



April 25, 2017

Jeff McClanahan  
Director Utilities  
Kansas Corporation Commission  
1500 SW Arrowhead Road  
Topeka, Kansas 66604

RE: Docket No. 02-GIME-365-GIE

Dear Mr. McClanahan:

Attached for filing are the Annual Reliability Performance Reports for Westar Energy, Inc. (Westar Energy North) and Kansas Gas and Electric Company (Westar Energy South). This is in compliance with the Commission's Orders in the above-mentioned docket.

If additional follow-up information is needed please let me know.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Robin Allacher', written over the printed name.

Robin Allacher  
Regulatory Analyst

Cc: Jeff Martin  
Larry Wilkus

Form ER Table of Contents  
**Westar Energy, North**

Annual Reliability Performance Report for Kansas Service Territory, 2016  
Docket No. 02-GIME-365-GIE

Table 1. Annual Performance Data .....	Page 2
Table 2. Major Events .....	Page 2
Table 3. Actual Interruptions Statistics By Root Cause .....	Page 3
Table 4. Statistics for Worst-Performing Circuits With Respect to SAIDI .....	Pages 4-6
Table 5. Statistics for Worst-Performing Circuits With Respect to SAIFI .....	Pages 4-5
Assessment of Performance and Planned Improvement of 2016 WPC's that also Qualified as a WPC in the Previous Year (2015) .....	Pages 7-8
Five-Year Reliability Assessment .....	Page 9

# Form ER

## Westar Energy, North

Annual Reliability Performance Report for Kansas Service Territory, 2016

Docket No. 02-GIME-365-GIE

Table 1. Annual Performance Data		
	Actual(1)	Normalized (1)(2)
Average monthly customers	369,465	369,465
Total number of customer interruptions (1)	524,249	524,249
Sum of all customer interruption durations (minutes) (1)	54,227,544	54,227,544
SAIDI (minutes)	146.77	146.77
SAIFI (interruptions)	1.42	1.42
CAIDI (minutes)	103.44	103.44

<b>Table 2. Major Events</b>			
Date(s)	Description (i.e. cause of event)	Customer Interruptions (1)	Customer Interruption Minutes (1)
Total Related to Major Events		-	-

please provide attachments if necessary

## Notes

(1) Report data for all sustained interruptions as defined in subsection 3(t), subject to the limitations specified in subsection 7(c)

(2) Report data excluding interruptions related to major events, as defined in subsection 3(n), and as reported in Table 2

# Form ER

**Westar Energy, North**  
Annual Reliability Performance Report for Kansas Service Territory, 2016  
Docket No. 02-GIME-365-GIE

**Table 3. Actual Interruptions Statistics By Root Cause**

Cause	Customer Interruptions (1)	Customer Interruption Minutes (1)
03-EQUIPMENT FAILED	203,636	22,653,819
09-OVERLOAD	731	47,176
10-TREES/VEGETATION	54,872	6,949,596
11-PUBLIC DAMAGE	34,153	2,965,164
15-ANIMALS/WILDLIFE	79,957	5,403,696
16-OTHER	-	-
17-LIGHTNING	38,154	4,658,457
18-EXTREME WIND	-	-
19-ICE STORM	2	47
20-TREES OUTSIDE RIGHT OF WAY	10,445	1,387,428
21-DEBRIS, NATURE/WEATHER	3,209	204,665
22-UNKNOWN	56,893	3,798,113
23-COMPANY DAMAGED	3,222	150,154
24-PROCEDURAL ERROR	37	1,892
26-LOAD TRANSFER	1,030	8,118
29-LOAD SHED	-	-
30-MAINTENANCE	26,205	2,683,027
31-FUSE FATIGUE	3,892	254,036
32-TORNADO	6,974	2,754,025
33-MICROBURST	837	308,131
<b>Total All Causes</b>	<b>524,249</b>	<b>54,227,544</b>

## Notes

(1) Report data for all sustained interruptions as defined in subsection 3(t), subject to the limitations specified in subsection 7(c)

