

**BEFORE THE CORPORATION COMMISSION OF OKLAHOMA**

IN THE MATTER OF THE APPLICATION OF )  
**OKLAHOMA GAS AND ELECTRIC COMPANY** )  
FOR AN ORDER OF THE COMMISSION ) CAUSE NO. PUD 201500273  
AUTHORIZING APPLICANT TO MODIFY ITS )  
RATES, CHARGES, AND TARIFFS FOR RETAIL )  
ELECTRIC SERVICE IN OKLAHOMA )

Direct Testimony

of

Jarod Cassada

on behalf of

Oklahoma Gas and Electric Company

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OF OKLAHOMA

December 18, 2015

I. INTRODUCTION

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Q. **Please state your name and business address.**

A. My name is Jarod Cassada. My business address is 3220 South High Avenue, Oklahoma City, Oklahoma 73129.

Q. **By whom are you employed and in what capacity?**

A. I am employed by Oklahoma Gas and Electric Company (“OG&E” or “Company”) as Supervisor, Vegetation Management.

Q. **Please summarize your educational background and professional qualifications.**

A. I graduated from Oklahoma State University in 1996 with a Bachelor’s of Science in Forestry and a Minor in Soils/Agronomy. I am currently pursuing a Master’s in Business Administration at the University of Central Oklahoma; I expect to graduate in May 2016. I am an Oklahoma Department of Agriculture, Food and Forestry (“ODAFF”) Oklahoma Registered Forester (License No. 203), an International Society of Arboriculture (“ISA”) Certified Arborist (License No. MW0422A) and an ISA Utility Specialist (License No. MW0422AU). I am a Certified Pesticide Applicator with the Oklahoma Department of Agriculture (“ODA”) License No. 01020. I am a graduate of the Oklahoma Citizens Academy, which is an academy sponsored by the Oklahoma Municipal League. I came to OG&E in 2011. Prior to assuming my current position at OG&E, I was employed by American Electric Power from 1995 to 2011 in the areas of Transmission or Distribution as a Forester and in Distribution as Senior Engineer Technician. In those positions, I managed regional contract line clearance operations, designed electrical facilities to meet the demands of new and existing customers, performed load calculations to determine minimum design requirements, and business development determining new streams of revenue in Oklahoma and Texas.

1 Q. **What are your principal duties and responsibilities for the Company?**

2 A. I manage vegetation management budgets, contracts and activities on OG&E's  
3 distribution, transmission and facilities. I ensure compliance with federal and state  
4 vegetation management requirements, particularly statutes, regulations, and rules under  
5 the authority of NERC, the Federal Energy Regulatory Commission ("FERC"), the  
6 Oklahoma Corporation Commission ("Commission") and the Environmental Protection  
7 Agency ("EPA").  
8

9 Q. **Have you previously filed testimony before the Oklahoma Corporation Commission  
10 ("Commission")?**

11 A. No.  
12

13 Q. **What is the purpose of your testimony?**

14 A. I provide an overview of basic utility vegetation management, quantify the growth in  
15 OG&E's power delivery system since the last rate case and discuss the importance of  
16 cycle work as it pertains to vegetation management and reliability. I also discuss factors  
17 which impacted vegetation management cycle work during the test year. Finally, I  
18 explain the basis for the Company's request in this case which results in *pro forma*  
19 expense adjustment.  
20

## 21 II. VEGETATION MANAGEMENT OVERVIEW

22 Q. **Please provide a brief overview of utility vegetation management.**

23 A. The power delivery system consists of a series of poles, structures and wires. The wires  
24 are subject to movement from sag (load/temperature) and wind. The trees and other  
25 vegetation that surround these power lines are subject to growth and wind. Utility  
26 vegetation management is a combination of different methods to manage vegetation near  
27 power lines. Specifically, vegetation management is the integration of various control  
28 methods for the purpose of managing "space" around the conductors to prevent  
29 interruptions. That space has a finite life expectancy and must be reclaimed on a cyclical  
30 basis. Failure to do so impacts OG&E's ability to deliver safe, reliable and affordable  
31 electricity. Vegetation near power lines poses safety hazards as it gives the public

