward town, and the other branch toward the college, fault indicators at this location might help AIC locate and isolate future outages more quickly. The 2014 SAIFI for this circuit improved to 1.33.

Photo 9: Crossarms deteriorated at insulator pins (U33-509)

- *Circuit Q15-844 (12 kV, 54 miles): (In 2013: SAIFI=3.31; CAIDI=156; CAIFI=3.31)*

  Circuit Q15-844, which supplies 1574 customers in Mt. Olive and the rural area to the southwest, was a worst performing circuit due to both SAIFI and CAIFI during 2013. To improve circuit performance, in 2014, AIC reduced the span lengths of its conductor and increased the clearance between phases at several locations where lines were coming together during windy conditions. In 2014, AIC also installed additional fuses, animal guards, and lightning arresters, replaced 7 poles, and rebuilt its facilities that were located in an inaccessible area. In 2015, AIC installed additional lightning arresters and re-sagged conductors. In 2016, AIC plans to install a distribution automation scheme. AIC completed tree trimming in April of 2013. AIC conducted its own circuit inspection in 2011, and identified 937 items for replacement or repair, which it completed in 2014.

49 interruptions occurred on Circuit Q15-844 during 2013:

- 16 were intentional
- 10 due to overhead equipment failures
- 8 due to animals
- 7 due to weather
- 7 due to trees
- 1 due to the public or a customer

When inspecting Circuit Q15-844 on May 14, 2014, Staff identified many locations where riser stand-off brackets did not appear to comply with the 8-foot spacing requirement found in NESC Rule 217.A.2.c. In addition, Staff noted: a down guy that did not appear to be either insulated or grounded; a down guy that was disconnected or broken; a deteriorated pole top where the nut was coming off of the top bolt at a pole top pin (Photo 10), and a pole with woodpecker damage. Staff also identified several unfused taps and at least two locations where fault indicators might be beneficial. The 2014 SAIFI for this circuit improved to 1.19.

Photo 10: Cracked pole top with pole top pin coming loose from pole (Q15-844)

- *Circuit U16-500 (12 kV, 18 miles): (In 2013: SAIFI=4.07; CAIDI=91; CAIFI=4.07)*

Circuit U16-500, which supplies 331 customers southwest of Beardstown, was a worst performing circuit due to both SAIFI and CAIFI during 2013. To improve the performance of this circuit, in 2013, AIC replaced several poles and a recloser, added fuses, and re-framed a pole top. AIC completed tree trimming in July of 2012. AIC conducted its own circuit inspection in 2010, and identified 69 items for replacement or repair, which AIC indicates were completed in 2014.

21 interruptions occurred on Circuit U16-500 during 2013, and 5 of them affected the entire circuit:

- 11 due to overhead equipment failures
- 3 due to trees
- 3 were intentional
- 2 due to animals
- 1 due to underground equipment
- 1 due to the public or a customer

When inspecting Circuit U16-500 on May 20, 2014, Staff found that several line sections are not visible from the roadway and that fault indicators might improve AIC's restoration times. Staff found that AIC's distribution facilities that make up this circuit appeared to be in good condition, noting one location where trees appeared to be contacting the primary, and one location where a large mulch pile located directly beneath AIC's primary conductor resulted in inadequate ground clearance. On the same property where the mulch pile existed Staff noted that AIC had attached a guy to the roof of its customer's building (see red arrows in Photo 11). AIC agreed to modify this installation so that it would no longer depend upon the customer's building to support its distribution facilities. The 2014 SAIFI for this circuit improved to 0.08.

Photo 11: AIC's primary guyed to the roof of its customer's building (U16-500)

- *Circuit M05-368 (12 kV, 25 miles): (In 2013: SAIFI=3.35; CAIDI=1333; CAIFI=3.38)*

  Circuit M05-368 supplies 759 customers in and around Edwardsville. It was a worst performing circuit in 2013 due to SAIFI, CAIDI, and CAIFI. A tree-caused interruption that affected the entire circuit lasted for more than 15 hours. To improve the performance of this circuit, in 2014, AIC replaced poles and installed animal guards on transformers along a fused tap. AIC completed tree trimming in October of 2010. AIC conducted its own circuit inspection in 2012, and identified 40 items for replacement or repair, which AIC indicates were completed in 2014.

  39 interruptions occurred on Circuit M05-368 during 2013:

  - 21 attributed to weather
  - 4 due to overhead equipment failures
  - 4 due to trees
  - 4 were intentional
  - 3 due to animals
  - 2 due to the public or a customer
  - 1 due to an error

When inspecting Circuit M05-368 on May 28, 2014, Staff found AIC's distribution facilities to be in good condition, but did note two vegetation issues, including tree growth that was enveloping a capacitor bank. Staff suggested that AIC consider installing fault indicators where several line sections head cross-country. The 2014 SAIFI for this circuit improved to 0.02, and the 2014 CAIDI improved to 463 minutes.

- *Circuit P05-826 (12 kV, 30 miles): (In 2013: SAIFI=3.23; CAIDI=295; CAIFI=3.23)*

  Circuit P05-826 supplies 444 customers in the community of Alhambra and the surrounding rural area – in southwestern Illinois: about 15 miles northeast of Edwardsville. Circuit P05-826 was a worst performing circuit in 2013 due to both SAIFI and CAIFI. To improve the performance of this circuit, in 2013, AIC replaced a pole, and retrofitted the circuit with avian protection (longer crossarms or conductor covers that prevent large birds from contacting two phase conductors simultaneously). In 2014, AIC replaced a pole and a guy wire. AIC completed tree trimming in October of 2013. AIC conducted its own circuit inspection in 2011, and identified 336 items for replacement or repair, which AIC indicates were completed in 2013.

  40 interruptions occurred on Circuit P05-826 during 2013:

  - 18 were intentional
  - 9 due to trees
  - 5 due to overhead equipment failures
  - 3 due to the public or a customer
  - 3 due attributed to weather
  - 1 due to animals
  - 1 due to an unknown cause

  When inspecting Circuit P05-826 on May 28, 2014, Staff found AIC's distribution facilities to be in good condition, but did note a pole with several woodpecker holes, including one adjacent to the dead-end bolt (Photo 12). Staff also noted two issues at the source substation: a ground connection appeared to be detached from the substation fence (Photo 13), and what appeared to be an aluminum conductor was ineffectively attached to the western substation fence extended into an adjacent field where it was buried (Photo 14). The 2014 SAIFI for this circuit improved to 0.03.

Photo 12: Woodpecker hole at mounting point of dead-end insulators (P05-826)

Photo 13: Ground detached from fence post at Livingston Substation (P05-826)

Photo 14: Buried conductor loosely attached to Livingston Substation fence (P05-826)

- *Circuit T17-581 (12 kV, 8 miles): (In 2013: SAIFI=2.88; CAIDI=62; CAIFI=2.89)*

  Circuit T17-581 was not a worst performing circuit in 2013, but its SAIFI and CAIFI were both worse than AIC's system values. Circuit T17-581 was a worst performing circuit during 2012 due to CAIDI. The high CAIDI was due to a tornado hitting the area on February 29, 2012. Circuit T17-581 supplies 406 customers in and around the community of Harrisburg, located in southeastern Illinois. During 2013, two separate tree-related interruptions affected the entire circuit. To improve the performance of this circuit, in 2014, AIC replaced 4 poles and some aged underground equipment, and repaired loose or missing hardware on multiple poles. In 2015, AIC replaced some additional aged underground primary with an overhead line extension. AIC completed tree trimming in October of 2012. AIC conducted its own circuit inspection in 2010, and identified 13 items for replacement or repair, which AIC anticipates completing in 2015.

  13 interruptions occurred on Circuit T17-581 during 2013:

  - 6 were intentional
  - 3 due to trees
  - 2 due to animals
  - 1 due to an error
  - 1 due to an unknown cause

  When inspecting Circuit T17-581 on June 5, 2014, Staff noted many newer poles. Staff identified no maintenance problems associated with AIC's distribution facilities. The 2014 SAIFI for this circuit improved to 0.18.

Circuits that Staff Inspected in 2015:

- *Circuit R09-225 (12 kV, 29 miles): (In 2014: SAIFI=2.71; CAIDI=152; CAIFI=2.71)*

  Circuit R09-225, which supplies 173 customers in a rural area east of Bloomington between the communities of Downs and Ellsworth, was not a worst performing circuit in 2014, but its SAIFI and CAIFI were both worse that AIC's system values. During 2014, two separate interruptions due to overhead equipment failure affected the entire circuit. To improve reliability, in 2014, AIC replaced poles and installed additional fuses and animal guards. AIC plans to replace additional poles during 2015. AIC completed tree trimming in September of 2011. AIC conducted its own circuit inspection in 2013, and identified about 50 items for replacement or repair, which it completed in 2014.

  18 interruptions occurred on Circuit R09-225 during 2014:

  - 9 due to overhead equipment failure
  - 3 were intentional
  - 2 due to animals
  - 1 attributed to weather
  - 1 categorized as "other"
  - 2 due to an unknown cause

  When inspecting Circuit R09-225 on July 16, 2015, Staff observed 34 locations where riser bracket spacing appeared to be in violation of NESC Rule 217.A.2.c.[11] Staff also noted: 13 locations where trees were close to or contacting the primary conductors; a location where the soil at the base of the pole was washing out (Photo 15); a failed wood insulator pin; a location where the neutral conductor had inadequate ground clearance; a deteriorated pole top; and a broken down guy.

Photo 15: Soil washing out at base of pole (R09-225)

[11] On August 11, 2015, AIC met with Staff and explained that most of the locations on Circuit R09-225 that Staff identified as being in violation of NESC Rule 217.A.2.c were constructed prior to the rule's effective date, and therefore were "grandfathered". For safety reasons, AIC agreed it would review and reposition riser brackets where AIC believed the bracket's spacing could jeopardize safety by providing a means for unauthorized persons to climb the pole.

- *Circuit Q15-845 (12 kV, 16 miles): (In 2014: SAIFI=3.64; CAIDI=295; CAIFI=3.64)*

  Circuit Q15-845, which supplies 490 customers northeast of the community of Staunton, was a worst performing circuit due to SAIFI and CAIFI during both 2013 and 2014. To improve the performance of this circuit, in 2014, AIC installed lightning arresters and animal guards, and replaced several poles and crossarms. In 2015, AIC installed additional lightning arresters and re-sagged several spans of conductor. AIC plans to install an automated switching scheme on this circuit in 2016. AIC completed tree trimming in January of 2013. AIC conducted its own circuit inspection in 2011, and identified 220 items for replacement or repair, which it completed in 2013.

  17 interruptions occurred on Circuit Q15-845 during 2014, three of which affected the entire circuit:

  - 10 due to overhead equipment failures
  - 3 were intentional
  - 2 attributed to weather
  - 2 due to animals

  When inspecting Circuit Q15-845 on July 21, 2015, Staff noted that several cross-country spans were not visible from the roadway, so that fault indicators might help AIC find problems and restore service more quickly following an outage. Staff found that AIC's distribution facilities were in good condition, noting problems at only 3 locations: an NESC violation where a service drop was lying on a roof (Photo 16); trees close to the primary; and an unusual double-circuit configuration where all conductors are part of the same circuit (Photo 17). Staff is concerned that this arrangement could be confusing and potentially dangerous during emergency restoration, especially if out-of-area restoration crews who are unfamiliar with it are involved.

Photo 16: AIC's service drop laying on customer's roof (Q15-845)

Photo 17: Unusual Construction with single circuit constructed as a double circuit (Q15-845)

- *Circuit 307-004 (4 kV, 16 miles): (In 2014: SAIFI=2.37; CAIDI=247; CAIFI=2.37)*

  Circuit 307-004, which supplies 661 customers in Fairview Heights and Caseyville, was not a worst performing circuit in 2014, but its SAIFI and CAIFI were both worse than AIC's system values. During 2014, three separate interruptions affected the entire circuit. To improve reliability, in 2014, AIC installed additional fuses and replaced several poles. AIC replaced additional poles during 2015. AIC completed tree trimming in April of 2012. AIC conducted its own circuit inspection in 2014, and identified 85 items for replacement or repair, which it completed during the first quarter of 2015.

  33 interruptions occurred on Circuit 307-004 during 2014:

  - 18 due to overhead equipment failure
  - 8 due to trees
  - 6 were intentional
  - 1 due to an unknown cause

When inspecting Circuit 307-004 on July 21, 2015, Staff observed 17 locations where vegetation was contacting, or close to, AIC's primary conductors (Photos 18 to 20). Tree trimmers were working on the circuit at the time of Staff's inspection, but AIC had waited too long before beginning to trim vegetation along this circuit, especially considering the high number of tree contacts and the high number of tree-related interruptions during 2014. Except for vegetation issues, Staff found AIC's distribution facilities to be in good condition. Many back-lot and cross-country line sections cause much of this circuit to be impossible to view from a roadway, and therefore this circuit is another good candidate for fault indicators.

Photo 18: Vines grown to primary level of pole and enveloping transformer (307-004)

Photo 19: Vines grown to primary level of pole and enveloping transformer (307-004)

Photo 20: Vegetation Grown around and Pulling Down on AIC's Neutral Conductor (307-004)

- *Circuit Y59-520 (12 kV, 36 miles): (In 2014: SAIFI=3.02; CAIDI=155; CAIFI=3.05)*

  Circuit Y59-520 supplies 223 customers in and around the community of East Lynn, about 30 miles northeast of Champaign. It was a worst performing circuit in 2014 due to SAIFI and CAIFI. In 2014, interruptions on two consecutive days due to overhead equipment failure affected the entire circuit. To improve the performance of this circuit, in 2014, AIC replaced and/or braced several poles. In 2015, AIC replaced additional poles and crossarms, and installed animal guards. AIC completed tree trimming in June of 2012. AIC conducted its own circuit inspection in 2013, and identified 137 items for replacement or repair, which it completed during 2013 and 2014.