(2) Report data excluding interruptions related to major events, as defined in subsection 3(n), and as reported in Table 2

## Form ER

### Westar Energy, North Annual Reliability Performance Report for Kansas Service Territory, 2016 Docket No. 02-GIME-365-GIE

**Table 4. Statistics for Worst-Performing Circuits With Respect to SAIDI**

Circuit ID Code	WPC in Previous Year (1)	Associated Substation	Communities Affected (i.e., Cities, townships, portions of counties)	Customers Served	Customer interruptions (2)(3)	Customer interruption minutes (2)(3)	SAIDI (minutes) (2)(3)	SAIFI (interruptions) (2)(3)	CAIDI (minutes) (2)(3)
SO10012014		S. 10TH	HIAWATHA, RESERVE	99	1,225	152,141	1,536.778	12.374	124.197
NWLE012014		NW LEAVENWTH	LEAVENWORTH	191	978	256,327	1,342.026	5.120	262.093
LEGH012002		LEHIGH COOP	HILLSBORO, LEHIGH	115	393	136,910	1,190.522	3.417	348.372
SBEN012002		S BENNINGTON	BENNINGTON, CULVER, MINNEAPOLIS, NILES, SALINA, SOLOMON, WELLS	655	4,117	722,514	1,103.075	6.285	175.495
MAPL012012		MAPLE STREET	EUREKA	660	1,426	722,741	1,095.062	2.161	506.831
TXCS012000		TEXACO-CTYSV	EUREKA, REECE	68	234	72,574	1,067.265	3.441	310.145
TEET012016		TEETERVILLE	CASSODAY, EUREKA	36	62	36,698	1,019.389	1.722	591.903
VAUG012024		VAUGHN	HAMILTON, MADISON, OLPE	140	824	140,461	1,003.293	5.886	170.462
EEUR012022		EAST EUREKA	EUREKA	529	1,724	526,366	995.021	3.259	305.317
KEEN012001		KEENE	ESKRIDGE, MAPLE HILL, MC FARLAND, PAXICO, WILLARD	579	2,276	564,468	974.902	3.931	248.009
TORO012012		TORONTO RURL	BENEDICT, BUFFALO, COYVILLE, EUREKA, FALL RIVER, FREDONIA, TORONTO	285	1,323	271,660	953.193	4.642	205.336
FALL012012	X	FALL RIVER	CLIMAX, EUREKA, FALL RIVER, FREDONIA, HOWARD, SEVERY, TORONTO	215	1,582	203,439	946.228	7.358	128.596

please provide attachments if necessary

**Table 5. Statistics for Worst-Performing Circuits With Respect to SAIFI**

Circuit ID Code	WPC in Previous Year (1)	Associated Substation	Communities Affected (i.e., Cities, townships, portions of counties)	Customers Served	Customer interruptions (2)(3)	Customer interruption minutes (2)(3)	SAIDI (minutes) (2)(3)	SAIFI (interruptions) (2)(3)	CAIDI (minutes) (2)(3)
SO10012014		S. 10TH	HIAWATHA, RESERVE	99	1,225	152,141	1,536.778	12.374	124.197
BENJ012012		BENDENA JCT	ATCHISON, BENDENA, DENTON, HIGHLAND, LEONA, ROBINSON, SEVERANCE, TROY	282	2,382	204,356	724.667	8.447	85.792
FALL012012	X	FALL RIVER	CLIMAX, EUREKA, FALL RIVER, FREDONIA, HOWARD, SEVERY, TORONTO	215	1,582	203,439	946.228	7.358	128.596
JEFF007001	X	JEFFREY E.C.	BELVUE, EMMETT, HAVENSVILLE, LOUISVILLE, SAINT MARYS, WAMEGO	86	622	50,039	581.849	7.233	80.449
SSEN343283		S SENECA	DULUTH, HAVENSVILLE, ONAGA, SENECA	2	14	1,473	736.500	7.000	105.214
GYPS012001		GYPSUM	GYPSUM, KIPP, SALINA, SOLOMON	114	769	102,656	900.491	6.746	133.493
THED012012		THEDEN CORNR	BASEHOR, BONNER SPRINGS, DE SOTO, LAKE QUIVIRA, LINWOOD, SHAWNEE, TONGANOXIE	534	3,561	287,555	538.493	6.669	80.751
TALM012001		TALMAGE	ABILENE, LONGFORD, MANCHESTER, TALMAGE, WAKEFIELD	145	929	82,514	569.062	6.407	88.820
SBEN012002		S BENNINGTON	BENNINGTON, CULVER, MINNEAPOLIS, NILES, SALINA, SOLOMON, WELLS	655	4,117	722,514	1,103.075	6.285	175.495
WABI012014		WEST ABILENE	ABILENE, HOPE, SOLOMON, TALMAGE	785	4,646	280,255	357.013	5.918	60.322
GYPS012002		GYPSUM	GYPSUM, KIPP, ROXBURY, SALINA, SOLOMON	387	2,280	343,007	886.323	5.891	150.442
VAUG012024		VAUGHN	HAMILTON, MADISON, OLPE	140	824	140,461	1,003.293	5.886	170.462

