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**BEFORE  
THE PUBLIC UTILITIES COMMISSION OF OHIO**

In the Matter of the Commission :  
Consideration of a Settlement Agreement : Case No. 03-2570-EL-UNC  
between the Staff of the Public Utilities :  
Commission and Columbus Southern Power :  
Company and Ohio Power Company. :

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**MOTION FOR ACCEPTANCE OF THE STIPULATION AND  
SETTLEMENT AGREEMENT  
ON BEHALF OF THE STAFF OF  
THE PUBLIC UTILITIES COMMISSION OF OHIO**

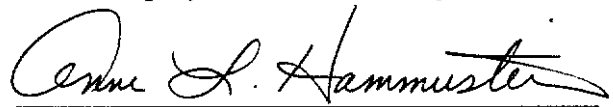
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The Staff of the Public Utilities Commission of Ohio moves the Commission to accept and adopt the stipulation and settlement filed pursuant to §4901:1-23-04, Ohio Admin. Code on December 31, 2003 in this docket.

Respectfully submitted,

**Jim Petro**  
Attorney General

**Duane Luckey**  
Senior Deputy Assistant Attorney General



**Anne L. Hammerstein**  
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**MEMORANDUM IN SUPPORT**

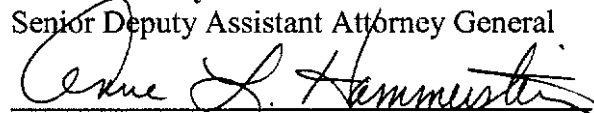
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The Staff, Ohio Power and Columbus Southern Power negotiated and reached an agreement pursuant to Ohio Administrative Code §4901:1-23-04. This agreement represents a framework to address issues raised in a document entitled, *Staff Concerns and Recommendations about Columbus Southern Power Company and Ohio Power Company's Provision of Electric Services* (Attachment) regarding the Companies provision of electric distribution service to certain rural areas in the state. The agreement also provides a means to measure improvements in the Companies' distribution service quality over the next two years. The Staff recommends that the Commission adopt this agreement as it was seriously negotiated by knowledgeable parties, benefits ratepayers and the public interest, and does not violate any important regulatory principle or practice. *In the Matter of the Application of the Cincinnati Gas & Electric Company for Authority to Amend Filed Tariffs to Increase the Rates and Charges for Electric Service*, Case No. 91-410-EL-AIR, Order on Remand (April 14, 1994).

Respectfully submitted,

**Jim Petro**  
Attorney General

**Duane Luckey**  
Senior Deputy Assistant Attorney General



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**CERTIFICATE OF SERVICE**

I hereby certify that a true copy of the foregoing **motion for acceptance of the stipulation and settlement entered into between the Staff, Ohio Power Company and Columbus Southern Power Company** submitted on behalf of the Staff of the Public Utilities Commission of Ohio was served by regular U.S. mail, postage prepaid, or hand-delivered to the following parties of record, this 31st day of December, 2003.



**Anne L. Hammerstein**

**Parties of Record:**

Henry Fayne  
1 Riverside Plaza  
Columbus, Ohio 43215-2355

**Staff**  
**Concerns and Recommendations**  
**About**  
**Columbus Southern Power Company**  
**And**  
**Ohio Power Company's**  
**Provision of Electric Service**

**May 1, 2003**

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## Introduction

The purpose of this document is to outline the concerns Staff has with Columbus Southern Power (CSP) and Ohio Power's (OP), (the Companies) provision of electric distribution service in their rural Ohio service territories. In addition, Staff has made recommendations to the Companies on ways to improve service to their customers.

### Reported "Worst Performing Circuits" (ESSS Rule 11)

ESSS Rule 11 requires that the EDUs report their four percent "worst performing circuits" for the twelve-month periods ending June 30 and December 31 each year.<sup>1</sup> Staff's review of the reports for CSP and OP revealed that the Companies' "worst performing circuits" located in the more rural areas continued to experience high numbers of controllable outages<sup>2</sup>. Many of these rural circuits were being repeatedly reported on the "worst performing circuits" list from one year to the next.

As shown in the table below, 29 of the circuits investigated have appeared on the four percent worst circuits list more than once during the most recent 5-year period. Three of these circuits have been on the worst-circuits list for all five years appearing in the table. Numbers in parentheses indicate the circuit's ranking on the worst-performing list. "( )<sub>1</sub>" indicates circuit ranking from a mid-year report. Year 2002 data is also from a mid-year report. A ranking number of "(1)" indicates the worst circuit in the ranking. Note that the table contains several low numbers, which means that some of the Companies' "worst of the worst" circuits are being repeated.