  18 interruptions occurred on Circuit Y59-520 during 2014:

  - 7 due to overhead equipment failure
  - 3 attributed to weather
  - 2 due to animals
  - 1 due to trees
  - 1 due to underground equipment failure
  - 1 was intentional
  - 3 due to an unknown cause

  When inspecting Circuit Y59-520 on July 23, 2015, Staff observed that AIC had installed many new poles and crossarms. Staff identified only 2 problem locations: a split crossarm and a loose nut on a pole top pin bolt. The circuit appeared to be in excellent condition, with no vegetation issues.

- *Circuit A91-004 (13.2 kV, 37 miles): (In 2014: SAIFI=7.15; CAIDI=125; CAIFI=7.15)*

  Circuit A91-004, which supplies 666 customers in and around Peoria, was AIC's worst performing circuit in 2014 due to SAIFI and CAIFI, and was also a worst performing circuit due to SAIFI and CAIFI during 2008. The poor overall performance during 2014 included 4 interruptions to the entire circuit. To improve reliability, in 2015, AIC replaced several poles. AIC plans to install an automatic switching scheme at some point in the future. AIC completed tree trimming in February of 2014. AIC conducted its own circuit inspection in 2012, and identified 146 items for replacement or repair. AIC did not state when it plans to complete these items.

  25 interruptions occurred on Circuit A91-004 during 2014:

  - 5 due to the public or a customer
  - 5 were intentional
  - 4 due to overhead equipment failure
  - 3 due to underground equipment failure
  - 2 due to animals
  - 2 due to trees
  - 4 due to an unknown cause

  When inspecting Circuit A91-004 on July 28, 2015, Staff identified only 1 problem location: a missing guy guard, which AIC promptly installed. The circuit's source, Allen Substation, appeared to be well maintained, with an electrified animal fence surrounding the distribution equipment.

- *Circuit B10-001 (13.2 kV, 62 miles): (In 2014: SAIFI=3.61; CAIDI=84; CAIFI=3.62)*

  Circuit B10-001, which supplies 1028 customers in a largely rural area between Peoria and Bloomington, was a worst performing circuit in 2014 due to SAIFI and CAIFI. To improve the performance of this circuit, AIC plans to installed an additional recloser in 2015. AIC completed tree trimming in October of 2011. AIC conducted its own circuit inspection in 2013, and identified 343 items for replacement or repair. AIC expects to complete the identified items during 2015.

  36 interruptions occurred on Circuit B10-001 during 2014:

  - 11 due to overhead equipment failure
  - 8 due to the public or a customer
  - 8 were intentional
  - 5 due to animals
  - 2 due to underground equipment failure
  - 1 due to trees
  - 1 due to an unknown cause

  When inspecting Circuit B10-001 on July 30, 2015, Staff identified only 1 problem location: a neutral conductor with inadequate ground clearance. At the substation, Staff noted a broken barbed-wire hanging from the substation fence that could pose a hazard (Photo 21); and inside the substation Staff noted rusting cooling fins on the substation transformer that should be treated and painted (Photo 22).

Photo 21: Broken barbed-wire hanging outside of Cruger Substation (B10-001)

Photo 22: Transformer cooling fins rusting (B10-001)

F. Vegetation Management:

Many outages that occur during weather events involve trees - broken limbs or limbs that stay attached to the tree but get blown and contact and/or damage primary distribution conductors. Consequently, interruptions categorized as weather-related are sometimes actually tree-related. Tree conditions near AIC's overhead electric distribution lines are required to meet NESC Rule 218(A)(1) from the 2002 NESC, as adopted by the Commission in 83 Ill. Adm. Code 305.20 on June 15, 2003. NESC Rule 218(A)(1) and its associated note state the following:

> *Trees that may interfere with ungrounded supply conductors should be trimmed or removed.*
>
> *NOTE: Normal tree growth, the combined movement of trees and conductors under adverse weather conditions, voltage, and sagging of conductors at elevated temperatures are among the factors to be considered in determining the extent of trimming required.*

Each of AIC's annual reports for the years 2012 – 2014 state that AIC trimmed trees along 100% of the circuit-miles that it planned to trim, plus AIC trimmed additional circuit-miles each of these years to more evenly balance the tree trimming required during each year of its four-year tree trimming cycle. AIC has approximately 33,200 circuit-miles of distribution circuits that require trimming. This translates to an average of approximately 8,300 circuit-miles each year of its four-year cycle. AIC trimmed 8,298 circuit-miles during 2014, and plans to trim 8,127 circuit-miles during 2015.

To reduce tree-related outages, AIC removed 131,167 trees in 2012, 105,366 trees in 2013, and 109,237 trees in 2014 as a proactive approach to reducing future tree trimming and tree related outages. These tree removals include trees removed through community programs and trees that jeopardized the system. Removing inappropriate trees from under or near AIC's distribution lines when the trees are young is an effective way to reduce future tree removal costs and future tree trimming requirements.

In addition to its four-year tree trimming cycle, AIC performs mid-cycle inspection and selective trimming on its circuits to eliminate problems from fast-growing trees. AIC reports that it completed all of its scheduled mid-cycle inspections during 2012 - 2014.

When inspecting AIC's circuits, Staff found that in most cases AIC had done a good job keeping vegetation cleared from its distribution lines. Along most circuits, Staff identified few locations where vegetation was contacting or growing near the primary conductor. Notable exceptions were Circuits 307-004, R09-225, and A73-002. Staff observed more trees contacting AIC's primary comprising these three circuits than other AIC circuits that Staff inspected. Though tree trimming crews were working on Circuit 307-004 at the time of Staff's inspection, AIC had waited too long to trim vegetation along this circuit. Vegetation was already contacting the primary conductor at many locations. During 2014, at least 8 tree-related interruptions occurred on Circuit 307-004.[12]

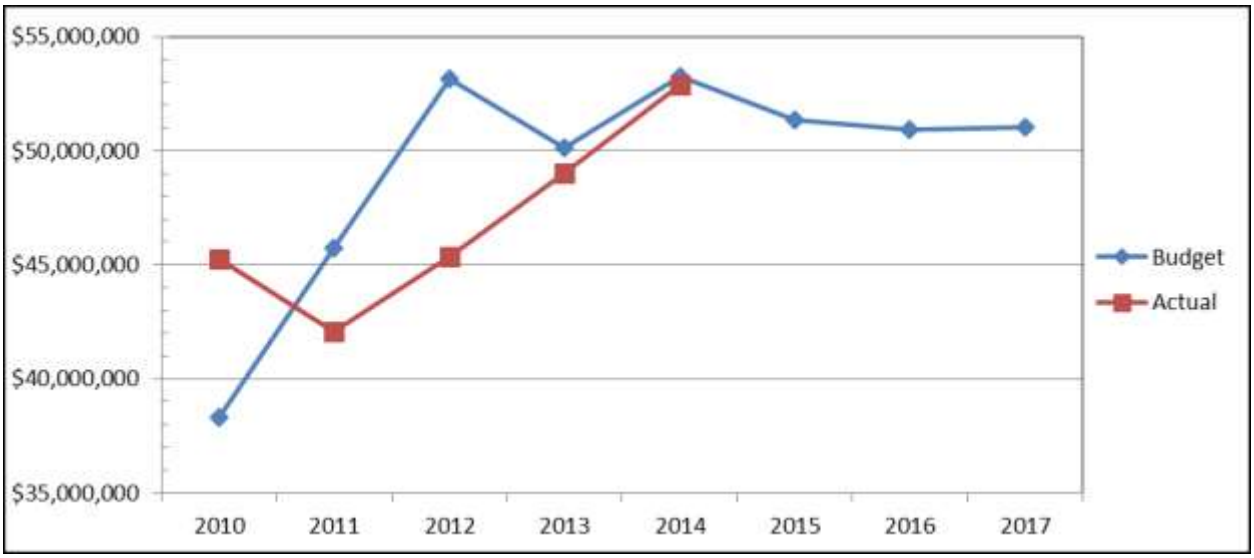
[12] AIC's data shows that 18 interruptions occurred due to overhead equipment failures, and one due to an unknown cause. Staff believes some of these 19 additional interruptions were likely tree-related.

Though Staff observed some circuits where it appeared that AIC should address the timing of its vegetation clearing, AIC's system-wide statistics indicate that customers in AIC operating area, on average, have been experiencing fewer and shorter tree-caused interruptions. Specifically, compared to the period 2010 - 2011, the average annual number of tree-caused interruptions occurring on AIC's system was about 16% lower during 2012 – 2014. Additionally, the number of customers interrupted during tree-caused interruptions was about 27% lower; and the number of minutes customers were interrupted due to tree-caused interruptions was about 39% lower.

Maintaining an effective vegetation management program is vital to improving and maintaining the reliability of a distribution system. The negative effects of a utility's neglect in this area may not be apparent immediately, but will become very apparent over a period of several years, after the distribution system becomes overwhelmed with vegetation. Recovery from such neglect is very costly and time consuming, and, because after such neglect the limbs that must be trimmed are of greater size, customer complaints associated with the utilities vegetation management efforts escalate after periods of neglect.

Rather than neglecting vegetation management, AIC has continually sought ways to improve its vegetation management programs. Figure 6 illustrates AIC's actual and budgeted expenditures for distribution vegetation management during the period 2010 – 2017. AIC spent less than it budgeted during 2011 and 2012, but in 2013 and 2014 AIC spent very close to the amount budgeted. AIC's projected spending for the years 2015 - 2017 indicates that AIC plans to continue funding its existing vegetation management program's four-year tree trimming cycle and mid-cycle patrols.

Figure 6: AIC's Actual and Budgeted Vegetation Management Expenditures



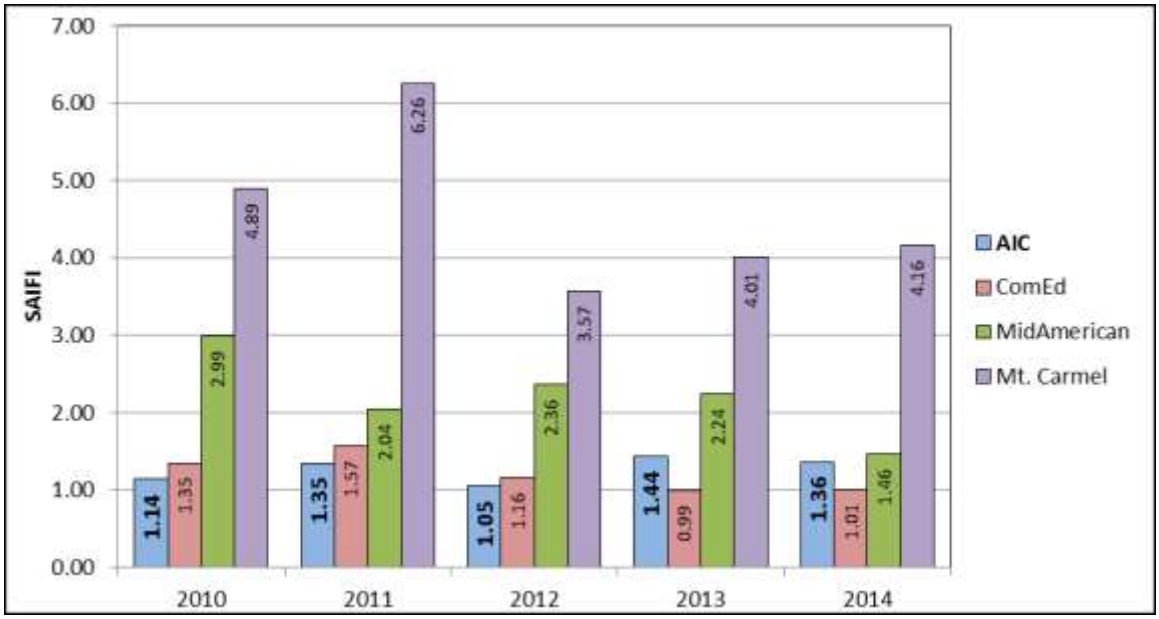
8. Trends in Reliability Performance

A. Trends in Reliability Indices:

SAIFI:

AIC has generally performed well with respect to SAIFI when other reporting utilities are also considered. This trend has continued during the annual reporting periods from 2012 to 2014. Figure 7 shows the SAIFI reported by each electric utility for the years 2010-2014. AIC reported relatively low SAIFI values during each of these years.