1 potential access to high voltage facilities and/or can damage facilities placing the public  
2 and utility workers at risk of serious injury or death. Vegetation management also  
3 prevents outages, which adversely affect customers because they disrupt and sometimes  
4 halt commercial activity and degrade quality of life. When determining the extent of  
5 vegetation management, OG&E considers several factors including: line voltage class,  
6 vegetation species' growth rates and failure characteristics, right-of-way limitations, the  
7 vegetation's location in relation to the conductors, the potential combined movement of  
8 vegetation and conductors during routine winds, and sagging of conductors due to  
9 elevated temperatures or icing.

10  
11 **Q. What are some constraints when performing line clearance on OG&E's power**  
12 **delivery system?**

13 **A.** When conducting vegetation management on the power delivery system, OG&E must  
14 generate enough space around the conductors to facilitate the safe, reliable operation of  
15 the power delivery system between line clearance events. Many trees "encroach" from  
16 outside the easement and require pruning at each cycle event. Other trees emanate from  
17 directly beneath the lines. Failure to manage these trees results in an increasing number  
18 of future trees that will need to be pruned over time. As the number of trees increase due  
19 to fire suppression and land use changes, so does the source of seeds contributing to more  
20 "volunteer" trees. These volunteer trees that establish themselves under the power lines  
21 are generally varieties that grow quickly with weak or brittle wood. In addition, the  
22 distribution system often shares space with other utilities, and our vegetation  
23 management activities must account for private landscaping, fences, boundaries and  
24 specific property uses. A significant portion of the system requires access from private  
25 property which OG&E has a notification and education program for those owners or  
26 customers impacted by line clearance operations. Not all of the power delivery system is  
27 on dedicated easements which impacts the Company's ability to apply vegetation  
28 management guidelines uniformly.

1 Q. **What standards and regulations drive the need for vegetation management?**

2 A. Several standards and regulations drive the need for vegetation management, these  
3 regulations come mainly from the National Electric Safety Code (“NESC”),<sup>1</sup> NERC,<sup>2</sup>  
4 American National Standards Institute (“ANSI”),<sup>3</sup> and the OCC.<sup>4</sup>

5

6 Q. **Please describe the various control methods OG&E uses to maintain its  
7 transmission and distribution lines.**

8 A. OG&E utilizes mechanical, chemical and cultural control methods in its vegetation  
9 management processes. Mechanical control includes the manual clearing of vegetation  
10 from areas around power lines with saws and pruners. It also includes the use of large  
11 machinery to mechanically prune or mulch whole trees. Chemical control is the use of  
12 selective herbicides to manage the vegetation that will interfere with the system.  
13 Chemical management may also include the use of tree growth regulators (“TGR”s) to  
14 temporarily manipulate the speed at which a tree may re-grow towards the power lines.  
15 Cultural control is promotion of low growing vegetation and grasses to interfere with  
16 vegetation that is not compatible with power lines.

17

18 Q. **Please describe how costs are directly tied to vegetation growth.**

19 A. As vegetation develops and becomes larger, it has a greater capacity for re-growth and  
20 becomes more costly to maintain. The most cost effective vegetation management is to  
21 target immature trees for removal or control. It generally costs less to treat or remove  
22 immature trees than to trim them repeatedly. For example, the Company can remove an  
23 8” diameter at breast height (“DBH”) tree for less than twice the cost to trim it. By  
24 removing that tree, the cost to prune that tree during the next line clearance event is  
25 avoided then and every line clearance event thereafter. Mature trees may also be good  
26 candidates for removal due to declining health, proximity to poles and/or equipment, rate  
27 of re-growth, or they are unsightly when trimmed near power lines and elicit negative  
28 public comment. The value for mature tree removal is not as universal as with trees less