**Repeated Listings on the Worst-Performing Circuits Report**  
Circuit rank appears in parentheses ( )

Company / Region	Circuit Number	1998	1999	2000	2001	2002
CSP / Columbus Region	0229-04				(1)	(1)
	0166-02	(2)			(2)	(4)
	0136-02	(1)			(3)	(3)
	0230-03				(4)	(5)
	0136-03				(5)	(6)
	0191-32			(2)	(6)	(9)
	0131-02	(3)		(4) <sub>1</sub>	(7)	
	0149-01				(10)	(18)
	0226-06			(1)	(11)	(2)
	0103-01				(13)	(12)
	0145-01				(15)	(19)

<sup>1</sup> Each reporting period overlaps six months of the preceding reporting period.

<sup>2</sup> "Controllable outages" means electric service outages which the Company could prevent by performing proper inspections and maintenance. The following examples illustrate the meaning: Completing proper vegetation management "controls" outages caused by trees located inside the Company's right-of-way, "controls" wind related outages, and "controls" momentary service interruptions. Performing thorough inspections of the circuits to detect deteriorated equipment/facilities, loose connections, faulty lightning arresters and performing follow-up preventative, corrective action as required by ESSS Rule 27 can "control" outages caused by deterioration, hardware failures, loose connections, lightning, etc.

	0179-01			(3)	(17)	
OP / Columbus Region	4217-02	(3)	(2)	(1)	(1)	(1)
	4012-04		(1)	(3) <sub>1</sub>	(3)	(10)
	4123-01			(3)	(4)	(6)
	4243-01		(4)		(6)	(8)
	4295-01			(1) <sub>1</sub>	(8)	
	4042-03				(10)	(3)
	4065-02				(11)	(7)
OP / Ft Wayne Region	1094-02	(10)			(5)	(8)
	2308-02				(7)	(15)
	1085-01				(10)	(7)
	5007-02			(7)	(12)	
	5154-01	(4)	(3)	(5)	(14)	
	5015-04				(16)	(13)
	1041-03			(7) <sub>1</sub>	(17)	
	1246-01	(1)	(8)	(14) <sub>1</sub>	(18)	(3)
	5143-01			(10)	(20)	
	1184-02	(15)	(6)	(11)	(22)	(17)

The repeatedly reported circuits gave Staff concerns about the effectiveness of the Company's remedial actions.

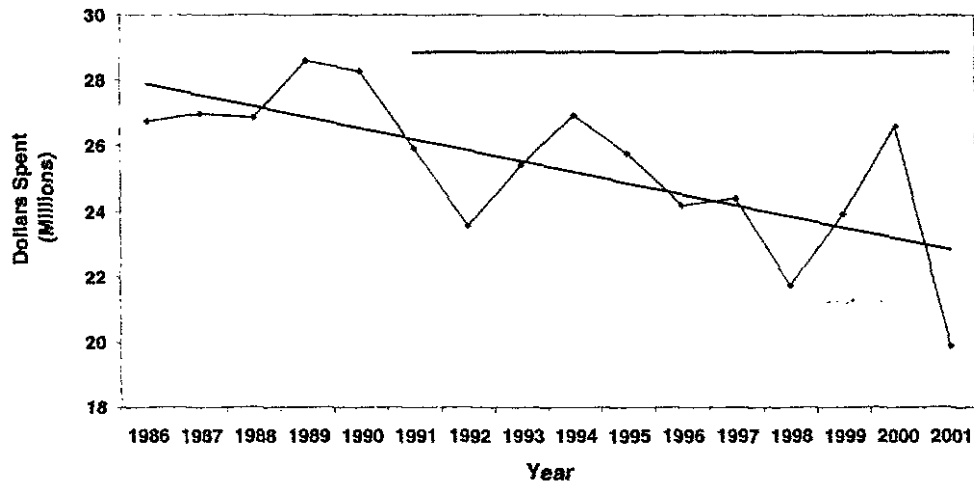
#### Reduced Capital and Maintenance Expenditures (ESSS Rule 26)

ESSS Rule 26 (B) requires EDUs to report their annual capital expenditures for distribution facilities as well as capital budgets for the four succeeding years. The Companies' ESSS Rule 26 annual reports for years 2000 and 2001 reveal that they have decreased their capital spending. Although the Companies planned to spend \$142.684 million in 2001 on capital projects for their distribution systems, their actual capital expenditures for 2001 were only \$109.063 million, a shortfall of \$33.621 million (or 24 percent below budget). The Companies reported in their 2000 annual report that they planned to spend \$148.878 million in 2002; however, their 2001 annual report shows that they reduced their budget for 2002 to \$124.743 million, a reduction of \$24.135 million (or 16 percent below the previous projection). These reports also show decreased capital spending plans of \$31.362 million and \$28.712 million for years 2003 and 2004, respectively. Staff is concerned that these reductions in distribution system capital spending may impact future distribution system reliability and safety.