please provide attachments if necessary

#### Notes

- (1) Check if circuit qualified as a worst-performing circuit in the previous calendar year
- (2) Report data for all sustained interruptions as defined in subsection 3(t), subject to the limitations specified in subsection 7(c)
- (3) Report data excluding interruptions related to major events, as defined in subsection 3(n), and as reported in Table 2

## Form ER

## Westar Energy, North

Annual Reliability Performance Report for Kansas Service Territory, 2016

Docket No. 02-GIME-365-GIE

Table 4. Statistics for Worst-Performing Circuits With Respect to SAIDI

Circuit ID Code	WPC in Previous Year (1)	Associated Substation	Communities Affected (i.e., Cities, townships, portions of counties)	Customers Served	Customer interruptions (2)(3)	Customer interruption minutes (2)(3)	SAIDI (minutes) (2)(3)	SAIFI (interruptions) (2)(3)	CAIDI (minutes) (2)(3)
FORB012022		FORBES FIELD	BERRYTON, TOPEKA, WAKARUSA	1,262	6,239	1,152,447	913.191	4.944	184.717
TORO012014	X	TORONTO RURL	TORONTO	16	75	14,592	912.000	4.688	194.560
GYPS012001		GYPSUM	GYPSUM, KIPP, SALINA, SOLOMON	114	769	102,656	900.491	6.746	133.493
GYPS012002		GYPSUM	GYPSUM, KIPP, ROXBURY, SALINA, SOLOMON	387	2,280	343,007	886.323	5.891	150.442
EEUR012024		EAST EUREKA	EUREKA	667	1,890	540,478	810.312	2.834	285.967
TORO007010		TORONTO RURL	EUREKA, NEAL, TORONTO	65	260	49,476	761.169	4.000	190.292
EEUR012026		EAST EUREKA	CLIMAX, EUREKA, FALL RIVER, HAMILTON, HOWARD, PIEDMONT, SEVERY	876	2,552	646,052	737.502	2.913	253.155
SSEN343283		S SENECA	DULUTH, HAVENSVILLE, ONAGA, SENECA	2	14	1,473	736.500	7.000	105.214
QNCY012000		QUINCY	HAMILTON, TORONTO, VIRGIL	97	388	70,776	729.649	4.000	182.412
BENJ012012		BENDENA JCT	ATCHISON, BENDENA, DENTON, HIGHLAND, LEONA, ROBINSON, SEVERANCE, TROY	282	2,382	204,356	724.667	8.447	85.792
TESC012001		TESCOTT	ADA, BARNARD, BENNINGTON, BEVERLY, BROOKVILLE, CULVER, LINCOLN, MINNEAPOLIS, SHADY BEND, TESCOTT, WESTFALL	628	3,433	452,269	720.174	5.467	131.742
FKFT012001		FRANKFORT	FRANKFORT, VERMILLION, VLIETS, WINIFRED	467	2,692	322,001	689.510	5.764	119.614

please provide attachments if necessary

Table 5. Statistics for Worst-Performing Circuits With Respect to SAIFI

[illegible]

please provide attachments if necessary

## Notes

- (1) Check if circuit qualified as a worst-performing circuit in the previous calendar year
- (2) Report data for all sustained interruptions as defined in subsection 3(t), subject to the limitations specified in subsection 7(c)
- (3) Report data excluding interruptions related to major events, as defined in subsection 3(n), and as reported in Table 2