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<sup>1</sup> NESC 218A1

<sup>2</sup> Reliability Standard FAC-003-2

<sup>3</sup> ANSI A300 (part 7), ANSI Z133-2012

<sup>4</sup> OAC 165:35-25-15

1 than 8" DBH, but in some circumstances, it may be the best prescription for managing  
2 the vegetation on the system. Rights-of-way that are free and clear of vegetation  
3 demonstrate a well maintained system and, in fact, do reduce the costs of upgrades,  
4 maintenance and/or storm restoration as well as promote safe operating conditions.  
5

6 **Q. Please describe the notification and education program OG&E utilizes.**

7 A. Whenever possible, OG&E notifies distribution customers with a letter prior to the arrival  
8 of the line clearance contractor. The letter goes to active customers on the target circuit  
9 regardless of whether they have trees, overhead lines, or tree/line conflicts on their  
10 property. The letter provides an e-mail address for customers to contact OG&E  
11 Vegetation Management directly, as well as providing information on proper planting and  
12 tree selection. The line clearance contractor leaves a door card at the residence in advance  
13 of work to be completed. The door card describes the work to be completed and on the  
14 reverse has a graphic depicting the Arbor Day Foundation's recommendations for "right  
15 tree in the right place." On the day work is to be completed, the contractors are instructed  
16 to give a courtesy knock before proceeding with any work. After work is completed,  
17 OG&E contractors may leave an additional door card for the property owner to rate their  
18 satisfaction and/or request additional follow up information. In addition to OG&E's  
19 cycle notification program, OG&E also retains the services of a contract customer service  
20 specialist to answer the thousands of inquiries and requests specific to vegetation and  
21 power lines and to make site visits as necessary.  
22

### 23 III. OG&E'S TRANSMISSION AND DISTRIBUTION SYSTEMS

#### 24 Transmission

25 **Q. Please give a brief overview of the OG&E transmission system.**

26 A. OG&E has approximately 5,152 miles of transmission line as of December 16, 2015.  
27 The transmission system is a series of poles, structures and conductors designed to  
28 transmit and move high voltage electricity from power plants or the grid to substations or  
29 large consumers of energy. The system is managed using a combination of the  
30 vegetation clearing cycle and a robust inspection program which allows OG&E to  
31 identify and manage vegetation problems before they cause interference.

1  
2 Q. **Please explain the change to the OG&E transmission system since the last OG&E**  
3 **rate case.**

4 A. At the end of 2010, OG&E had 4,487 miles of transmission lines, including 958 miles of  
5 345-500kV line. OG&E currently has 5,152 miles of transmission lines, including 1533  
6 miles of 345-500kV line. This constitutes a 15% growth in the overall transmission  
7 system, but 60% increase in transmission lines regulated under NERC FAC-003-3 which  
8 includes OG&E's 345 kV and greater lines. The table below gives an overview of the  
9 transmission line expansion that has occurred from 2010-present.

Chart 1

Voltage	2010 Miles	2015 Miles	Miles Increase	% Increase
<b>69-161kV</b>	3529	3619	90	3%
<b>345-500kV</b>	958	1533	575	60%
<b>Total</b>	4487	5152	665	15%