Figure 7: System SAIFI by Utility (2010-2014)

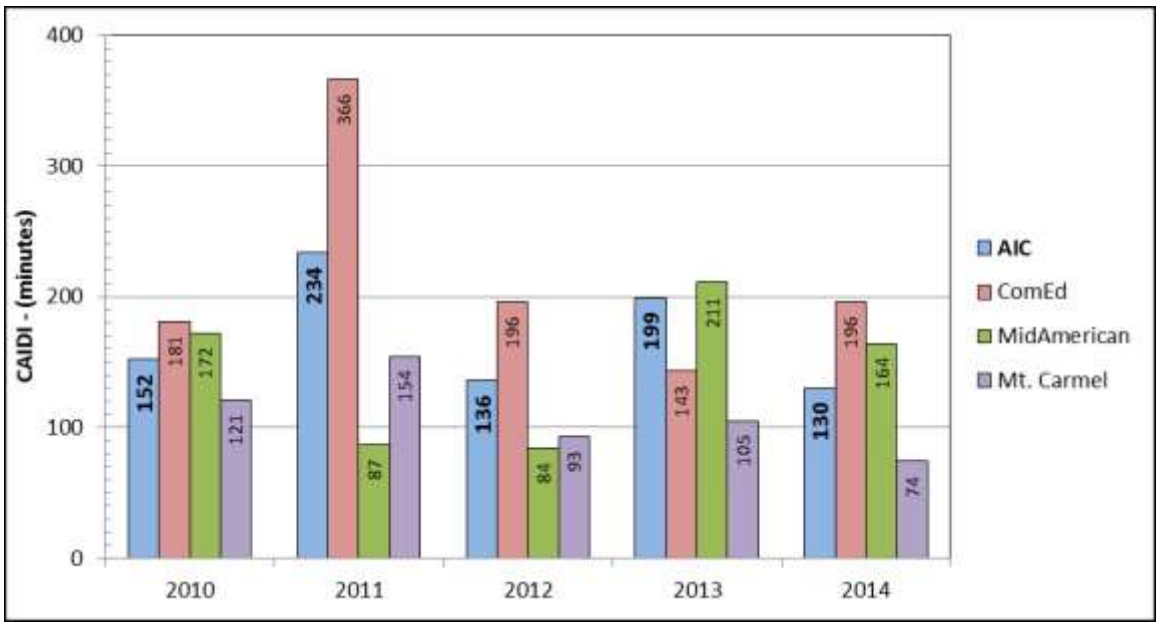


- In 2011, AIC's SAIFI worsened by about 18% when compared to 2010, but remained the lowest reported value: 59% lower (better) than the average of the SAIFI values reported by the three other utilities (AIC's 2011 SAIFI=1.35).
- In 2012, AIC's SAIFI, which improved by 22% when compared to 2011, was again the lowest value reported: about 56% lower (better) than the average of the SAIFI values reported by the three other utilities (AIC's 2012 SAIFI=1.05).
- In 2013, AIC's SAIFI worsened by about 37%, but was still 40% lower (better) than the average of the SAIFI values of the three other utilities, and the second lowest (best) value reported (AIC's 2013 SAIFI=1.44).
- In 2014, AIC's SAIFI improved by about 6%, and was 38% lower (better) than the average of the SAIFI values of the three other utilities: again the second lowest (best) (AIC's 2014 SAIFI=1.36).

CAIDI:

AIC has, in general, performed relatively poorly with respect to CAIDI compared to all reporting utilities. In recent years, AIC has made an effort to affect that trend by introducing programs intended to decrease outage duration times for its customers. During 2014, AIC's CAIDI was lower (better) than the average of the CAIDI values reported by the three other utilities, with only one utility reporting a lower value. Figure 8 shows CAIDI values for the years 2010 - 2014 for each reporting electric utility. While AIC's CAIDI values have not demonstrated a trend of dramatic improvement, AIC's CAIDI improved significantly in 2014 relative to other reporting utilities.

Figure 8: System CAIDI by Utility (2010-2014)

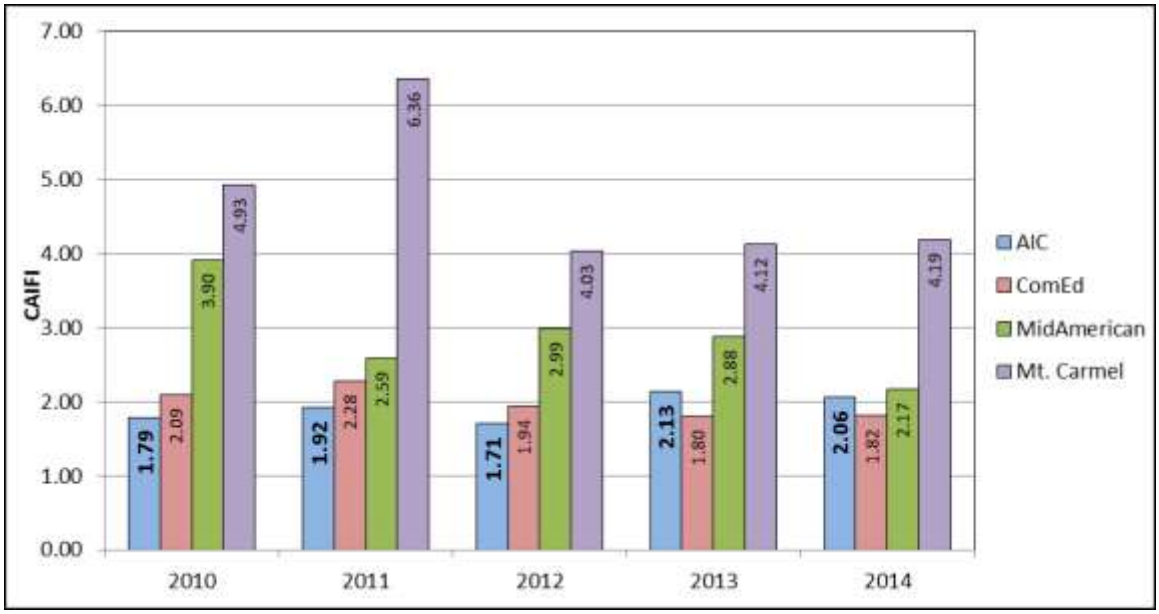


- In 2011, AIC's CAIDI increased (worsened) by approximately 54% when compared to 2010, and was the second highest value: about 16% higher (worse) than the average of the CAIDI values of the three other reporting utilities (AIC's 2011 CAIDI=234 minutes).
- In 2012, AIC's CAIDI decreased (improved) by approximately 42%, but was still the second highest: about 9% higher (worse) than the average of the CAIDI values reported by the three other reporting utilities (AIC's 2012 CAIDI=136 minutes).
- In 2013, AIC's CAIDI increased (worsened) by approximately 46%, and was the second highest reported value: about 30% higher (worse) than the average of the CAIDI values of the three other reporting utilities (AIC's 2013 CAIDI=199 minutes).
- In 2014, AIC's CAIDI decreased (improved) by about 34%, and was about 10% lower (better) than the average of the CAIDI values of the three other reporting utilities. (AIC's 2014 CAIDI=130).

CAIFI:

As with SAIFI, AIC has historically performed relatively well with respect to CAIFI. This trend has continued during each of the years 2012 - 2014. Figure 9 shows CAIFI for the years 2010-2014 for each reporting electric utility.

Figure 9: CAIFI by Utility (2010-2014)



- In 2011, AIC's CAIFI increased (worsened) by approximately 7% when compared to 2010, but was still the lowest value reported: about 48% lower (better) than the average of the CAIFI values of the three other reporting utilities (AIC's 2011 CAIFI=1.92).
- In 2012, AIC's CAIFI decreased (improved) by 11%, and was again the lowest reported: about 43% lower (better) than the average of the CAIFI values reported by the other three utilities (AIC's 2012 CAIFI=1.71).
- In 2013, AIC's CAIFI increased (worsened) by 25%, and was the second lowest reported: about 27% lower (better) than the average of the CAIFI values reported by the three other utilities (AIC's 2013 CAIFI=2.13).
- In 2014, AIC's CAIFI improved slightly (by about 3%), and was again the second lowest reported: about 24% lower (better) than the average of the CAIFI values reported by the three other utilities (AIC's 2014 CAIFI=2.06).

Conclusion about Changes in Reliability Indices

AIC's reliability indices for 2014 compared to 2013 indicate that, on average, AIC's customers experienced slightly fewer interruptions during 2014. For customers experiencing interruptions, on average the duration of those interruptions was shorter during 2014 than during 2013.

Except for CAIDI, changes in AIC's reliability indices from 2013 to 2014 were similar to the changes in reliability indices of Illinois' other reporting utilities:

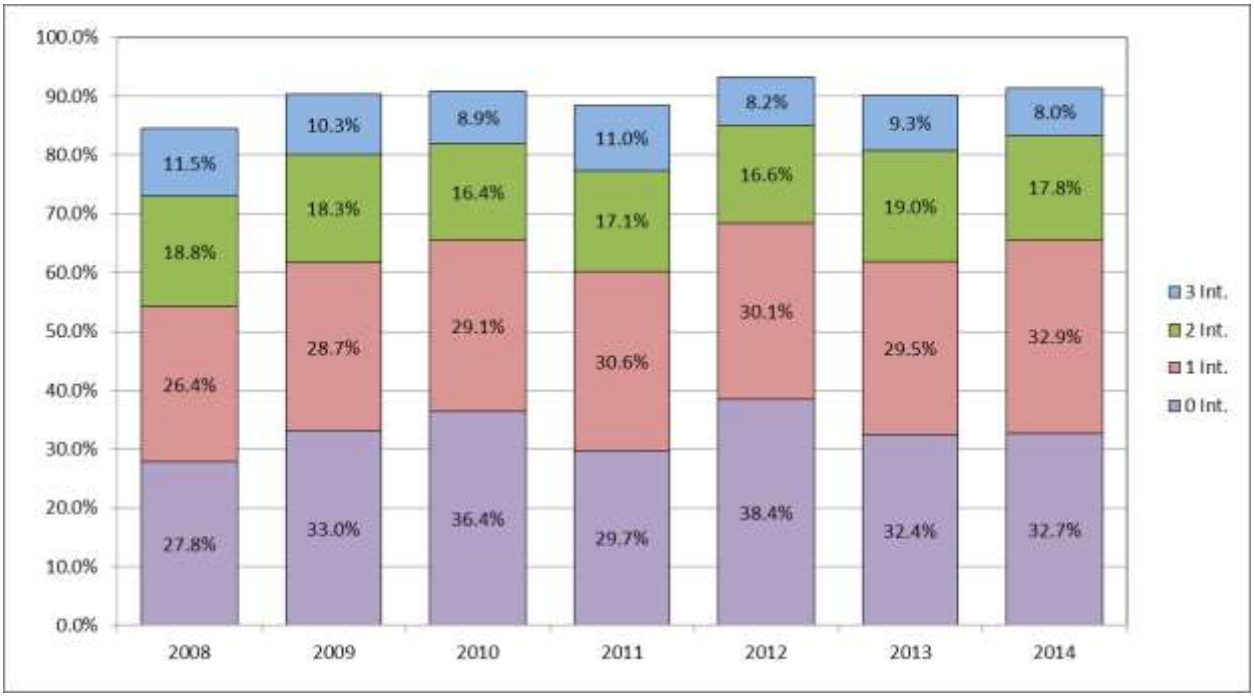
- AIC's SAIFI improved by about 6% from 2013 to 2014. The average of the SAIFI values from all other reporting utilities improved by about 8%.
- AIC's CAIDI decreased (improved) by about 35% from 2013 to 2014. The average of the CAIDI values from all other reporting utilities decreased by about 5%. With this relatively large decrease, AIC reported the second lowest CAIDI for 2014.
- AIC's CAIFI decreased by about 3% from 2013 to 2014. The average of the CAIFI values from all other reporting utilities decreased by about 7%.

B. Trends in Interruptions to Individual Customers:

Customers Experiencing Three or Fewer Interruptions Annually

AIC's interruption data indicates that, during each of the years 2012 through 2014, more than 90% of AIC's customers experienced three or fewer interruptions. Included in that 90% were at least 32% of AIC's customers (38% in 2012) who experienced no interruptions at all. These statistics, illustrated in Figure 10, indicate that AIC has been maintaining its distribution system so that the majority of its customers have not had to endure a high number of interruptions each year.

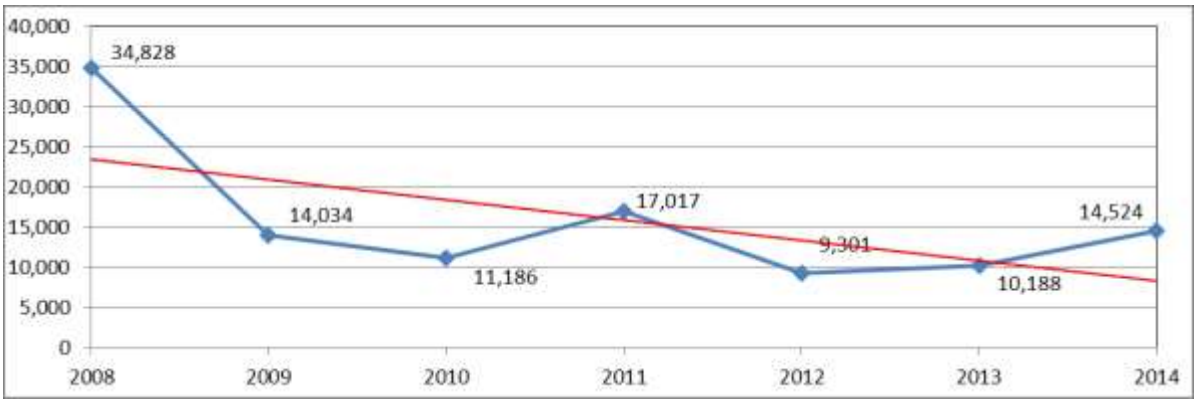
Figure 10: Percentage of AIC's Customers Experiencing 3 or Fewer Interruptions



Customers Experiencing a Higher Number of Interruptions Annually

Figure 11 shows that the number of AIC's customers experiencing more than six interruptions increased from 9301 customers during 2012 to more than 14,000 during 2014. This statistic illustrates that, though most of AIC's customers are experiencing few interruptions each year, some less fortunate customers have had to endure a high number of interruptions. The number of AIC's customers who experienced a high number of interruptions increased in both 2013 and 2014 compared to 2012.

Figure 11: AIC Customers Who Experienced more than 6 Interruptions Annually (2008-2014)



AIC's annual reports indicate that there were three weather events in AIC's service area that exceeded NESC design criteria during 2012, six during 2013, and three during 2014. These weather events included high winds and tornados. It is understandable that weather events with conditions that exceed NESC design criteria could result in interruptions to AIC's customers, since even a well maintained distribution system can fail under those conditions. The challenge for utilities, including AIC, is to properly maintain its distribution facilities, including keeping vegetation properly cleared from its overhead lines, so that interruptions to customers do not unnecessarily occur during lesser wind speeds and/or less remarkable storm events. While Figure 11 illustrates that a greater number of AIC's customers experienced six or more interruptions during 2014 than during either 2012 or 2013, the overall linear trend since 2008 (red line) is one of improvement for AIC. Unfortunately, if only the most recent five years of data are used (2010 – 2014), the red linear trend line is nearly level, as shown in Figure 12. Figure 12 illustrates that AIC has been less successful at realizing additional improvement in recent years.