## Form ER

**Westar Energy, North**  
Annual Reliability Performance Report for Kansas Service Territory, 2016  
Docket No. 02-GIME-365-GIE

**Table 4. Statistics for Worst-Performing Circuits With Respect to SAIDI**

Circuit ID Code	WPC in Previous Year (1)	Associated Substation	Communities Affected (i.e., Cities, townships, portions of counties)	Customers Served	Customer interruptions (2)(3)	Customer interruption minutes (2)(3)	SAIDI (minutes) (2)(3)	SAIFI (interruptions) (2)(3)	CAIDI (minutes) (2)(3)
BETO007010		BETO JCT	LEBO, OLIVET	107	578	71,898	671.944	5.402	124.391
LWAB012000		LK WABAUNSEE	ALMA, ESKRIDGE	305	1,591	198,682	651.416	5.216	124.879
1BRA012002		1ST & BRADY	ABILENE	448	2,360	287,979	642.810	5.268	122.025
FAIR012014		FAIRVIEW RL	POWHATTAN	399	952	253,101	634.338	2.386	265.862
OLPE012016		OLPE LYON CO	EMPORIA, OLPE	125	489	77,015	616.120	3.912	157.495
1BRA012003		1ST & BRADY	ABILENE	321	1,493	189,506	590.361	4.651	126.930

please provide attachments if necessary

**Table 5. Statistics for Worst-Performing Circuits With Respect to SAIFI**

Circuit ID Code	WPC in Previous Year (1)	Associated Substation	Communities Affected (i.e., Cities, townships, portions of counties)	Customers Served	Customer interruptions (2)(3)	Customer interruption minutes (2)(3)	SAIDI (minutes) (2)(3)	SAIFI (interruptions) (2)(3)	CAIDI (minutes) (2)(3)

please provide attachments if necessary

### Notes

- (1) Check if circuit qualified as a worst-performing circuit in the previous calendar year
- (2) Report data for all sustained interruptions as defined in subsection 3(t), subject to the limitations specified in subsection 7(c)
- (3) Report data excluding interruptions related to major events, as defined in subsection 3(n), and as reported in Table 2

## **Westar Energy, North**

### **Assessment of Performance and Planned Improvement of 2016 WPC's that also qualified as a WPC in the Previous Year (2015)**

#### **JEFF007001 (East Jeffrey Substation)**

- Westar completed tree trimming on this circuit in August 2015. The next trim is planned for Q3 of 2020.
- In 2016, Westar completed the process of rebuilding the mainline of this circuit and converting it to the company's standard 12kV primary distribution voltage. This conversion required significant inspection and re-grounding of every customer transformer fed from the circuit. In addition, crews will identify other reliability issues and make repairs as discovered. The planned outages associated with this conversion likely contributed to circuit performance during construction and contributed this circuit to qualify as a KCC Worst Performer.
- A new 34 to 12 kV load center has been constructed near this source as a replacement. All former JEFF 7-1 customers will be switched to the new source at completion of the project, the new load center will also serve as an alternate source to the Doyle Creek load center in the area.