10 Q. **Will there continue to be additions to the transmission system?**

11 A. Yes. The OG&E Transmission System is projected to increase to 5,342 miles by 2020.  
12

13 Q. **How has this growth contributed to vegetation management costs on the**  
14 **transmission system?**

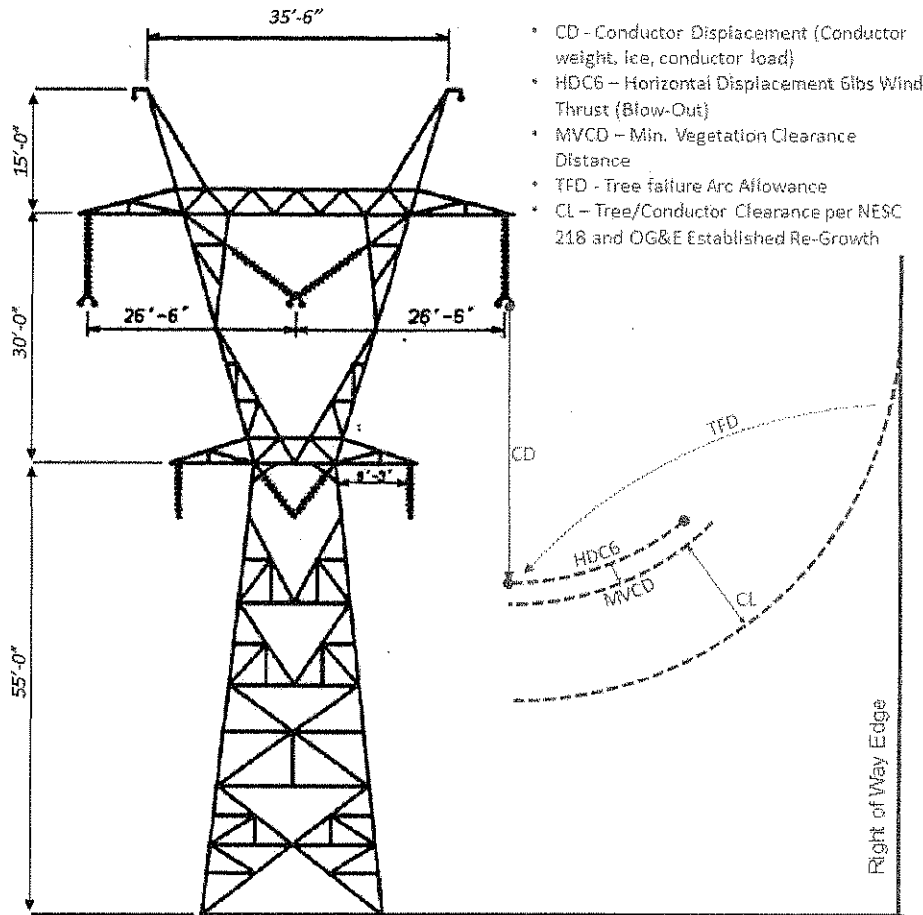
15 A. Since 2010, the increase in line miles and associated transmission infrastructure has  
16 contributed to a need for increased spending of approximately \$1.69 million, resulting in  
17 an approximately \$4.5 million total transmission request in this case.  
18

19 Q. **How is 345 kV and above transmission line maintenance regulated by NERC?**

20 A. NERC requirements regarding transmission line maintenance require that the system be  
21 managed to prevent vegetation encroachment inside the flash-over clearance or minimum  
22 vegetation clearance distance ("MVCD"). The Company must also maintain

1 documentation of the maintenance strategies, procedures, processes and specifications  
 2 used to manage vegetation to prevent potential flash-over conditions including  
 3 consideration of conductor dynamics and the interrelationships between vegetation  
 4 growth rates, control methods and the inspection frequency. The following diagram  
 5 depicts some of the parameters that should be considered when performing line clearance  
 6 on the transmission systems.

Chart 2



Distribution

7  
 8 Q. Please give a brief overview of OG&E's distribution system in Oklahoma.

9 A. The distribution system consists of primary (2,400V to 34,500V) and secondary  
 10 conductors (>750V) that generally reside on the same structures except where a  
 11 conductor leaves the structure to service a customer (service drop). The distribution

1 system is often located on or adjacent to residential properties and creates unique  
2 challenges for OG&E when maintaining or accessing vegetation near these lines. Since  
3 the last rate case, overhead distribution miles on the OG&E system have increased by  
4 approximately 11%.

5  
6 **Q. How does OG&E manage vegetation on its distribution system?**

7 A. OG&E conducts vegetation management activities on approximately 18,587 miles of  
8 Oklahoma right of way. The system is managed using vegetation clearing on a 4 year  
9 cycle of maintenance which includes the mechanical, chemical and cultural practices  
10 discussed above.