Figure 12: AIC Customers Who Experienced more than 6 Interruptions Annually (2010-2014)

C. Trends in Customer Interruption Cause Categories:

Figure 13 illustrates that the total number of interruption events that occurred annually on AIC's distribution system due to all causes has generally been decreasing since 2008. The 37,167 interruption events that affected AIC's distribution system in 2014, though higher than the number that occurred during 2013, was lower than years prior to 2013.

Figure 13: Interruption Events Occurring on AIC's Distribution System Annually (2010-2014)

In order to logically invest in reliability improvements, a utility should examine the causes of the interruptions that occur on its distribution system. Table A to Part 411 includes interruption cause categories and interruptoin code descriptions that each reporting utility must use when recording its interruption events in order to provide reporting consistency. For example, Table 5 identifies the cause categories for the interruption events that occurred annually on AIC's distribution system that are shown on Figure 13.

Table 5: Number of interruption events by cause (2010-2014)

Cause Category	2010		2011		2012		2013		2014	
OVERHEAD EQUIPMENT	10,479	25.50%	10,518	25.29%	10,133	26.74%	11,076	31.03%	11,408	30.69%
INTENTIONAL	8,205	19.97%	6,355	15.28%	8,980	23.70%	7,528	21.09%	9,218	24.80%
ANIMAL RELATED	4,789	11.66%	4,508	10.84%	4,943	13.04%	4,312	12.08%	4,923	13.25%
TREE RELATED	3,865	9.41%	5,286	12.71%	3,612	9.53%	4,186	11.73%	3,767	10.14%
UNDERGROUND EQUIPMENT	2,451	5.97%	2,474	5.95%	2,850	7.52%	2,746	7.69%	2,761	7.43%
WEATHER	3,563	8.67%	4,664	11.22%	2,489	6.57%	2,535	7.10%	2,332	6.27%
PUBLIC	1,142	2.78%	1,021	2.46%	1,103	2.91%	1,029	2.88%	939	2.53%
UNKNOWN	2,340	5.69%	2,610	6.28%	2,563	6.76%	900	2.52%	710	1.91%
CUSTOMER	301	0.73%	368	0.88%	421	1.11%	467	1.31%	338	0.91%
OTHER	3,491	8.50%	3,302	7.94%	226	0.60%	342	0.96%	254	0.68%
JURISDICTIONAL	173	0.42%	177	0.43%	298	0.79%	277	0.78%	218	0.59%
SUBSTATION EQUIPMENT	217	0.53%	224	0.54%	221	0.58%	177	0.50%	204	0.55%
TRANSMISSION OUTAGE	47	0.11%	51	0.12%	32	0.08%	96	0.27%	62	0.17%
LOSS OF SUPPLY	26	0.06%	28	0.07%	26	0.07%	19	0.05%	33	0.09%
Total	**41,089**	**100.00%**	**41,586**	**100.00%**	**37,897**	**100.00%**	**35,690**	**100.00%**	**37,167**	**100.00%**

AIC explains that it only uses the cause code "weather" when weather data confirms that National Electrical Safety Code ("NESC") design criteria was exceeded during a weather event (for example, ice and/or wind loading). AIC attributed 6% to 7% of interruption events to weather during the years 2012 through 2014, compared to 9% to 11% during the years 2010 and 2011. AIC's reporting practice pertaining to weather results in more accurate, reliable and useful interruption data.

Table 5 illustrates that, at least since 2010, overhead equipment failures have caused the highest number of interruption events on AIC's system. During Staff's circuit inspections, Staff observed that most of AIC's facilities were in good condition; however, Staff observed some locations where AIC's overhead facilities were in need of repair and/or maintenance. Repairing and/or maintaining its distribution system prior to the occurrence of an interruption would be the best way for AIC to decrease the number of interruption events due to overhead equipment failure.

Identifying the cause of interruption events as shown in Table 5 is not, by itself, indicative of how AIC's customers were affected by the interruptions that occurred. To better explain how interruptions affect customers, additional statistics are needed: (a) customer interruptions and (b) interruption durations. As an illustration as to why additional statistics are needed, consider a tree-caused interruption isolated by a tap fuse so that the interruption affects 10 customers for one hour. This single tree-caused interruption event would result in 10 customer-interruptions (10 customers X 1 interruption) and 600 customer-minutes (10 customers interrupted X 60 minutes of duration). As a second example, consider an overhead equipment failure on the mainline of a circuit that causes an interruption of service to 1000 customers for five hours. This single interruption event caused by overhead equipment failure results in 1000 customer-interruptions (1000 customers X 1 interruption) and 300,000 customer-minutes (1000 customers interrupted X 300 minutes of duration). Even though the first example (involving the fuse and 10 customers) affects fewer customer and had a much shorter duration, each of these two hypothetical interruptions would be counted in Table 5 as a single interruption event.

A utility should pay close attention not only to the number of interruption events that occur on its distribution system, but also to how those interruption events impact customers. Table 6 shows the five interruption cause categories that resulted in the highest numbers of AIC's customer interruptions during 2014.

Table 6: AIC's Cause Categories Resulting in the Highest Number of Customer Interruptions

Cause Category	2010		2011		2012		2013		2014	
OVERHEAD EQ	445,603	27.16%	486,558	25.38%	401,073	26.77%	571,543	32.13%	553,275	33.06%
INTENTIONAL	202,670	12.35%	225,393	11.76%	183,643	12.26%	198,905	11.18%	254,390	15.20%
SUBSTATION EQ	228,086	13.90%	191,028	9.96%	160,741	10.73%	144,937	8.15%	176,288	10.53%
TREE RELATED	172,694	10.52%	217,018	11.32%	122,827	8.20%	165,502	9.30%	135,783	8.11%
ANIMAL RELATED	115,323	7.03%	113,079	5.90%	132,161	8.82%	133,193	7.49%	111,965	6.69%

Similarly, Table 7 shows the five cause categories that resulted in AIC's highest durations (measured in customer-minutes).

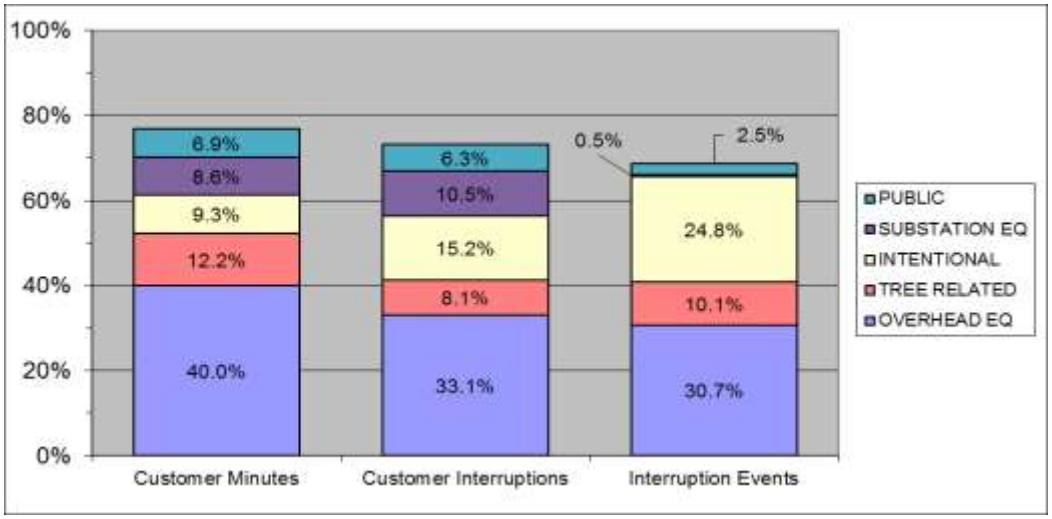
Table 7: AIC's Cause Categories Resulting in the Highest Duration of Interruption Time

Cause Category	2010		2011		2012		2013		2014	
OVERHEAD EQ	84,980,803	36.58%	120,381,817	29.25%	58,526,080	30.44%	99,362,794	28.22%	86,786,246	40.04%
TREE RELATED	31,935,990	13.75%	69,931,704	16.99%	25,483,993	13.25%	41,292,889	11.73%	26,338,494	12.15%
INTENTIONAL	16,081,468	6.92%	16,524,902	4.01%	13,656,502	7.10%	14,235,886	4.04%	20,082,219	9.26%
SUBSTATION EQ	20,483,811	8.82%	21,011,606	5.10%	20,909,299	10.87%	13,855,613	3.94%	18,728,731	8.64%
PUBLIC	11,243,588	4.84%	11,206,933	2.72%	9,763,128	5.08%	9,914,808	2.82%	14,849,107	6.85%

Using Substation Equipment failures as an example, Table 5 shows that only 0.55% of AIC's interruption events were due to substation equipment failures during 2014, whereas more than 10% of AIC's customer interruptions were due to substation equipment failures, and more than 8% of the interruption duration that occurred during 2014 were due to substation equipment failures. The greater impact of each Substation equipment failure is not surprising, since Substation equipment failures could simultaneously affect all customers on every distribution circuit that the substation supplies. Since each substation equipment failure could result in a disproportionately high number of customer interruptions, properly maintaining substation equipment should be a high priority for electric utilities.

Referring again to Tables 6-7, which show AIC's interruption-cause categories that most affect customers, it is surprising that the "Intentional" category is one of the highest categories in each table. Intentional interruptions are interruptions that occur when AIC purposely de-energizes its facilities to perform maintenance or repairs. AIC attributed more than 15% of its total annual customer interruptions to intentional interruptions during 2014, and more than 9% of the customer-minutes that occurred. Intentional interruptions have been the cause of a significant percentage of AIC's interruption events every year, including over 20% of the total annual interruption events during the period 2012 through 2014. Figure 14 shows AIC's five interruption cause categories that resulted in the most customer-minutes during 2014, as well as the contribution of those 5 interruption cause categories toward AIC's customer interruptions and interruption events.

Figure 14: Contribution of Various Causes to AIC's 2014 Interruptions



AIC identified nearly one quarter of its 2014 interruption events as intentional. When an intentional interruption occurs, crews are typically, but not always, already in position to perform the necessary repairs, so it is in some ways surprising that intentional interruptions accounted for over 9% of the customer-minutes of interruption that occurred in AIC's service area during 2014. While intentional interruptions are often necessary to perform repairs, AIC should be attentive regarding the impact intentional interruptions have on its customers, and should seek methods to reduce the scope and negative impact of intentional interruptions when possible.

As Figure 14 illustrates, AIC's ability to continue to improve the reliability of service it provides to its customers will largely depend on its success at reducing impacts of interruptions caused by overhead equipment failures, trees, substation equipment failures, and the interruptions it categorizes as intentional. There is likely little AIC can do to prevent the public from causing some number of interruptions each year. These interruptions occur without warning and regardless of the condition of AIC's equipment, such as when a vehicle hits and breaks a pole. In 2014, 2.5% of interruption events occurring on AIC's distribution were caused by the public.

9. Plan to Maintain or Improve Reliability

A. AIC's Reliability Programs

In its annual reports, AIC lists several ongoing activities that it employs as part of its effort to positively impact the reliability of its distribution system.[13] Included are practices any electric utility must perform to adequately operate an electric distribution system in Illinois, such as: preparing for and responding to storms, performing substation and relay maintenance, performing capacity planning, complying with the National Electrical Safety Code, periodically inspecting distribution facilities and verifying that devices installed on the distribution system are operational, installing lightning protection, repairing faulted cables, and keeping vegetation cleared from its distribution system. Based upon information in AIC's annual reports and on Staff's observations, AIC has competently and responsibly kept up with these activities on most of its distribution circuits. In addition to these "required" activities, AIC's 2014 annual report includes descriptions of additional activities that AIC performs that are worthy of special mention:

- Animal Protection:

  As shown in Table 5, nearly 5,000 animal-caused interruption events occurred on AIC's distribution system in 2014 alone, with similar numbers of interruptions occurring in prior years. In an effort to reduce the negative effect on customers that animal-caused interruptions have, all pole-mounted transformers that AIC purchases come supplied with animal guards and insulated wire. In addition, in 2014, AIC installed 164 animal guards on existing transformers located on 15 of its distribution circuits. AIC installed more animal guards during 2015. Also in 2014, AIC installed electric animal fences at 17 substations to prevent animals from accessing its distribution equipment, thus minimizing the likelihood of large-scale interruptions of entire circuits due to failure of substation equipment. AIC should continue its animal protection programs.

[13] AIC's 2014 annual report, pages 5-28.

- Multiple Device Interruption:

  As Figure 1 illustrates, over 600 of AIC's customers experienced interruptions in excess of the Commission's reliability targets during 2014. With its Multiple Device Interruption Program, AIC initiates the review and remedial action for facilities that experience 3 or more interruptions during a rolling 12-month window. During 2014, AIC completed 121 of the 122 projects developed as a result of this program, with the remaining project completed in 2015. AIC should continue this program, which is a practical means to identify and correct problems on distribution circuits that create repeat interruptions for individual or groups of customers.

- Customers with Repetitive Outages:

  AIC discovered that its Multiple Device Interruption program may not identify some customers who experienced multiple interruptions during a year. For example, if a portion of a circuit is transferred to a different circuit, the Multiple Device Interruption program may not identify and address interruptions that some of the transferred customers experience, because those customers would no longer be supplied by the same distribution equipment. In 2014, AIC began its Customers with Repetitive Outages Program to identify and address such situations. With this program, AIC reviews outages for customers who experienced five or more interruptions for three consecutive years, and identifies remedial actions to improve service for those customers. AIC states that in future years it plans to lower the threshold value for taking remedial action. AIC should continue this program as it is a logical approach to improving service to individual customers or small groups of customers who are plagued by frequent service interruptions. Importantly, this program will reduce the number of customers who experience interruptions that exceed reliability targets.