#### **FALL012012 (Fall River Substation)**

- Westar completed tree trimming on this circuit in July 2015. The next trim is planned for Q2 of 2020.
- Following the completion of a scheduled inspection of the FALL 12-12 circuit, identified repairs and maintenance will be performed on the distribution circuit.
- Fall River Substation is fed by EEUR 34-4588 out of East Emporia, a substation which is radially sourced on the 115kV transmission. It is currently in the forecast to rebuild the Butler-Viola-Altoona 138kV line which runs through this area, as well as tie it to the north into East Eureka. This thereby creates a loop to provide N-1 contingency on the transmission which feeds much of the south Emporia area. At such time, it is also tentatively planned to establish a 34 kV and 12.47 kV source in the area to relieve much of the exposure FALL 12-12 carries. The addition of a 34kV source in the area will also allow creating a loop-tie for the EEUR 34-4588 circuit feeding Fall River.

#### **DUNL007000 (Dunlap Substation)**

- Westar completed tree trimming on this circuit in March 2015. The next trim is planned for Q1 of 2020.
- Many of the outages experienced on the DUNL 7-0 circuit were a result of events on the 34kV circuit sourcing it, MORR 34-4550. In 2015 and 2016, helicopter inspections were performed and followed up with line repairs on this 34kV circuit to help improve reliability to customers in the area.
- Following the completion of a scheduled inspection of the DUNL 7-0 circuit, identified repairs and maintenance will be completed on the distribution circuit.
- The Dunlap area is a small gradually shrinking community that has several lines and taps with distribution assets which are no longer required. It is believed in addition to repairs identified following an inspection, we will be able to retire and de-energize several taps and transformers which no longer feed customers but contribute to circuit exposure which effect overall circuit reliability.



TORO012014 (Toronto Rural Substation) [EEUR 34-4588]

- Westar completed tree trimming on this circuit in March 2015. The next trim is planned for Q1 of 2020.
- As a previously identified KCC Worst Performing Circuit, this circuit has already been inspected and circuit maintenance has begun. Several work orders have been designed and repairs made to several areas of the circuit in 2015/2016. Design on the rebuild/relocation of the main feed into Toronto from the city was stalled in 2016 due to complications in acquiring easement from the Army Corps of Engineers due to proximity to Toronto Lake. Discussions with the Corps continue into 2017.
- If necessary, an additional planned option to improve reliability includes building in a 34.5kV circuit into the city directly from the north and construct a 34/12 kV source locally in town. This is a more expensive option which will be considered as a budgeted project if all other options to improve area reliability are exhausted.

# Westar Energy, North

Five-Year Assessment of SAIFI, SAIDI, & CAIDI by Subsidiary

Subsidiary	Year	SAIFI	SAIDI	CAIDI	Normalized Events
North	2012	1.475	140.1	95.0	0
	2013	1.475	139.1	94.3	0
	2014	1.621	169.9	104.8	0
	2015	1.726	233.2	135.2	0
	2016	1.419	146.8	103.4	0

Note: Years 2012-2016 were normalized by the KCC Major Event classification.

Form ER Table of Contents  
**Westar Energy, South**

Annual Reliability Performance Report for Kansas Service Territory, 2016  
Docket No. 02-GIME-365-GIE

Table 1. Annual Performance Data .....	Page 2
Table 2. Major Events .....	Page 2
Table 3. Actual Interruptions Statistics By Root Cause .....	Page 3
Table 4. Statistics for Worst-Performing Circuits With Respect to SAIDI.....	Page 4
Table 5. Statistics for Worst-Performing Circuits With Respect to SAIFI.....	Page 4
Assessment of Performance and Planned Improvement of 2016 WPC's that also Qualified as a WPC in the Previous Year (2015) ..... Page 5-6	
Five-Year Reliability Assessment.....	Page 7

## Form ER

## Westar Energy, South

Annual Reliability Performance Report for Kansas Service Territory, 2016

Docket No. 02-GIME-365-GIE

Table 1. Annual Performance Data		
	Actual(1)	Normalized (1)(2)
Average monthly customers	320,873	320,873
Total number of customer interruptions (1)	451,055	451,055
Sum of all customer interruption durations (minutes) (1)	53,151,765	53,151,765
SAIDI (minutes)	165.65	165.65
SAIFI (interruptions)	1.41	1.41
CAIDI (minutes)	117.84	117.84