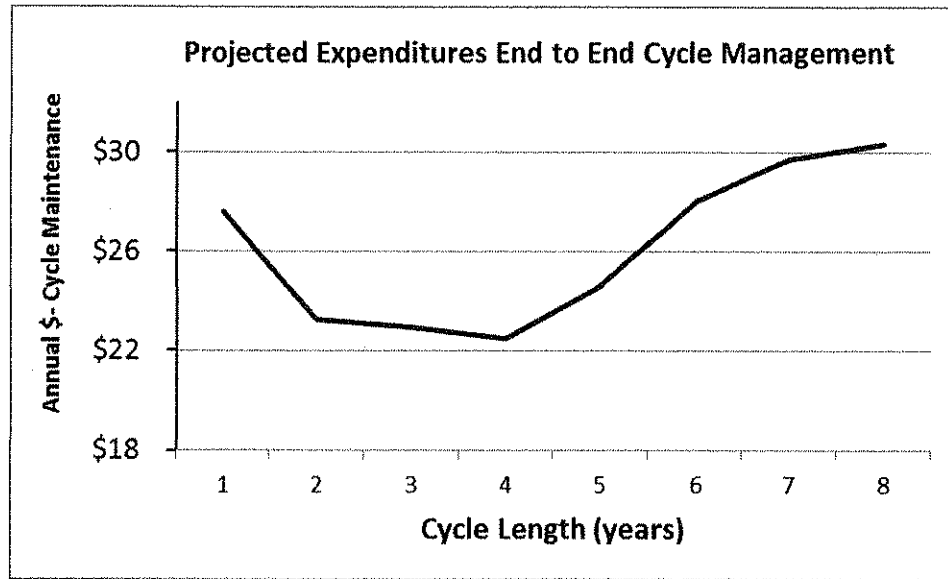
11  
12 **Q. Please explain why the 4 year cycle is important.**

13 A. Pruning a tree from the power lines provides safe, reliable operation for a finite period of  
14 time, in this case four years. The clearance obtained from pruning is related to the cycle  
15 length, the regrowth rate for the particular species and the site conditions. Once the tree  
16 re-grows, it must be trimmed again (*i.e.*, on cycle or once every four years). The  
17 Commission specifies a minimum of a 4 year cycle under OAC 165:35<sup>5</sup>. OG&E has  
18 completed an analyses that indicates that a 3-4 year cycle length is an optimal cycle for  
19 controlling both cost and tree growth. Cycle lengths longer than 4 years result in reduced  
20 reliability and increased costs of maintenance. Cycles shorter than 4 years result in  
21 improved reliability but at an increased cost to the customer. Chart 3 graphically depicts  
22 the highlights from the analysis.

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<sup>5</sup> *Id.*

Chart 3



1 By maintaining a cycle with Integrated Vegetation Management (“IVM”)<sup>6</sup> techniques,  
2 the Company can best control current and future costs of system operation.

3  
4 **IV. FACTORS IMPACTING DISTRIBUTION CYCLE WORK**

5 **Q. What adverse impacts can cause the Company to have difficulty meeting the 4 year**  
6 **cycle?**

7 **A.** During any given year, the Company can experience unanticipated natural events,  
8 contractor availability, cost issues, and increased customer requests. These issues  
9 adversely impact scheduled cycle maintenance which affects system reliability and can  
10 result in increased cycle costs.

11  
12 **Q. Please describe the unanticipated natural events occurring during the test year.**

13 **A.** One significant natural event occurring during the test year was the May 6, 2015 tornado  
14 outbreak, which did impact vegetation management. Specifically, this event caused  
15 OG&E contractors to halt planned cycle maintenance on distribution lines and turn their

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<sup>6</sup> IVM is a best management practice defined in ANSI A300 part 7 as a system by which managing plant communities set objectives, identify vegetation, consider action thresholds, evaluate, select and implement control methods to meet objectives. The control methods selected are done so with respect to environmental impact, anticipated effectiveness, site characteristics, security, economics, and current land use.

1 work efforts to storm restoration on both the OG&E system and neighboring utility  
2 systems. Another significant event was the heavy rainfall that occurred throughout the  
3 service territory in the second quarter of 2015 that delayed scheduled work on many  
4 circuits. OG&E also regularly shares line clearance resources with other utilities  
5 throughout the United States in immediate need from storms, fires or ecological disasters.  
6 These types of events also highlight the need for consistent cycle maintenance, which is  
7 directly linked to reliability and minimizing the impact when severe weather occurs. In  
8 addition, weather impacts the ability to keep crews on cycle, as do mutual assistance  
9 agreements and the nature of the vegetation business also constrain cycle work.  
10 Inclement weather may impact available work hours or access in both the short and long  
11 term. Many planned projects were necessarily delayed due to the significant rainfall and  
12 flooding in 2015 which reduced the number of work days available.