- CAIDI Initiatives:

  AIC is taking steps to reduce the average duration of interruptions that its customers experience by using several tools, including fault indicators. As Figure 8 illustrates, AIC has historically reported relatively high CAIDI values. Fault indicators, working in conjunction with AIC's supervisory control and data acquisition (SCADA) system, will help AIC locate and isolate interruption causes more quickly so that service can be restored to a greater number of customers more quickly. AIC's efforts to improve system CAIDI are commendable, and appear to have shown some success. AIC's system CAIDI during 2014, at 130 minutes, was the lowest system value AIC has reported to date.

AIC uses the reporting tool shown below to monitor the company's progress at completing its reliability activities.

Table 8: AIC's Year-end Reliability Action Plan Summary (copied from p. 28 of AIC's 2014 annual report)

Ameren Illinois
January-December 2014

	ENGINEERING, REVIEWS & INSPECTIONS			FIELD WORK			CI REDUCTION	
	# Planned	# Completed	% Completed	# Planned	# Completed	% Completed	# Planned	% Completed
Division Responsibility								
Circuit Performance Improvement Projects	141	141	100.0%	159	157	98.7%	11456	98.3%
Protective Device Coordination Program	2	2	100.0%	4	4	100.0%	2210	100.0%
Animal Outage Reduction Projects	19	19	100.0%	10	10	100.0%	6642	100.0%
Storm Normalized Worst Performing Circuits	15	15	100.0%	15	15	100.0%	4810	100.0%
Lightning Protection	8	6	75.0%	10	9	90.0%	6249	100.0%
System Automation	0	0	0.0%	0	0	0.0%	0	0.0%
Hendrix Spacer Cable	0	0	0.0%	0	0	0.0%	0	0.0%
Multiple Device Interruptions	642	623	97.0%	118	117	99.2%	18554	99.6%
ICC Worst Performing Circuits	49	49	100.0%	49	48	98.0%	30016	100.0%
Customers Exceeding ICC Reliability Targets	14	14	100.0%	13	12	92.3%	2679	100.0%
Circuit Repairs & Pole Replacements				3283	2285	69.6%		
Device Inspections and Repairs	23590	23285	98.7%	300	243	81.0%		
URD Cable Replacements	259	227	87.6%	90	86	95.6%	2469	95.9%
UG Primary Cable Repairs < 30 Days				1207	1193	98.8%		
CAIDI Improvements	0	0	0.0%	0	0	0.0%		
Total Division Responsibility							85085	99.6%
Illinois Technical Services Responsibility								
Substation Reliability Initiatives				26	24	92.3%		
Substation Preventive Maintenance				12897	12897	100.0%		
Substation Corrective Maintenance				3000	3000	100.0%		
Distribution Relay Testing				2247	2247	100.0%		
Protective Device Coordination				0	0	0.0%		
Relay Setting Revision Implementation				328	250	76.2%		
Switch Maintenance/Repair				0	0	0.0%		
Total Illinois Technical Services Responsibility								
Illinois Operations Support Responsibility								
Vegetation Mgt - Tree Trimming (Required 2014)				7250	7250	100.0%		
Vegetation Mgt - Tree Trimming (Additional Planned)				706	1048	148.4%		
Vegetation Mgt - Multiple Device Interruptions	57	54	94.7%	4	0	0.0%		
Visual Circuit Inspections	463	463	100.0%					
Groundline Inspections	232	232	100.0%					
Pole Restoration by C-truss				1827	937	51.3%		
Total Illinois Operations Support Responsibility								

AIC completed most planned activities during the years 2012 – 2014 within the calendar year the work was planned, but each year AIC carried-over some uncompleted work to following calendar year. In particular, each year, AIC has deferred a significant percentage of its planned circuit repairs and pole replacements. Table 8 shows that, during 2014, AIC completed less than 70% of the work planned in this category. AIC also carried over a significant percentage of planned circuit repairs and pole replacement from 2012 to 2013, and from 2013 to 2014.

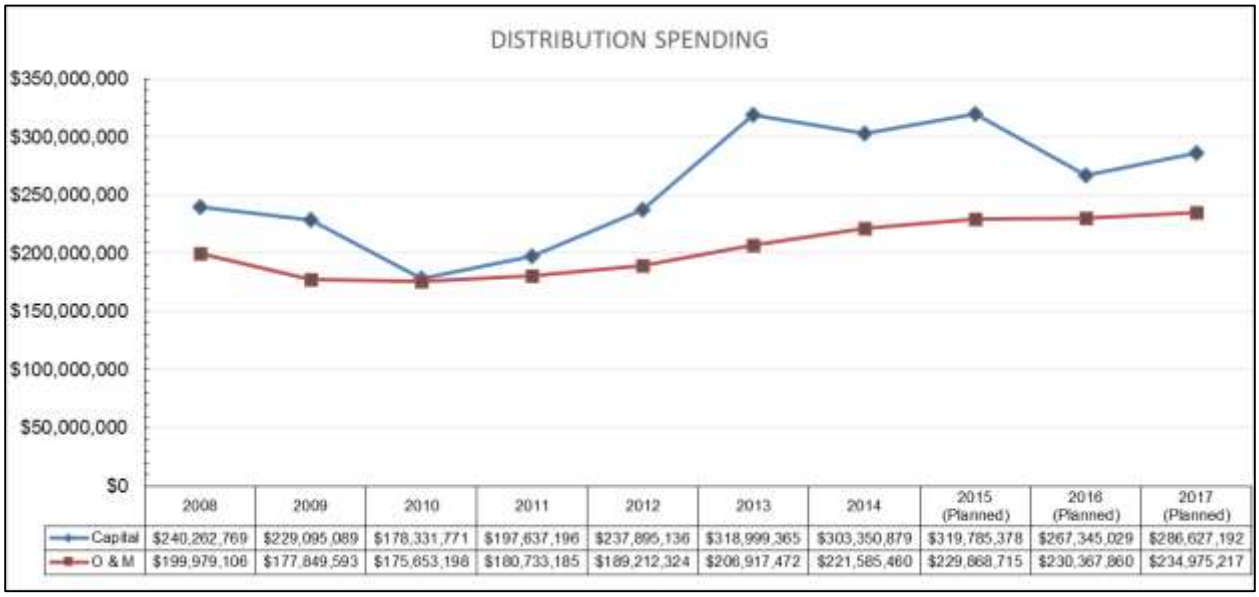
B. Funding

Distribution

Figure 15 illustrates AIC's historical and planned spending on distribution capital.[14] AIC's distribution capital expenditures, which decreased by more than 25% from 2008 to 2010, increased by over 75% from 2010 to 2013. AIC's 2014 annual report indicates that AIC expects to maintain this higher level of capital expenditures through 2015, followed by an approximate 16% decrease from 2015 to 2016.

Figure 15 also illustrates that AIC's distribution O&M expenditures gradually increased by about 23% from 2011 through 2014. AIC indicates in its 2014 Annual Report that it plans to maintain this higher level of O&M expenditures at least through 2018.

Figure 15: AIC's Distribution Expenditures (2008-2017)



	2008	2009	2010	2011	2012	2013	2014	2015 (Planned)	2016 (Planned)	2017 (Planned)
Capital	$240,262,769	$229,095,089	$178,331,771	$197,637,196	$237,895,136	$318,999,365	$303,350,879	$319,785,378	$267,345,029	$286,627,192
O & M	$199,979,106	$177,849,593	$175,653,198	$180,733,185	$189,212,324	$208,917,472	$221,585,460	$229,868,715	$230,367,860	$234,975,217

[14] Values shown in Figure 14 for calendar years 2008 and 2009 are the sum of expenditures by AIC's three legacy utilities: AmerenCILCO, AmerenCIPS, and AmerenIP.

Transmission

Figure 16 illustrates AIC's historical and planned transmission expenditures. AIC increased its transmission capital spending by more than 750% from 2010 to 2013 ($33 million to $288 million), and AIC expects to continue this higher spending level on transmission capital through 2015 or 2016. Capital spending depends upon the timing of large transmission construction projects, and AIC is currently constructing several new transmission lines to connect its existing transmission system to new 345 kV transmission lines constructed by its affiliate, Ameren Transmission Company of Illinois. AIC also expects to increase its O&M expenditures by about 16% during the years 2015 – 2017.

Figure 16: AIC's Transmission Expenditures (2008-2017)

	2008	2009	2010	2011	2012	2013	2014	2015 (Planned)	2016 (Planned)	2017 (Planned)
Capital	$30,520,169	$50,036,203	$33,386,403	$68,547,708	$115,786,266	$287,959,585	$276,411,051	$326,688,688	$212,892,880	$126,492,289
O & M	$12,473,063	$12,600,838	$18,540,563	$22,959,201	$26,072,916	$28,491,497	$29,185,994	$34,425,110	$33,271,332	$33,936,759

10. Potential Reliability Problems and Risks

The results of AIC's efforts in preceding years to improve or maintain the reliability of its distribution system are apparent. When inspecting AIC's distribution circuits during 2013, 2014, and 2015, Staff identified no problem locations on several of AIC's distribution circuits. While AIC has already taken many positive steps to improve the reliability of its distribution system, Staff has, nonetheless, identified a few additional steps that AIC should take to minimize potential reliability problems and risks:

- It appears that AIC's inspectors may not consistently identify all the deteriorated facilities and NESC violations on AIC's overhead distribution circuits that they inspect, or that AIC has not yet adequately addressed all of the locations the inspectors identified. When inspecting AIC's distribution circuits, Staff observed some locations with deteriorated poles, crossarms, broken braces, or loose hardware. In addition, Staff identified locations where AIC's conductors had inadequate ground clearance per NESC clearance requirements. At most of these locations, it seemed likely that the maintenance issues existed for a long time – at least since the time AIC had last performed its own inspection of the circuit (for example, see Photos 2, 4, 6 and 9).

- At locations where AIC plans to perform remedial action or make reliability improvements on a distribution circuit following poor performance of that circuit, it sometimes takes a long time for AIC to execute those plans. Until AIC completes the planned improvements, customers supplied by the circuit continue to be at risk for an elevated level of interruptions. Circuit N70-330 was a worst performing circuit due to SAIFI and CAIFI during 2013 largely due to two episodes where broken spacer cable caused an interruption to the entire circuit: on February 21, 2013, and on July 22. AIC completed work to repair pole tops and replace hardware in May of 2014. It was good that AIC performed this work, but AIC completed it more than a year after the initial whole-circuit outage that occurred in 2013. In the meantime, Circuit N70-330 was again a worst performing circuit during 2014 due to problems with spacer cable "and other hardware". AIC upgraded sections of spacer cable in February of 2015: two years after the initial problem occurred during an ice storm. It seems likely that completion of this work sooner would have improved reliability on Circuit N70330 during 2014, so that Circuit N70-330 may not have been a worst performing circuit due SAIFI and CAIFI for two years in a row.
- During each of the years 2012 through 2014, AIC did not complete all of the reliability projects during the year that it planned to complete them.[15] In particular, AIC's Annual Report indicate that AIC completed about 72% of the circuit repairs and pole replacements planned during both 2012 and 2013, and about 70% during 2014. In addition to missing potential gains in service reliability, an on-going backlog of unconstructed reliability projects might cause AIC's employee's to perceive that the company does not give reliability improvement projects for distribution circuits a very high priority. Such a perception could stifle development of future important projects that are needed to improve reliability.
- On certain distribution circuits, AIC may need to trim vegetation more often than every four years, or else use more aggressive vegetation clearing techniques. During Staff's inspections, Staff found in most cases that AIC had done an excellent job keeping vegetation away from its power lines, but when inspecting a few circuits, Staff observed vegetation close to or making contact with the energized conductors, jeopardizing reliability of service for customers supplied by those circuits. For example, Photos 18 – 20 depict vegetation grown all around AIC's Circuit 307-004.
- Intentional interruptions accounted for nearly one quarter of interruption events on AIC's system during 2014. AIC should ensure that its employees are aware of the negative effects intentional interruptions are having on reliability, and encourage its employees to control the timing and scope of intentional interruptions, when possible, to minimize these negative effects.

[15] AIC's Year-end Reliability Action Plan Summary is shown on page 29 of its 2012 Annual Report, page 34 of its 2013 Annual Report, and page 28 of its 2014 Annual Report.

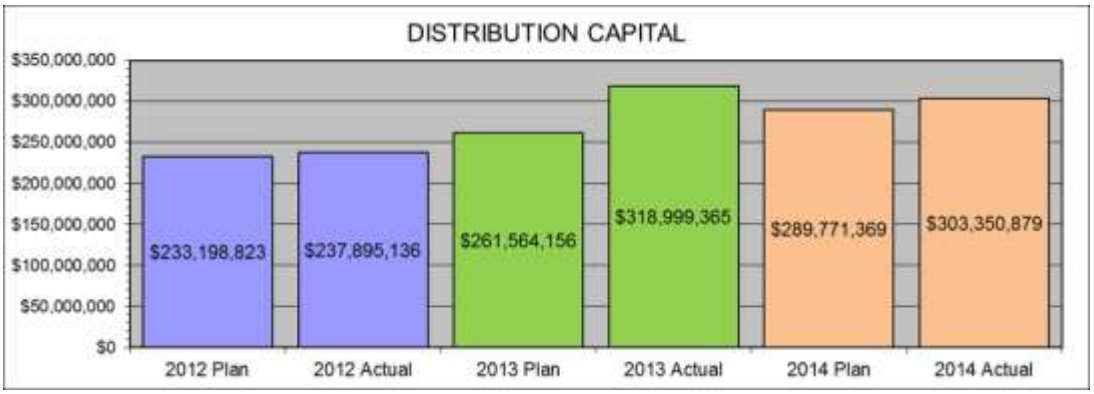
11. Implementation of AIC's Plan Listed in the Previous Reliability Report

A. 2012 – 2014 Planned vs. Actual Expenditures

Distribution Capital

Figure 17 compares AIC's planned and actual capital spending for distribution for each of the calendar years 2012 - 2014.