Table 2. Major Events			
Date(s)	Description (i.e. cause of event)	Customer Interruptions (1)	Customer Interruption Minutes (1)
Total Related to Major Events		-	-

please provide attachments if necessary

## Notes

(1) Report data for all sustained interruptions as defined in subsection 3(t), subject to the limitations specified in subsection 7(c)

(2) Report data excluding interruptions related to major events, as defined in subsection 3(n), and as reported in Table 2

# Form ER

**Westar Energy, South**  
Annual Reliability Performance Report for Kansas Service Territory, 2016  
Docket No. 02-GIME-365-GIE

<b>Table 3. Actual Interruptions Statistics By Root Cause</b>		
Cause	Customer Interruptions (1)	Customer Interruption Minutes (1)
03-EQUIPMENT FAILED	191,617	23,860,818
09-OVERLOAD	672	38,203
10-TREES/VEGETATION	17,212	4,239,330
11-PUBLIC DAMAGE	10,621	1,764,993
15-ANIMALS/WILDLIFE	56,024	4,238,505
16-OTHER	-	-
17-LIGHTNING	64,330	10,330,289
18-EXTREME WIND	-	-
19-ICE STORM	1	142
20-TREES OUTSIDE RIGHT OF WAY	2,701	658,154
21-DEBRIS, NATURE/WEATHER	2,480	102,118
22-UNKNOWN	77,926	5,051,340
23-COMPANY DAMAGED	3,705	41,820
24-PROCEDURAL ERROR	45	9,138
26-LOAD TRANSFER	268	47,248
29-LOAD SHED	-	-
30-MAINTENANCE	19,220	1,945,034
31-FUSE FATIGUE	1,445	121,106
32-TORNADO	1,108	134,979
33-MICROBURST	1,680	568,548
<b>Total All Causes</b>	<b>451,055</b>	<b>53,151,765</b>

## Notes

(1) Report data for all sustained interruptions as defined in subsection 3(t), subject to the limitations specified in subsection 7(c)

(2) Report data excluding interruptions related to major events, as defined in subsection 3(n), and as reported in Table 2

## Form ER

### Westar Energy, South

Annual Reliability Performance Report for Kansas Service Territory, 2016

Docket No. 02-GIME-365-GIE

**Table 4. Statistics for Worst-Performing Circuits With Respect to SAIDI**

Circuit ID Code	WPC in Previous Year (1)	Associated Substation	Communities Affected (i.e., Cities, townships, portions of counties)	Customers Served	Customer interruptions (2)(3)	Customer interruption minutes (2)(3)	SAIDI (minutes) (2)(3)	SAIFI (interruptions) (2)(3)	CAIDI (minutes) (2)(3)
PRLD012004	X	PRAIRIELAND	ARKANSAS CITY	14	365	17,396	1,242.571	26.071	47.660
UDAL012008		UDALL	DOUGLASS, ROCK, UDALL, WINFIELD	415	1,873	475,195	1,145.048	4.513	253.708
MAGN012002	X	MAGNA	ATLANTA, AUGUSTA, DOUGLASS, LEON	252	953	251,667	998.679	3.782	264.079
HILL012001		HILLSBORO	HILLSBORO	44	117	41,985	954.205	2.659	358.846
OXFO012002	X	OXFORD	OXFORD, WELLINGTON	80	377	75,973	949.663	4.713	201.520
ELKR023002	X	ELK RIVER	MOLINE	22	131	20,800	945.455	5.955	158.779
BURR012002	X	BURRTON	BUHLER, BURRTON, HALSTEAD, INMAN, MOUNDRIDGE	632	2,367	549,623	869.657	3.745	232.202
HOWA002000	X	HOWARD	ELK CITY, ELK FALLS, HOWARD, LONGTON, MOLINE	551	2,293	439,515	797.668	4.162	191.677
BURR012016	X	BURRTON	BUHLER, BURRTON, HALSTEAD, HAVEN, HUTCHINSON	327	1,228	247,120	755.719	3.755	201.238
LEON012002	X	LEON	EL DORADO, LEON	121	374	80,980	669.256	3.091	216.524
WARE012004		WARE	ARCADIA, FORT SCOTT, GARLAND	934	3,708	622,119	666.080	3.970	167.778