13  
14 **Q. How did contractor availability and increased costs impact cycle work during the**  
15 **test year?**

16 **A.** OG&E uses contractors to complete 100% of its line clearance work. OG&E is able to  
17 achieve the best price possible with the greatest flexibility using skilled contract labor  
18 however over the last five years contractor costs have increased by approximately 20%.  
19 Additionally, OG&E has experienced uncertainty with the availability of its vegetation  
20 contractors, which are a highly specialized workforce, in high demand by all regional  
21 utilities. This demand and therefore the cost increases; are driven by regional factors  
22 such as weather and competition for contractors. Contractors may decide to pay contract  
23 penalties to seek storm restoration work that is more profitable, thereby putting some  
24 OG&E cycle work at risk of being uncompleted as planned. For example, during the test  
25 year one of our contractors was awarded work on Russett 64, a 119 mile circuit near  
26 Madill. After completing 73% of the circuit, the contractor moved their resources off this  
27 circuit to address the Butte fire at Pacific Gas & Electric ("PG&E") in California. The  
28 contractor was compensated for 73% of the work minus a penalty of 10% of the total bid  
29 amount for non-completion. This impacted OG&E's ability to complete the work as  
30 planned.

1 Q. **Please describe how customer requests impact cycle work.**

2 A. The Company experiences a growing volume of customer requests that come through  
3 customer service. In particular, customers are more storm savvy and requests noticeably  
4 increase before predicted weather events. Other types of requests may include the need to  
5 remove trees for customer construction projects and/or for trees that are dead and need to  
6 be made safe. This increase has impacted not only cycle maintenance scheduling but  
7 overall cost. While OG&E knows it needs to address customer requests, it cannot plan  
8 for the complexity or location where they will occur. Customer requests require pulling  
9 resources from the cycle work which disrupts cycle planning, notification, and  
10 completion time. These requests require unplanned travel, planning, access, and may  
11 result in remediation using less than optimal equipment (*i.e.* climbing crew used where a  
12 bucket could be used) due to availability in the area.

13  
14 Q. **Are customer requests considered cycle work?**

15 A. No. Customer requests are considered non-cycle work because they are variable costs  
16 that can cause delays to cycle work. Since 2010, costs associated with non-cycle work  
17 have increased from \$1.2 million to \$2.4 million in 2014.

18  
19 **V. IMPACTS ON RELIABILITY**

20 Q. **How does OG&E measure reliability of their distribution system?**

21 A. System reliability is measured using three reliability indices: System Average  
22 Interruption Duration Index (“SAIDI”) and System Average Interruption Frequency  
23 Index (“SAIFI”). SAIDI measures the average time per year OG&E customers are  
24 without service. SAIFI measures the average number of interruptions a customer  
25 experiences.

26  
27 Q. **How do vegetation interruptions impact the reliability indices?**

28 A. The charts below illustrate the impact of tree related incidents on reliability indices since  
29 2010. When the Company employed its System Hardening program, OG&E realized an  
30 improvement in reliability indices driven by a decrease in tree related incidents. Now  
31 that the program has ended, reliability is degrading as evidenced by the charts below.