Figure 17: Comparison of AIC's Planned and Actual Capital Spending for Distribution

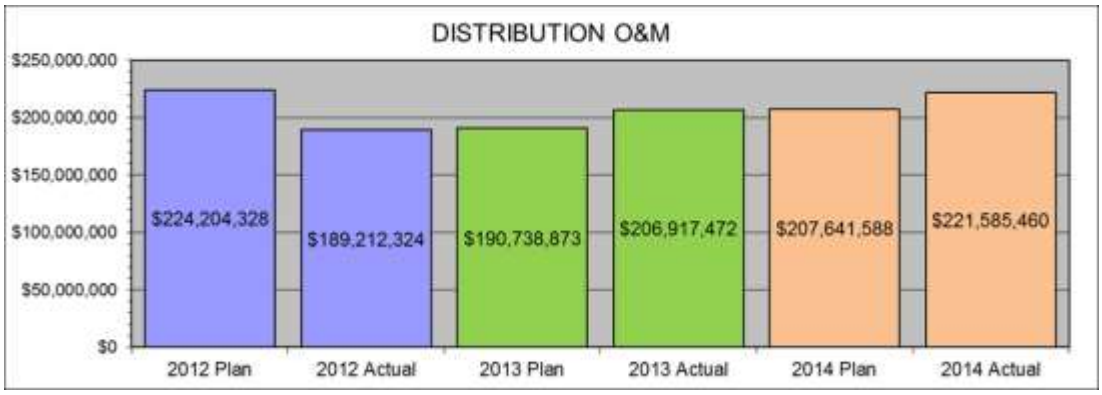


- In 2012, AIC's actual capital expenditures were about 2% higher than the amount planned and listed in its Annual Report for 2011. AIC states that major storms during 2012 added about $5 million in unbudgeted costs.
- In 2013, AIC's actual capital expenditures for distribution were about 22% higher than planned. AIC attributes some of its higher spending to major storms. In addition, AIC states it completed some expenditures that had been deferred in 2012, and performed material inventory adjustments.
- In 2014, AIC's actual expenditures for distribution capital were only about 5% higher than planned, which AIC primarily attributed to higher than expected expenditures for line work, major storms and new business.

Distribution O&M

Figure 18 compares AIC's planned and actual O&M spending for distribution for each of the calendar years 2012 - 2014.

Figure 18: Comparison of AIC's Planned and Actual O & M Spending for Distribution

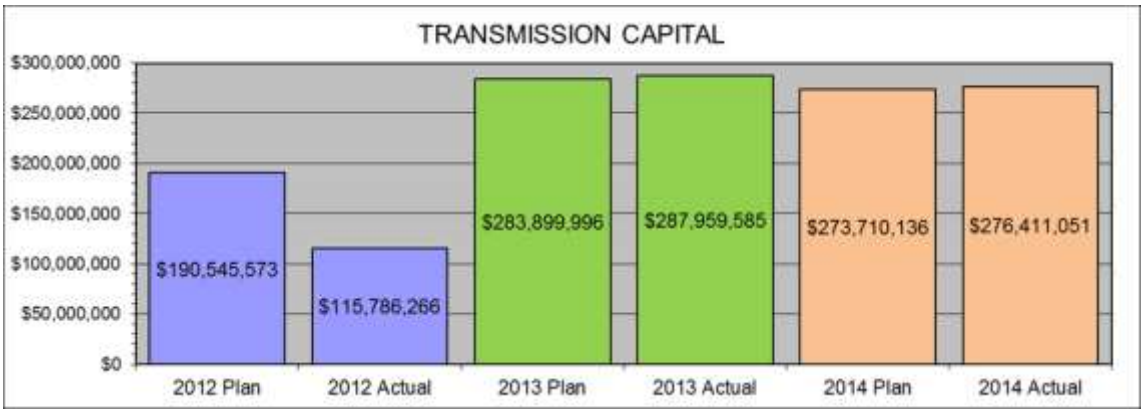


- In 2012, AIC spent about 16% less on distribution O&M than planned. AIC attributes its lower-than-expected O&M spending to lower costs for Liberty Audit recommendation implementation, vegetation management, and reduced major storm expense.
- In 2013, AIC spent about 8% more on distribution O&M than planned. AIC attributes the higher expenditure to increased storm expenses, higher vegetation management costs due to higher labor rates, and implementation of Liberty Audit recommendations.
- In 2014, AIC spent about 7% more on distribution O&M than planned. AIC attributes the higher O&M spending to increased operation supervision and engineering costs, overhead line expenses, increased metering expenses, and increased substation maintenance expenses.

Transmission Capital

Figure 19 compares AIC's planned and actual capital spending for transmission for each of the calendar years 2012 - 2014.

Figure 19: Comparison of AIC's Planned and Actual Capital Spending for Transmission

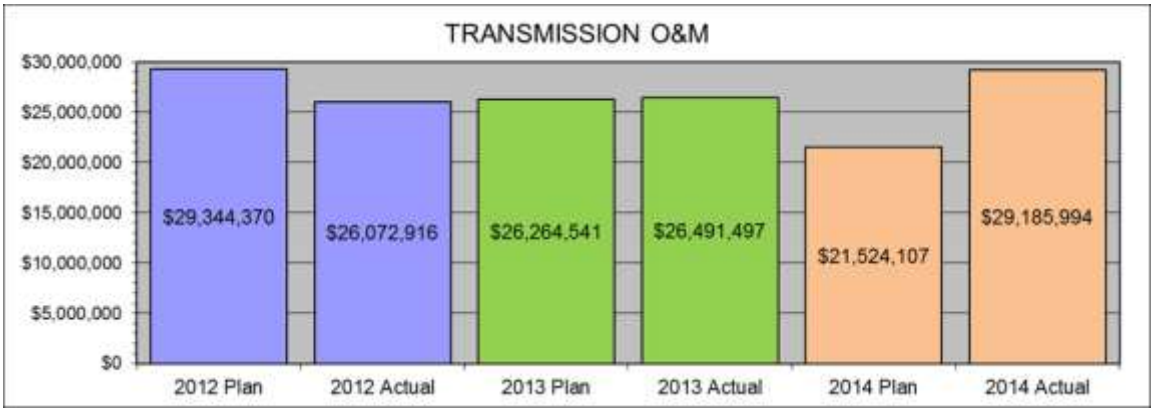


- In 2012, AIC spent about 39% less than planned on transmission capital. AIC attributes its lower-than-expected spending to unanticipated project delays, resource constraints, less costly implementation of Liberty Audit recommendations, and reductions in project scope.
- In 2013, AIC spent about 1% more than planned on transmission capital, which is not a significant variance from its plan.
- In 2014, AIC again spent about 1% more than planned on transmission capital, which is not a significant variance from its plan.

Transmission O&M

Figure 20 compares AIC's planned and actual O&M spending for transmission for each of the calendar years 2012 - 2014.

Figure 20: Comparison of AIC's Planned and Actual O&M Spending for Transmission



- In 2012, AIC spent about 11% less on transmission O&M than planned. AIC explains that its lower-than-expected O&M spending relates to line clearance issues for capital projects.
- In 2013, AIC spent about 1% more than planned on transmission O&M, which is not a significant variance from its plan.
- In 2014, AIC spent about 36% more than planned on transmission O&M. AIC attributes this variance to an error in its plan that did not properly account for charges from its affiliate, Ameren Services Company.

B. Worst Performing Circuits

In its annual reports for calendar years 2012 – 2014, AIC did a good job identifying the steps it took to improve the performance of its prior year's worst-performing circuits. Specifically, AIC's annual reports explain and update the progress of projects it initiated to improve the performance of worst-performing circuits. For example, Circuit 305-132, which supplies 654 customers in southwestern Illinois near the Mississippi River, was a worst performing circuit due to CAIDI during 2013. AIC explains on page 118 of its 2014 annual report that it replaced five poles, three pole tops, and two crossarms on this circuit, and added lightning arresters and wildlife protection. As another example, Circuit U45-536, which supplies Spoon River College and the community of Canton, was a worst performing circuit during 2013 due to SAIFI. On page 122 of its 2014 annual report, AIC explains that it replaced a crossarm, installed fault indicators and lightning arresters, replaced aging underground primary cable, added tap fuses, replaced deteriorated poles and overloaded transformers, and upgraded the station recloser. AIC provides similar information for each worst performing circuit listed.

12. Summary of Recommendations

- AIC should continue periodic thorough inspections of its distribution system in order to stay aware of the condition of its facilities that supply electricity to customers. AIC should also periodically audit its inspectors to verify that they are properly identifying reliability threats, including facilities in need of replacement and NESC violations.
- AIC should strive to streamline its process so that remedial actions occur as quickly as practicable – especially those that may affect safety and reliability. Knowing about a problem, but leaving it uncorrected, does not improve reliability.
- AIC should take steps to reduce the number of customers who experience interruptions in excess of reliability targets. Figure 1 illustrates that the number of AIC customers who experienced interruptions in excess of reliability targets decreased from 963 in 2010 to 74 in 2012. Since 2012, however, the number of AIC customers experiencing interruptions in excess of reliability targets has been increasing, reaching 609 in 2014. By definition, the reliability targets take into account a customer's experience over three consecutive years, so a single year of severe storms does not by itself explain why certain customers experience high numbers of interruptions. AIC should strive to improve its service for these customers. Prompt remedial actions, such as trimming a tree, tightening loose hardware, and replacing a broken crossarm or blown arrester, could prevent a future interruption from occurring during a storm. AIC's Multiple Device Interruptions program and AIC's Customers with Repetitive Outages program are both tools that AIC should continue using to identify and address customers who are experiencing an above average number of interruptions and/or longer than average duration interruptions.
- AIC should continue its efforts to reduce CAIDI. AIC's efforts to date appear to be paying off, as its system CAIDI for the 2014 calendar year was its lowest value reported. Of course AIC should continue its efforts to prevent interruptions from occurring in the first place, but AIC should also continue installing fault indicators and SCADA-enabled equipment to reduce the duration of the interruptions that do occur. In addition, since it typically takes a long time to restore service following interruptions due to underground equipment failures, AIC should continue its Vault and Manhole Inspections Program and Underground Cable Fault Tracking Program so that the duration of interruptions due to failures of underground equipment can be minimized.
- AIC should regularly inspect its substations for gaps in perimeter fencing, inadequate grounding, or damage. When inspection AIC's distribution circuits, Staff noted gaps at substation gates (Photo 7), that could allow some fairly large animals to access and climb on substation equipment, potentially causing an outage.
- AIC should continue adequately funding its vegetation management program to keep vegetation from contacting its distribution lines, with a maximum 4-year tree trimming cycle accompanied by mid-cycle patrols. Staff's distribution circuit inspections during 2013, 2014, and 2015 revealed that AIC has done a good job keeping vegetation cleared from the majority of its distribution circuits, but also showed that AIC may wish to consider trimming specific circuits more frequently than once every 4 years if it

cannot keep vegetation cleared from its facilities using that cycle. For example, when inspecting Circuit 307-004 in July of 2015, Staff observed vegetation contacting the primary conductor throughout the circuit. AIC indicates that at least eight tree-related interruption events occurred on this circuit during 2014. More frequent or more aggressive vegetation clearing would likely have prevented some of these interruption events.

- AIC should continue to emphasize the installation of animal protection where it is not already installed. AIC's installation of animal protection when it is performing other work at distribution transformer locations is an efficient way to reduce the number of animal-caused interruptions.
- AIC should take its customers' convenience into account when scheduling intentional interruptions. When possible, AIC should limit the number and scope of intentional interruptions.

2013 Distribution Circuit Inspections

Summary of Distribution Circuit Field Inspection by ICC Staff			
Utility:	AIC	**Date:**	5/28/13
Circuit:	R10903: Supplies 1191 Customers	**Inspector:**	Rockrohr (ICC)/Tatlock(AIC)
Gen. Notes:	Soutwest Sparta and rural area to S &W. Tree trimming last completed July 2011. Most recent utility inspection 2010. Only one veg. issue noted. Very few hardware issues noted on this 76 mile long 12 kV mostly rural circuit. Several line sections not visible from roadway. 2012 & 2011 WPC: OH(23), tree(13), weather(11), animal(3), public(3), UG(2), unknown(1), operator error(1).		
Map No.	***Item Description***	***Photo(s)***	***Location***
30	Burnt open or broken grounding bond on substation gate	3	NE gate @ Substation
32	Two detached cross arm braces	5 to 7	Hwy 4 -1 pole E/Trf 15751
10	Deteriorated pole top	8 to 10	10269 Country Club (P# 2500587)
14	**NESC**: one of the poles @ RR crossing has single arm and pin insulators	11 & 12	1351 Kane Ln. (Pvt lane S/Broadway) (P# 3249381)
15	Woodpecker holes & splitting pole top - underbuilt pole		Structure 90 -Substation Rd.
22	Tree contacting primary		E/Rachel Rd. -2 spans E/Trf# 10402

Summary of Distribution Circuit Field Inspection by ICC Staff			
Utility:	AIC	**Date:**	5/29/13
Circuit:	S36570: Supplies 161 Customers	**Inspector:**	Rockrohr (ICC)/McReynolds(AIC)
Gen. Notes:	Community of Gorham and rural area to south. Tree trimming last completed July 2012. Utility's last inspection 2010. Circuit looked good. Additonal fuses and/or fault indicators could improve restoration efforts -lots of line along RR not easily accessed. AIC plans to repl problem UG cable. 2012 WPC: OH(4), tree(4), public(2), UG(1), animal(3). 2009 WPC & 2011 NWPC. Three interruptions to entire circuit caused high SAIFI.		
Map No.	***Item Description***	***Photo(s)***	***Location***
	No facility problems noted		