please provide attachments if necessary

**Table 5. Statistics for Worst-Performing Circuits With Respect to SAIFI**

Circuit ID Code	WPC in Previous Year (1)	Associated Substation	Communities Affected (i.e., Cities, townships, portions of counties)	Customers Served	Customer interruptions (2)(3)	Customer interruption minutes (2)(3)	SAIDI (minutes) (2)(3)	SAIFI (interruptions) (2)(3)	CAIDI (minutes) (2)(3)
PRLD012004		PRAIRIELAND	ARKANSAS CITY	14	365	17,396	1,242.571	26.071	47.660
PEAB012002		PEABODY	BURNS, FLORENCE, MARION, PEABODY	44	416	28,645	651.023	9.455	68.858
ELKR023002		ELK RIVER	MOLINE	22	131	20,800	945.455	5.955	158.779
MOBI012008		MOBIL	ANDOVER, AUGUSTA, EL DORADO, TOWANDA, WICHITA	1,010	5,901	594,536	588.650	5.843	100.752
WEST012002		WESTLINK	WICHITA	2,118	12,026	973,286	459.531	5.678	80.932

please provide attachments if necessary

#### Notes

- (1) Check if circuit qualified as a worst-performing circuit in the previous calendar year
- (2) Report data for all sustained interruptions as defined in subsection 3(t), subject to the limitations specified in subsection 7(c)
- (3) Report data excluding interruptions related to major events, as defined in subsection 3(n), and as reported in Table 2

## **Westar Energy, South**

### **Assessment of Performance and Planned Improvement of 2016 WPC's that also qualified as a WPC in the Previous Year (2015)**

#### **HOWA02000 (Howard Substation)**

- Westar completed tree trimming on this circuit in May 2016. The circuit is scheduled to be trimmed again in Q2 of 2021.
- In 2014, Westar began a multiyear project to upgrade the 69kV transmission line that serves Elk River Substation from Montgomery Substation.
- In 2014, Westar rebuilt 8.6 miles of 69kV transmission line from Elk River Substation south to the Sedan Tap.
- In 2015, Westar completed inspection of Howard 2-0 and identified additional repair and maintenance items that need to be completed on the distribution circuit.
- In 2016 and 2017, the area 23 kV sources at Elk River and Elk City will have their tie rebuilt to allow conductor capacity for each source to potentially carry the other during a planned outage or event. These two 23 kV sources serve this distribution circuit as well as all others in the area.
- In 2018, a transmission project is planned which will address this circuit and its surrounding area being fed by a radial 69 kV configuration. The current system configuration results in some transmission outages being immitigable on either the transmission or distribution system. This project will address this by converting Elk Junction into a ring-bus configuration. This will allow for any 69 kV originating outages to be isolated on transmission, or potentially mitigated by neighboring distribution (n-1 contingency in most cases).
- Westar is planning to rebuild additional segments of the 69kV transmission line from Montgomery to Dearing in the future years.

#### **MAGN012002 (Magna Substation)**

- Westar completed tree trimming on this circuit in November 2015. This circuit is scheduled to be trimmed again in Q3 of 2020.
- Following the completion of a scheduled inspection of the Magna 12-2 circuit, identified repairs and maintenance will be completed on the distribution circuit.
- A project exists to upgrade the Magna TX#1 source due to internal transformer gassing. The gassing is the result of electrical discharge through internal insulation, and is evidence that the transformer is failing. It is the intent to replace and upgrade the Magna source transformer with a new unit in the very near future. Replacing the transformer will provide a new source to the Magna circuit and proactively replace the transformer prior to a catastrophic failure resulting in a prolonged outage.

