

*Requests for Information*

1 **Q. Provide documents indicating distribution substation equipment and relay**  
 2 **equipment backlogged work, indicating the number of inspection, maintenance,**  
 3 **testing, and repair jobs that were backlogged (not completed within time limits per**  
 4 **program priorities) at the end of 2011, 2012, and 2013. Explain why the backloggs**  
 5 **occurred.**

6  
 7 A. Substation inspections are done monthly. The Company sets appropriate targets for the  
 8 completion of preventative maintenance activity on different types of substation  
 9 equipment and tracks successful completion.

10  
 11 Table 1 shows the targets and percentage of target completed for the Company’s  
 12 substation preventative maintenance program for each of 2011, 2012 and 2013.  
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**Table 1**  
**Substation Preventative Maintenance**  
**Targets and Percent Completed by Year**  
**2011-2013**

Preventative Maintenance	2011		2012		2013		Average %
	Target <sup>1</sup>	% <sup>2</sup>	Target <sup>1</sup>	% <sup>2</sup>	Target <sup>1</sup>	% <sup>2</sup>	
Substation Inspections	1624	95	1625	89	1290	96	93
Equipment Oil samples	452	97	474	98	459	98	98
Tap 4 Vibration Analysis <sup>3</sup>	-	-	66	86	70	93	90
Relay Maintenance <sup>4</sup>	176	63	128	45	120	106	70
Battery Maintenance	396	97	382	85	427	83	88
Thermography Inspection	131	98	131	99	187	98	98
Portable Substation Maintenance	3	100	3	100	3	100	100
Power Transformer Maintenance	16	50	16	63	16	106	73
Breaker Maintenance <sup>5</sup>	36	69	36	94	36	89	84

15 Preventative maintenance activities are undertaken weekly, monthly, quarterly, semi-  
 16 annually and annually.<sup>6</sup> These activities create hundreds of corrective maintenance work

<sup>1</sup> Target set for each year’s preventative maintenance program. Numbers vary from year to year based on the program established for that year.

<sup>2</sup> Percentage of target completed.

<sup>3</sup> Program was started in 2012.

<sup>4</sup> The Company replaced \$10.1 million of electromechanical relays between 2008 and 2012. See response to Request for Information PUB-NP-075.

<sup>5</sup> The breaker maintenance numbers include units that were either maintained or replaced. For the years 2011, 2012 and 2013, 12, 20 and 27 breakers were replaced, respectively. Please see response to Request for Information PUB-NP-074 for additional information on equipment replacements.

<sup>6</sup> Preventative maintenance activities such as monthly inspections are not considered as backlogged if they are not completed on schedule. These uncompleted inspections are not rolled forward into the next month such that 2 monthly inspections are required to be completed in 1 month.

1 activities each year ranging from replacing a heater in a recloser control cabinet to  
2 maintaining a high voltage switch because of a hot spot identified in a thermography  
3 inspection.  
4

5 At the end of 2011, 2012 and 2013 there were 5, 5 and 6 items of corrective work  
6 backlogged respectively as a result of inspections completed in the calendar year.  
7 Backlogged work typically results from unexpected circumstances resulting in delays of  
8 work. For critical work, the backlog may simply reflect that the work was completed  
9 through year-end.<sup>7</sup> For example, a cooling fan on transformer T3 at Hardwoods  
10 Substation was identified for corrective maintenance during a substation inspection on  
11 September 14<sup>th</sup>, 2013. The corrective maintenance activity on the cooling fan was  
12 scheduled to be completed by December 13<sup>th</sup>, 2013. The corrective maintenance activity  
13 was actually completed on January 28<sup>th</sup>, 2014. As the completion of the corrective  
14 maintenance activity on the cooling fan was still outstanding on December 31<sup>st</sup>, 2013 it  
15 was identified as backlogged.  
16

17 Inspection of distribution feeder reclosers in distribution substations is included in the  
18 monthly substation inspections. Unlike breakers which require maintenance, modern  
19 digital reclosers are considered to be maintenance free.<sup>8</sup> Therefore, the Company no  
20 longer has a separate preventative maintenance program for distribution reclosers. When  
21 substation inspections identify an issue with a distribution feeder recloser it is scheduled  
22 for replacement or repair. If replacement is required, and site conditions permit, the  
23 Company will replace legacy hydraulic reclosers with modern automation capable digital  
24 reclosers.  
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26 Inspection of voltage regulators in distribution substations is also included in the monthly  
27 substation inspections. When substation inspections identify an issue with a voltage  
28 regulator it is scheduled for refurbishment, replacement or repair. Historically, the most  
29 significant cause of deterioration of voltage regulators has been corrosion. The Company  
30 now exclusively purchases voltage regulators with stainless steel tanks. Voltage  
31 regulators with deteriorated mild steel tanks are now replaced and not refurbished.<sup>9</sup>  
32 Therefore, the Company no longer has a separate preventative maintenance program for  
33 voltage regulators.

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<sup>7</sup> All backlogged jobs as at year-end 2011 and 2012 are complete. 4 of the 6 backlogged jobs at year-end 2013 are also complete. The remaining 2 2013 backlogged jobs are considered non-critical and will be done later in 2014 as they require a substation outage to be completed.

<sup>8</sup> 98 of 200 distribution feeder reclosers in service are modern automation capable digital reclosers, 56 of which have been purchased since 2004. See response to Request for Information PUB-NP-074.

<sup>9</sup> 157 of 360 voltage regulators in service have been purchased since 2004. See response to Request for Information PUB-NP-074.