Summary of Distribution Circuit Field Inspection by ICC Staff			
Utility:	AIC	**Date:**	5/29/13
Circuit:	S15559: Supplies 669 Customers	**Inspector:**	Rockrohr (ICC)/McReynolds(AIC)
Gen. Notes:	Urban in Carbondale. Tree trimming last completed July, 2009. Most recent utility inspection 2011. Circuit appeared to be in good condition. 3 outages affected entire circuit in 2012 -AIC performed coord study and replaced section of poorly performing UG cable. 2012 WPC: OH(3), unknown(1), animal(3), tree(3), public(1), UG(2).		
Map No.	***Item Description***	***Photo(s)***	***Location***
	No facility problems noted		

Summary of Distribution Circuit Field Inspection by ICC Staff			
Utility:	AIC	**Date:**	6/6/13
Circuit:	S02502: Supplies 320 Customers	**Inspector:**	Rockrohr (ICC)/Cearlock(AIC)
Gen. Notes:	Dahlgren & rural area to west. Tree trimming last completed March, 2011. Most recent utility inspection 2010. No hardware issues noted. Lots of new poles. FI's on some x-country underbuilt might aid fault finding. 2012 WPC: animal(3), OH(6), weather(2), unknown(2), tree(1), public(1). 2011 WPC. The overall condition of this circuit appeared to be very good.		
Map No.	***Item Description***	***Photo(s)***	***Location***
	No facility problems noted		

Summary of Distribution Circuit Field Inspection by ICC Staff			
Utility:	AIC	**Date:**	6/6&7/2013
Circuit:	P62138: Supplies 1547 Customers	**Inspector:**	Rockrohr (ICC)/Eberhart(AIC)
Gen. Notes:	North edge of Mt. Vernon & rural area to north. Tree trimming last completed March, 2010. Most recent utility inspection 2012. Lots of new poles installed on 97 mile circuit -fair amount of WP damage. Interior electric animal fence around dist equip @ substation. 2012 NWPC: OH(22), animal(20), weather(19), unknown(10), tree(8), UG(6), Public(2), error(1). 2011: Top 10 veg int.; 2010: WPC; 2009 NWPC.		
Map No.	***Item Description***	***Photo(s)***	***Location***
27	New gates at substation do not appear to have ground straps	1	Mt. Vernon Gaskins St. Substation
35	Pole with deteriorated pole top & significant WP damage	3	N. Morton Lane -N/N Pump House Ln. (P#2902787)
27	Trees contacting or very close to primary (Hendrix)		12th S/Geourge
21	**NESC**:Neutral conductorhas +/- 11' clearance over mowed area		Along lane to 12445 Oakton
23	Trees contacting or very close to primary		Lane heading E/Wildflower -1st tap S/Violet
37	Neutral strands broken & unraveling -only about 1 strand holding	4 & 5	#18793 Miller Lake Ln. -near Trf#10945
38	2 poles with significant woodpecker damage	6	Beal Rd. -4th & 6th pole W/Miller Lake Ln.
32	Trees contacting or very close to primary		Along lane to #20959 Mayflower Ln.
32	**NESC**:Single x-arm 2 RR - both sides of tracks	8	Dix-Irvington E/Mayflower
39	Woodpecker damaged pole		Miller Lake Ln. -1st N/Rosewood
18	Marker broken off of down guy		North St E/Hwy 37 (@E/L)
33	Woodpecker damaged pole		N/#22225 Mayflower Ln - @ Fuse 138-214
42	Woodpecker damaged pole		Tolle Ln. -1st N/Divide Rd.
42	Woodpecker damaged pole		Tolle Ln. -2nd N/Hershey (1 S/Trf 21218)
46	Trees contacting or very close to primary		Hershey -E/Tolle

Summary of Distribution Circuit Field Inspection by ICC Staff			
Utility:	AIC	**Date:**	9/12/13
Circuit:	U16522: Supplies 253 Customers	**Inspector:**	Rockrohr (ICC)/Parmar & Hobrock (AIC)
Gen. Notes:	Rural area generally east of Beardstown along Chandlerville Rd. Tree trimming last completed July 2012. Most recent utility inspection 2010. Lots of new poles installed on 32 mile circuit. Several sets of FIs. Good coverage of AG. Cct appeared to be in good shape - only 2 locations noted. 2012 WPC: OH(5), UG(3), animal(3), tree(2), weather(1), unknown(1). 2011: NWPC.		
Map No.	***Item Description***	***Photo(s)***	***Location***
14	Woodpecker hole near crossarm mounting bolt	2	Lane to pumphouse extending from Mound Lake Rd. (P#848140)
30	Bolt coming off pin insulator	3	#20008 Chandlerville Rd. (P# 850280)

Summary of Distribution Circuit Field Inspection by ICC Staff			
Utility:	AIC	**Date:**	9/17/13
Circuit:	Y24523: Supplies 292 Customers	**Inspector:**	Rockrohr (ICC)/Hite (AIC)
Gen. Notes:	Camargo & Murdock and rural area between. Tree trimming last completed May 2013. Most recent utility inspection 2010. No vegetation issues observed. Much of M-L circuit underbuilt along RR. Many dist transformers without AGs. Circuit appeared to be in good shape. 2012 WPC: OH(6), animal(4), unknown(1). 3-ciruit-wide outages in 2012. Due to tough access along RR, FIs could aid fault locating.		
Map No.	***Item Description***	***Photo(s)***	***Location***
4	Down guy very slack due to wire broken at anchor	5 & 6	CR 1750E - E/CR 1725 (P#765219)
13	Large gap between entrance gate sections @ substation	4	Murdock Substation -CR 1000

Summary of Distribution Circuit Field Inspection by ICC Staff			
Utility:	AIC	**Date:**	9/19/13
Circuit:	A73002: Supplies 663 Customers	**Inspector:**	Rockrohr (ICC)/McGarrah (AIC)
Gen. Notes:	Rural area NW of Illinois River including Mapleton and Kingston Mines. Tree trimming last completed Sept. 2010. Most recent utility inspection 2012. Lots of long 1-ph taps. Many new poles. Animal fence in sub and spinners on incoming lines. Tree trimming needed @ several locations. 2012 WPC: OH(14), UG(11), tree(11), unknown(4), weather(2), public(2), animal(1). 2009, 2007, 2006: NWPC. Many spans difficult to access/see.		
Map No.	***Item Description***	***Photo(s)***	***Location***
3	NESC: Neutral conductor very low		N/ corner in Lightbody Rd. (P#2593131)
9	Cross arm tilting severely.		W. Timber Rd. E/S. Kingston Mines Rd. (P#2593188)
12	Large woodpecker hole in pole		W. Timber Rd. 2nd E/Pvt lane (P#2588103)
21	Pole with large distribution transformer leaning severly		S. Reed City Rd. @ EOL (P#2588198)
24	2 adjacent poles appeared to have deteriorated tops		W. Wheeler Rd. W/Mapleton (P#2588710 & 2588711)
29	Tree close to or contacting primary		S Mapleton Rd. NW/ 1st St West (N from Fuse # 207261)
31	Tree close to or contacting primary		S. Gollon Rd. first span S/ W. Maple Ridge Rd.
32	Two of four down guys supporting vertical transmission detached		Adjacent to Wheeler Substation (P#2244388)
33	Tree close to or contacting primary		Powell Rd. near Pvt Ln. W/S Hillside Ln.
37	Tree close to or contacting primary		1st span W/ corner of W. 1st Street & Powell Rd.
38	Tree close to or contacting primary		S. Powell Rd. E/Hillside Dr.
38	NESC: Inadequate spacing of stand-off brackets		W. Schoolhouse Ln. E/ S. Powell Rd. (P#258887)
42	Tree close to or contacting primary		W. Wheeler Rd. W/Cameron Ln - just N/RR
51	Detached/broken cross arm brace	5	Cargill Rd. E/Hwy 24 (P#2157812)

2014 Distribution Circuit Inspections

Summary of Distribution Circuit Field Inspection by ICC Staff			
Utility:	AIC	**Date:**	4/30/14
Circuit:	B80004: Supplies 933 Customers	**Inspector:**	Rockrohr (ICC)/Haile & Bergquist (AIC)
Gen. Notes:	North Pekin to Creve Coeur-generally along Hwy 29. Most recent trim Sept. 2010. Most recent utility inspection 2012. No hardware issues noted on this 20-mile long 13.2 kV circuit. Some line sections along RR were not visible from roadway. Some spacer cable in use. 2013 WPC: UG(18), OH(17), Intentional(9), Weather(4), Animal(3), Jurisdictional error(3), Unknown(2), Public(1), Tree(1), Customer(1). 2012 WPC.		
Map No.	***Item Description***	***Photo(s)***	***Location***
2	Tree close to primary		Lawnbridge NE/Linden Ct.
2	Tree close to primary		Riverview @ Sylvan
9	Large gap between gates at substation entrance	4	Sheridan Sub -1411 2nd St.

Summary of Distribution Circuit Field Inspection by ICC Staff			
Utility:	AIC	**Date:**	4/30/14
Circuit:	U33509: Supplies 946 Customers	**Inspector:**	Rockrohr (ICC)/Johnson (AIC)
Gen. Notes:	Canton and area to west. Tree trimming last completed March 2013. Utility's last inspection 2011. 3 interruptions in 2013 affected entire cct. Fault indicators where cct branches outside of sub could improve restoration efforts: 1 branch goes to college & other to town. 2013 WPC: OH(9), Intentional(7), UG(4), Weather(2), Animal(2), Tree(2), Customer(1), Unknown(1). 2008 WPC. Cct appeared to be in good shape.		
Map No.	***Item Description***	***Photo(s)***	***Location***
13	Deteriorated crossarm	2	W. Maple @ Lyle

Summary of Distribution Circuit Field Inspection by ICC Staff			
Utility:	AIC	**Date:**	5/14/14
Circuit:	Q15844: Supplies 1574 Customers	**Inspector:**	Rockrohr (ICC)/Piekutowski (AIC)
Gen. Notes:	Mt. Olive and area to SW. Tree trimming last completed April 2013. Utility's last inspection 2011. 2 animal & 1 intentional interruption affected entire cct. FI's at (a) 300 N & RR & (b) where cct crosses I-55 could greatly aid trouble-shooting. Lots of NESC riser standoff-bracket spacing violations. 2013 WPC: Intentional(16), OH(10), Animal(8), Weather(7), Tree(7), Customer(1). 2010 NTWPC. Many taps with tree exposure appeared to be unfuse		
Map No.	***Item Description***	***Photo(s)***	***Location***
9	NESC -Riser Stand-off spacing near ground (< 8')		N/Rt 138 @ Trf # 24288
9	NESC -DG insulator or ground not visible	6	NS/Rt 138 P#2417676 (note several more S/this loc.)
10	NESC -Riser Stand-off spacing near ground (< 8')	4	Frontage Rd. @ Trf # 23232
16	NESC -Riser Stand-off spacing near ground (< 8')		2 Mile Rd. S/Wolf @ Trf # 19531
17	NESC -Riser Stand-off spacing near ground (< 8')		Wolf Rd @ Trf # 14-047
18	DG disconnected		US 66 - +/-3rd pole S/Wolf
21	NESC -Riser Stand-off spacing near ground (< 8')		Rt. 138 E/Blueberry Hill (Trf # 23644)
21	NESC -Riser Stand-off spacing near ground (< 8')		Blueberry Hill N/Park (Trf # 22985)
21	Deteriorated Pole Top	3	Collum W/Main (P# 2414707)
21	Consider fusing several taps		Main - Btw Park & Rt 138
26	NESC -Riser Stand-off spacing near ground (< 8')		Rt 4 S/Pingolt (Trf # 23218)
28	NESC -Riser Stand-off spacing near ground (< 8')		Staunton Country Club Ln & Rt 4 (Trf # 15114)
28	Woodpecker holes near primary attachment		W/Rt 4 -1 span E/Trf # 23558 (P# 2417447)
NOTE:	Not all Riser Stand-off NESC violations on cct are noted -recommend a company inspection to address this issue		

Summary of Distribution Circuit Field Inspection by ICC Staff			
Utility:	AIC	**Date:**	5/20/14
Circuit:	U16500: Supplies 331 Customers	**Inspector:**	Rockrohr (ICC)/BAIG (AIC)
Gen. Notes:	Beardstown and SW. Tree trimming last completed July 2012. Utility's last inspection 2010. 5 interruptions in 2013 affected entire cct. Fault indicators where cct branches outside of sub could improve restoration efforts: 1 branch goes east to cct U19534 and & other to the west & south 2013 WPC: OH(11), Intentional(3), Tree(3), Animal(2), UG(1), Public (1). Several spans not visible from roadway.		
Map No.	***Item Description***	***Photo(s)***	***Location***
3	DG attached to building roof -sec very low over roof	3 & 4	Hwy 125 E/Kent Feed Rd. (@ Trf # 110068 to 110070)
3	Large mulch pile under primary enveloping pole		Hwy 125 E/Kent Feed Rd. (@ Trf # 110078)
5	Trees appear to be contacting/close to primary		Myrtle btw Birch & Elm (#1920 Myrtle)

Summary of Distribution Circuit Field Inspection by ICC Staff			
Utility:	AIC	**Date:**	5/28/14
Circuit:	M05368: Supplies 759 Customers	**Inspector:**	Rockrohr (ICC)/Parker (AIC)
Gen. Notes:	West Edwardsville. Tree trimming last completed October 2010. Utility's last inspection 2012. 1 tree interruption affected entire cct in 2013 . FIs where line goes X-country could improve restoration efforts. Trees growing close at locations throughout circuit. Separate animal fence exists in sul 2013 WPC: Weather(21), OH(4), Intentional(4), Tree(4), Animal(3), Public (2), Error (1). 2010 NTWPC. Several spans not visible from roadway.		
Map No.	***Item Description***	***Photo(s)***	***Location***
3	Heavy vine growth along neutral		N/Grand Ave & S/Robinwood Ln (along bike path)
4	Tree growth enveloping capacitor bank		Grand W/Union