#### **PRLD012004 (Prairieland Substation)**

- Westar completed tree trimming on this circuit in December 2016. This circuit is scheduled to be trimmed again in Q4 of 2020.
- Following the completion of a scheduled inspection of the Prairieland 12-4 circuit, identified repairs and maintenance will be completed on the distribution circuit.
- A project plan exists to perform 69kV maintenance upgrades and install optical ground wire in the area which includes a path through Prairieland substation. The feed will also run the optical fiber line to the Ark City Service Center. This will improve system relaying and communication in the area, as well as serve as a static line to protect lightning events.

#### OXFO012002 (Oxford Substation)

- Westar completed tree trimming on this circuit in December 2014. This circuit is scheduled to be trimmed again in Q4 of 2019.
- Following the completion of a scheduled inspection of the Oxford 12-2 circuit, identified repairs and maintenance will be completed on the distribution circuit.
- In 2017-2018 it is planned to replace the Oxford source from three aged single phase transformers with regulators to our standard three-phase unit with load tap changer. The project also includes plans to install a high-side circuit switcher with relaying upstream of the transformer following a recent event where a 12kV event tripped the Sumner-to-Creswell 138kV line which feeds Oxford.

#### LEON012002 (Leon Substation)

- Westar completed tree trimming on this circuit in July 2015. This circuit is scheduled to be trimmed again in Q2 of 2020.
- Following the completion of a scheduled inspection of the Leon 12-2 circuit, identified repairs and maintenance will be completed on the distribution circuit.
- A System Planning project exists to upgrade the 69-12 kV Leon substation transformer. Due to limited room in the existing substation, the aged infrastructure will require a total rebuild which will also allow for a re-design of an 'in-and-out' looped feed on the 69kV system. This looped feed with the addition of a 69kV breaker at New Leon will greatly help Leon ride through transmission sourced outage events it experiences on its present day radial feed.

#### BURR012002 (Burrton Substation)

- Westar is currently performing tree trimming on this circuit in April 2017. This circuit is scheduled to be trimmed again in 2021.
- Following the completion of a scheduled inspection of the Burrton 12-2 circuit, identified repairs and maintenance will be completed on the distribution circuit.
- In 2016, under the EDGR initiative communicating fault indicators were installed on this circuit for providing near real-time data on load and fault events. These fault indicators will allow quicker response to outages, and eventually be leveraged for determining disturbance location of both sustained and momentary outages.
- Starting in 2017 and going through 2023, the 69kV transmission line sourcing the Burrton substation will be rebuilt in two phases. The looped transmission line will be rebuilt to the higher present day standard 1192 ACSR conductor and be more resilient to potential line interruption events.

#### BURR012016 (Burrton Substation)

- Westar completed tree trimming on this circuit in July 2014. This circuit is scheduled to be trimmed again in Q3 of 2018.
- Sections of circuit near Haven are being rebuilt/hardened in 2017 due to existing projects.
- Following the completion of a scheduled inspection of the Burrton 12-16 circuit, identified repairs and maintenance will be completed on the distribution circuit.
- In 2016, under the EDGR initiative communicating fault indicators were installed on this circuit for providing near real-time data on load and fault events. These fault indicators will allow quicker response to outages, and eventually be leveraged for determining disturbance location of both sustained and momentary outages.
- Starting in 2017 and going through 2023, the 69kV transmission line sourcing the Burrton substation will be rebuilt in two phases. The looped transmission line will be rebuilt to the higher present day standard 1192 ACSR conductor and be more resilient to potential line interruptions.



# Kansas Gas and Electric Company Westar Energy, South

Five-Year Assessment of SAIFI, SAIDI, & CAIDI by Subsidiary

Subsidiary	Year	SAIFI	SAIDI	CAIDI	Normalized Events
South	2012	1.225	164.0	133.8	2
	2013	1.448	186.5	128.8	1
	2014	1.287	116.7	90.7	0
	2015	1.408	146.2	103.8	1
	2016	1.406	165.6	117.8	0

Note: Years 2012-2016 were normalized by the KCC Major Event classification.