Chart 4

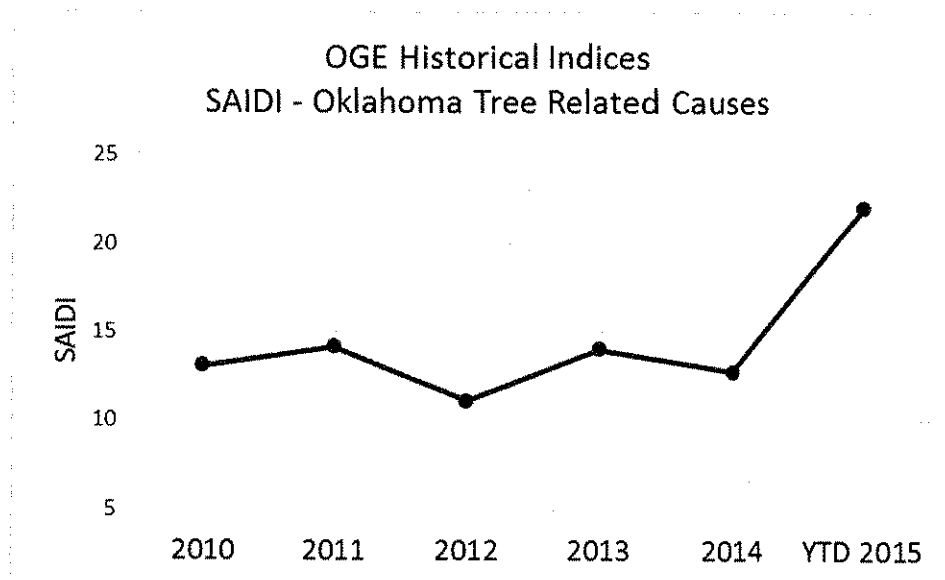
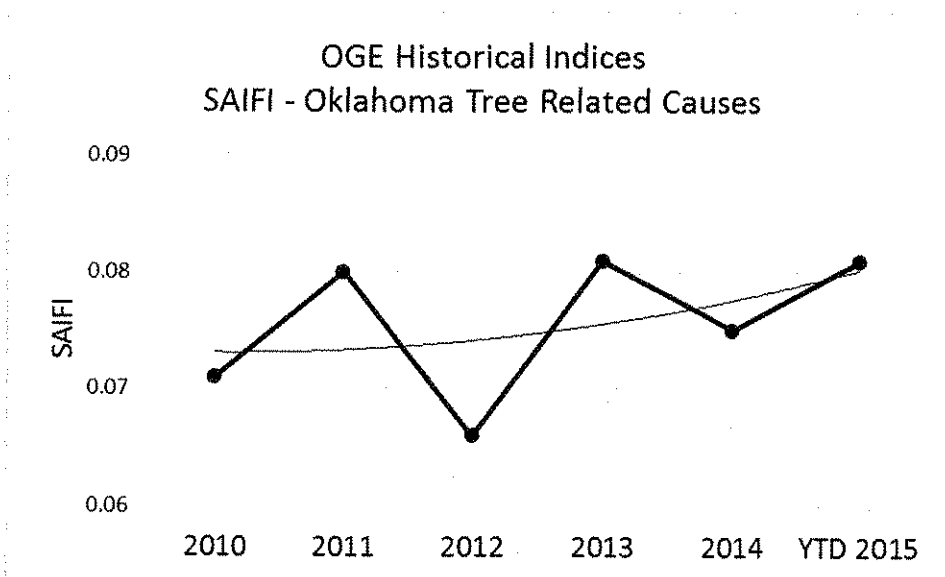