Summary of Distribution Circuit Field Inspection by ICC Staff			
Utility:	AIC	**Date:**	5/28/14
Circuit:	P05826: Supplies 444 Customers	**Inspector:**	Rockrohr (ICC)/Cleaver (AIC)
Gen. Notes:	Alhambra and surrounding rural area. Tree trimming last completed May 2013. Utility's last inspection 2011. Animal int. in 2013 affected entire cct. No CB in substation -this is 1 of 2 circuits formed with pole-mounted reclosers a couple spans out of sub after the unprotected OH branches. 2013 WPC: Intentional(18), Tree(9), OH(5), Weather(3), Public (2), Animal(1), UG(1), Unknown(1). Unusually high # of intentional int. Lots of new poles		
Map No.	***Item Description***	***Photo(s)***	***Location***
1	Gnds appear detached from substation fence posts	2	Livingston Substation
1	Wire attched to west fence & buried in adj tilled field	3	Livingston Substation
14	Several WP holes -large one near primary DE bolt.	5	Conn Rd. S/RR (1 E/Trf# 22878)

Summary of Distribution Circuit Field Inspection by ICC Staff			
[redacted]			
Gen. Notes:	Supplies community of Harrisburg. Tree trimming last completed Oct 2012. Utility's last inspection 2010. Entire cct affected 3X. trees(x2) and error(X1) Many newer poles. Supplies hospital and has solid ties to adjacent circuits. No vegetation or hardware issues noted. 2013 NTWPC: Intentional(6), Tree(3), Animal(2), Error(1), Unknown(1). 2012 WPC		
Map No.	***Item Description***	***Photo(s)***	***Location***
[redacted]			

2015 Distribution Circuit Inspections

Summary of Distribution Circuit Field Inspection by ICC Staff			
Utility:	AIC	**Date:**	7/16/15
Circuit:	R09225: Supplies 173 Customers	**Inspector:**	Rockrohr (ICC)/Behrends (AIC)
Gen. Notes:	Rural btw Downs & Ellsworth. Most recent trim Sept. 2011. Most recent utility inspection 2013. Lot's of apparent NESC riser stand-off spacing violations. Several tree contacts noted on this 29-mile long 12 kV circuit. A few x-country line sections were not visible from roadway. 2014 NWPC: OH(9), Intentional(3), Weather(1), Animal(2), Unknown(2), Other(1). Other than trees, condition of facilities appeared to be generally good		

Map No.	*Item Description*	*Photo(s)*	*Location*
1	Large wash-out @ base of new pole - needs to be back-filled	3 & 4	Downs - Dooley E/Lincoln (adjacent to cemetary)
1	Failed wood insulator pin -center phase		1 S/Trf # 13211
1	Tree contacting primary		Garfield W/Cleveland
1	Tree close to primary		Cleveland S/Garfield
1	Tree close to primary		N side /Washington E/Lincoln
2	Tree close to primary		800N -Tap to Trf #12499
3	Tree close to primary		21849 800N (@ Trf # 13306)
3	NESC Rule 217A.2.c violation- Riser stand-off bkt spacing < 8'		2200E N/800N (P# 3043041)
4	Tree close to primary (pines)		2200E 3-4 spans N/800N
4	NESC Rule 232B.1 violation - Neut. clearance +/-11' over mowed area		2200E - tap to Trf # 21778
4	NESC Rule 217A.2.c violation- Riser stand-off bkt spacing < 8'		2200E - @ Trf # 19681 (P# 3043059)
4	NESC Rule 217A.2.c violation- Riser stand-off bkt spacing < 8'		2200E - @ Trf # 22978
4	NESC Rule 217A.2.c violation- Riser stand-off bkt spacing < 8'		2200E - @ Trf # 23399
4	NESC Rule 217A.2.c violation- Riser stand-off bkt spacing < 8'		2200E - @ Trf # 13359
4	NESC Rule 217A.2.c violation- Riser stand-off bkt spacing < 8'		2200E - @ Trf # 23711
6	NESC Rule 217A.2.c violation- Riser stand-off bkt spacing < 8'		800N - @ Trf # 23959
6	NESC Rule 217A.2.c violation- Riser stand-off bkt spacing < 8'		800N - @ Trf # 19444
6	NESC Rule 217A.2.c violation- Riser stand-off bkt spacing < 8'		800N - @ Trf # 13310
6	Tree contacting primary		800N - @ near Trf # 13335
7	NESC Rule 217A.2.c violation- Riser stand-off bkt spacing < 8'		Ridgewood Dr E/2200E @ Trf # 19907
8	NESC Rule 217A.2.c violation- Riser stand-off bkt spacing < 8'		800N W/2300E @ Trf # 13312
9	NESC Rule 217A.2.c violation- Riser stand-off bkt spacing < 8'		2300E @ Primary Riser # 225-25
9	NESC Rule 217A.2.c violation- Riser stand-off bkt spacing < 8'		2300E @ Trf # 22790
9	NESC Rule 217A.2.c violation- Riser stand-off bkt spacing < 8'		2300E across from Trf # 22741 (Address # 8625)
9	Trees close to primary		2300E -along tap N/ Trf # 22790
10	Trees contacting primary (pines)		800N W/ Trf # 17302
11	Trees close to primary		E/2300E -along tap to Trf # 17819
11	NESC Rule 217A.2.c violation- Riser stand-off bkt spacing < 8'		E/2300E @ Trf # 17819
18	NESC Rule 217A.2.c violation- Riser stand-off bkt spacing < 8'		S/CH36 @ Trf # 21293
18	NESC Rule 217A.2.c violation- Riser stand-off bkt spacing < 8'		S/CH36 @ Trf # 23017
20	Pole Top appears to be rotted down to cross arm bolt		800 N @ Trf # 13318
21	NESC Rule 217A.2.c violation- Riser stand-off bkt spacing < 8'		800 N @ Trf # 22633
21	NESC Rule 217A.2.c violation- Riser stand-off bkt spacing < 8'		2600E @ Trf # 13360
21	NESC Rule 217A.2.c violation- Riser stand-off bkt spacing < 8'		2600E @ Trf # 21595
21	NESC Rule 217A.2.c violation- Riser stand-off bkt spacing < 8'		2600E @ Trf # 21730
21	Trees close to primary		Near Trf # 23011
21	Trees close to primary (pines)		Tap to Trf # 14618
21	NESC Rule 217A.2.c violation- Riser stand-off bkt spacing < 8'		2600E @ Trf # 22898
21	NESC Rule 217A.2.c violation- Riser stand-off bkt spacing < 8'		2600E @ Trf # 19813
22	NESC Rule 217A.2.c violation- Riser stand-off bkt spacing < 8'		County Hwy 36 across from Trf # 23015
23	NESC Rule 217A.2.c violation- Riser stand-off bkt spacing < 8'		800N @ Trf # 23256
23	NESC Rule 217A.2.c violation- Riser stand-off bkt spacing < 8'		800N @ Trf # 14729
24	NESC Rule 217A.2.c violation- Riser stand-off bkt spacing < 8'		County Hwy 36 @ Trf # 13321
26	NESC Rule 217A.2.c violation- Riser stand-off bkt spacing < 8'		County Hwy 36 @ Trf # 14798
27	NESC Rule 217A.2.c violation- Riser stand-off bkt spacing < 8'		900N @ Riser # 225-35
28	NESC Rule 217A.2.c violation- Riser stand-off bkt spacing < 8'		County Hwy 36 @ Trf # 13338
29	NESC Rule 217A.2.c violation- Riser stand-off bkt spacing < 8'		County Hwy 36 @ Trf # 20227
29	Broken Down Guy @ guy stub		County Hwy 36 E/Trf # 20227
31	NESC Rule 217A.2.c violation- Riser stand-off bkt spacing < 8'		2850E @ Trf # 22463
32	NESC Rule 217A.2.c violation- Riser stand-off bkt spacing < 8'		2850E Secondary supplied from Trf # 22356
33	NESC Rule 217A.2.c violation- Riser stand-off bkt spacing < 8'		850N @ Trf # 24461
33	Trees close to primary		850 N W/ Riser 225-30

Summary of Distribution Circuit Field Inspection by ICC Staff			
Utility:	AIC	**Date:**	7/21/15
Circuit:	Q15-845: Supplies 490 customers	**Inspector:**	Rockrohr (ICC)/Cleaver (AIC)
Gen. Notes:	Rural NE of Staunton -15.9 miles long. Most recent trim Jan. 2013. Most recent utility inspection 2011. Fault indicators could aid troubleshooting on some line sections that are not visible from roadway. 2014 WPC: OH(10), intentional(3), animal(2), weather(2). 2013 WPC. The circuit appeared to be in good condition.		
Map No.	***Item Description***	***Photo(s)***	***Location***
9	NESC: Svc Drop laying on roof of shed.	6-9	20750 E N/Hwy 16 (Trf. 15679)
10	Trees close to primary		Tap to Trf. 23324 -N/Norfolk & Western RR
2,3,7,9,10	Double-circuit configuration for single circuit -reason unknown	1 & 2	Along Norfolk & Western RR btw Reservoir Rd. & I-55

Summary of Distribution Circuit Field Inspection by ICC Staff			
Utility:	AIC	**Date:**	7/21/15
Circuit:	307-004: Supplies 661 customers	**Inspector:**	Rockrohr (ICC)/Rose (AIC)
Gen. Notes:	Fairview Heights & Caseyville -15.5 miles long. Most recent trim Apr. 2012. Most recent utility inspection 2014. Except for trees, cct condition is good. Lots of vegetation issues: interuptions identified as OH equip were likely vegetation related. Many back-lot or cross country line sections not visible. 2014 NWPC: OH(18), trees(8), intentional(6), unknown(1). Tree trimmers working on circuit at time of inspection, but it is already overgrown.		
Map No.	***Item Description***	***Photo(s)***	***Location***
2	Trees contacting primary		Bunkum btw 81st & 82nd (tap to Trf# 401321)
2	Trees contacting primary -broken limb on primary		North end of 82nd (from Trf# 405601 to Trf# 604695)
4	Trees contacting primary		Maple @ Hueckel
7	Trees close to or contacting primary		Cliffe w/Trf# 500109)
7	Vines covering transformer	1 & 2	N/ #2716 Cliffe
7	Vine grown to primary		Old Bunkum @ Trf# 502686
7	Vine grown to prmary		Forest @ Glenwood
8	Trees contacting primary		Tap to #24 Willow (Trf# 707349)
8	Trees close to or contacting primary		Hwy 157 N/Bunkum (N/ Trf# 402605)
8	Trees contacting primary		#3820 Bluff Blvd.
8	Vines so heavy on neutral they are weighing it down	3	#3834 Hwy 157 (Btw Trf# 402606 & 402988)
8	Trees & vines contacting primary for many adjacent spans		Main N/ Botancial to Trf# 605747
8	Trees growing between phases of primary		Behind # 8840 Parkdale
8	Vines to primary		Rear lot near Trf# 404781
8	Vines weighing down secondary		Rear lot behind # 8825 Bermuda
10	Tree contact		Lynnwood W/ Trf# 803702
10	Tree contact		#9142 Lynnwood (Near Trf# 804738)

Summary of Distribution Circuit Field Inspection by ICC Staff			
Utility:	AIC	**Date:**	7/23/15
Circuit:	Y59-520: Supplies 223 customers	**Inspector:**	Rockrohr (ICC)/Anthony (AIC)
Gen. Notes:	East Lynn -36.2 miles long. Most recent trim Jun 2012. Most recent utility inspection 2013. No vegetation issues observed. Lots of new poles and crossarms. Some line sections not visible. Circuit appeared to be in excellent condition. 2014 WPC: OH(7), weather(3), unknown(3), animal(2), tree(1), intentional(1), UG(1).		
Map No.	***Item Description***	***Photo(s)***	***Location***
40	Split Crossarm (field side)		Hwy 136: 2 poles W/Peaceful Ct.
44	Loose bolt on PT pin		Pvt Lane W/Elm St. (1 pole E/Trf#102968)

Summary of Distribution Circuit Field Inspection by ICC Staff			
Utility:	AIC	**Date:**	7/28/15
Circuit:	A91-004: Supplies 666 customers	**Inspector:**	Rockrohr (ICC)/Haile & Bergquist (AIC)
Gen. Notes:	Peoria -36.9 miles long. Most recent trim Feb 2014. Most recent utility inspection 2012. No vegetation issues observed. Some line sections not visible. Circuit appeared to be in excellent condition. 2014 WPC: Public(5), intentional(5), OH(4), unknown(4), UG(3), animal(2), tree(2). WPC 2008.		
Map No.	***Item Description***	***Photo(s)***	***Location***
11	Missing guy guard -AIC reported that repairs were made on 7/28/15		Tap W/N. Ivy Lake Rd. (1 pole S/Trf# 502963)

Summary of Distribution Circuit Field Inspection by ICC Staff			
Utility:	AIC	**Date:**	7/30/15
Circuit:	B10-001: Supplies 1028 customers	**Inspector:**	Rockrohr (ICC)/Haile & Bergquist (AIC)
Gen. Notes:	Eureka -61.9 miles long. Most recent trim Oct 2011. Most recent utility inspection 2013. No vegetation issues observed. Lots of UG near Eureka Lake. Circuit appeared to be in excellent condition. 2014 WPC: OH(11), public(8), intentional(8), animal(5), UG(2), tree(1), unknown(1). NWPC 2009. NWPC 2008.		
Map No.	***Item Description***	***Photo(s)***	***Location***
41	Substation fence - barbed wire broken	2	Cruger Substation
41	Top of transformer cooling fins rusting	3	Cruger Substation
3	NESC: Neutral has inadequate ground clearance		2950E- fist span S/Hwy 24