Chart 5



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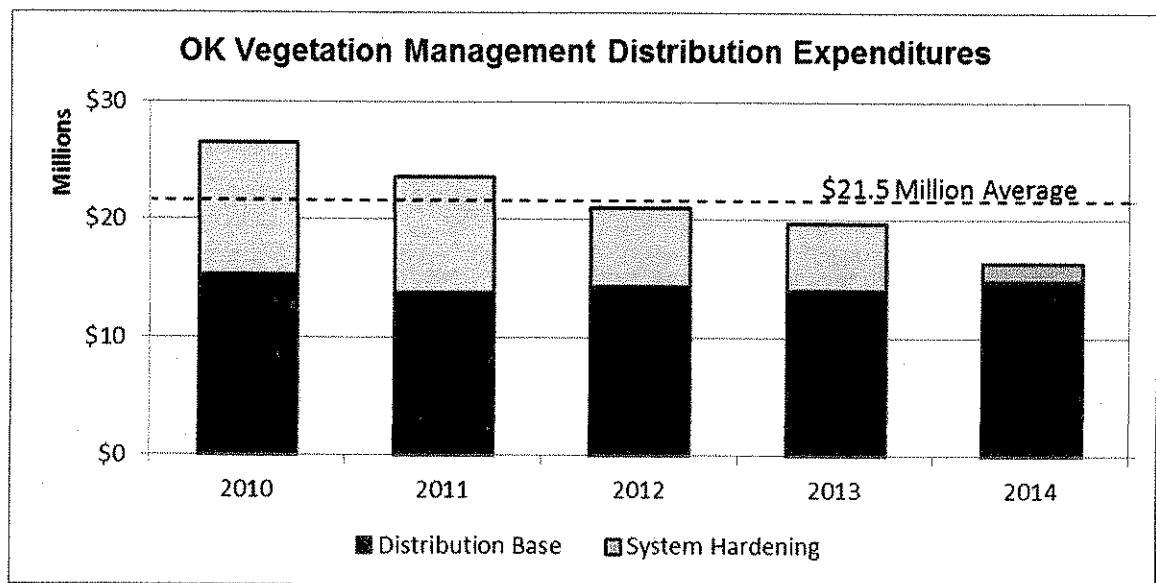
VI. HISTORIC SPENDING AND INCREASING COSTS

Q. What has OG&E historically spent on distribution vegetation management work?

A. Historically, OG&E used approved System Hardening Rider dollars in addition to its base rates to fund vegetation management activities, which on average was an annual

1 spend of approximately \$21.5 million. Chart 6 below details OG&E's historic spend. As  
2 you can see from the chart, OG&E's base spending for distribution vegetation  
3 management work has remained relatively steady since 2010. However, the contribution  
4 to vegetation management from the System Hardening program has steadily declined.

Chart 6



5 Q. **What impact did the System Hardening Rider have on cycle maintenance?**

6 A. In Cause No. PUD 201100087, the Commission approved additional spending under the  
7 System Hardening Rider to facilitate the 4 year cycle requirement per OAC 16:35-25-15.  
8 This Rider was necessary and enabled OG&E to adequately address its vegetation  
9 management needs consistent with the 4 year cycle. Once the System Hardening dollars  
10 expired, OG&E quickly discovered that the amount of funding in base rates is not  
11 adequate to maintain the 4 year cycle requirement.

12  
13 Q. **What did the Company learn about vegetation management since the last rate case?**

14 A. As System Hardening dollars expired, it became evident that we needed to spend at a  
15 level closer to the distribution base combined with System Hardening dollars to maintain  
16 reliability and the 4 year cycle on a growing system. As we increased our knowledge of

1 the clearances and practices necessary for a 4 year cycle, we incorporated what we have  
2 learned into our processes.

3  
4 **Q. Without System Hardening dollars, would the Company have been able to**  
5 **effectively implement its 4 year cycle program?**

6 **A.** No.

7  
8 **Q. What level of funding is necessary to maintain the 4 year distribution cycle**  
9 **maintenance?**

10 **A.** To adequately fund the 4 year cycle plan the Company will need approximately \$23.4  
11 million/year. This increase over the \$21.5 million average annual spend is reflective of  
12 increased contracting costs, increased line miles and increased number of trees on the  
13 system.

14  
15 **Q. What level of funding is necessary to address distribution non-cycle work?**

16 **A.** To fund the non-cycle work the company will need approximately \$2.1 million/year.

17  
18 **Q. What level of funding is necessary to support distribution substation work?**

19 **A.** Distribution substation ground maintenance includes costs for mowing and herbicide  
20 application around Company facilities. These costs account for approximately \$360,000  
21 of the request in this case.

22  
23 **VII. CONCLUSION**

24 **Q. What is OG&E requesting in this case?**

25 **A.** OG&E is requesting approximately \$30 million total company vegetation management  
26 expense level. As discussed above, this includes \$23.4 million in distribution cycle work,  
27 \$2.1 million in distribution non-cycle work, \$360,000 in distribution substation work and  
28 \$4.5 million in transmission work.

29  
30 **Q. Does this conclude your direct testimony?**

31 **A.** Yes.