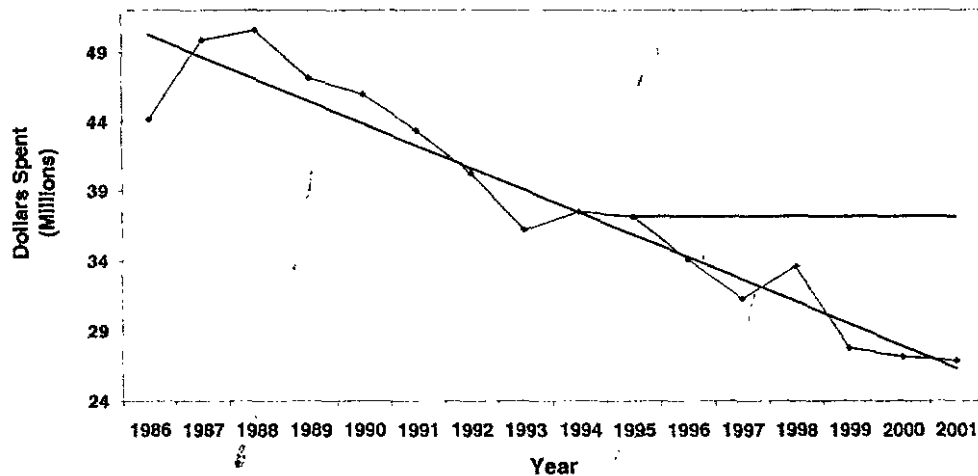
ESSS Rule 26 (B) also requires EDUs to report their distribution maintenance expenses for the reporting period. Because this data is also required to be filed with the Companies' FERC Form 1 Annual Reports, the Staff was able to review the Companies' distribution maintenance expense data for the last sixteen years. Staff found that both Companies significantly reduced their expenditures for distribution maintenance during 2001. The following charts illustrate the Companies' declining trends in distribution maintenance expenditures for 1986 through 2001.<sup>3</sup>

<sup>3</sup> Distribution maintenance expenses for years 1986 through 2000 are stated in 2001 dollars.

### CSP Distribution Maintenance Expenditures



### OP Distribution Maintenance Expenditures



The horizontal line located on the two charts above represents the Companies' annual jurisdictional distribution maintenance expense that the Commission authorized the Companies to recover through base rates in their most recent base ratemaking proceedings (these expenses are stated in 2001 dollars consistent with all other expense data included on the chart).

In CSP's last base rate case (Case No. 91-418-EL-AIR), the Commission granted the Company's request for an additional allowance of \$2,249,605 above the Company's 1991 jurisdictional distribution maintenance expense. The Commission authorized the Company to recover \$28,849,990 for annual jurisdictional distribution maintenance expense through its approved base rates. The chart titled "CSP Distribution Maintenance Expenditures" shows that CSP under-spent a total of \$46,157,887 for the period 1992 through 2001 (CSP's current base rates became effective in 1992).

In OP's last base rate case (Case No. 94-996-EL-AIR), the Commission authorized the Company to recover \$37,189,425 for annual distribution maintenance expense through its approved base rates. The chart titled "OP Distribution Maintenance Expenditures" shows that OP under-spent a total of \$42,356,125 for the period 1996 through 2001 (OP's current base rates became effective in 1995).

### Customer Complaints

In 2002, Staff noticed a substantial increase in the number of service-related contacts from CSP and OP customers to the Commission's Public Interest Center (PIC). These contacts generally dealt with numerous and/or lengthy service interruptions. Attachment 1 shows that the service interruption contacts more than doubled from year 2001 to year 2002. The following table summarizes the attachment.

<u>Company</u>	<u>Momentary</u>		<u>Out of Service</u>		<u>Total</u>	
	<u>2001</u>	<u>2002</u>	<u>2001</u>	<u>2002</u>	<u>2001</u>	<u>2002</u>
CSP	28	55	64	198	92	252 *
OP	17	32	38	130	55	161 *
CSP & OP	45	87	102	328	147	413

\* Signifies that the totals for 2002 includes one contact concerning both momentary interruptions and out of service.

In addition to these PIC contacts, the Commission began receiving complaints from several rural communities about numerous and/or lengthy service interruptions. These complaints are described in the following paragraphs.

- On October 16, 2001 the Hardin County Economic Development Council complained about a frequent disruptive pattern of outages that included "brown outs" and "power surges" resulting in manufacturing and sales losses and damage to computer equipment, refrigeration, compressors, and cash registers. The Council had made numerous attempts to discuss these problems with AEP, but felt they were being ignored. As a result, the Council scheduled a public meeting to have AEP present a plan of action to improve service reliability to the community. Representatives from the state legislature and the Commission Staff attended the meeting. As part of its investigation of this complaint, Staff reviewed the outage history on OP Circuit Nos. 2016-06 and 2016-07, which serve this community. It was found that lightning, tree, deterioration, animal/bird, and hardware failure were the top five causes of outages on these circuits. Staff's

investigation also revealed that both of these circuits have been reported by the Company as being "worst performing circuits".

- Between December 16, 2001 and January 4, 2002, the Commission received five complaints from residential CSP customers in the Athens area. The customers complained about frequent and lengthy electric outages. Staff reviewed the outage history on CSP Circuit Nos. 0229-04, 0230-02, 0230-03, and 0230-04, the circuits that serve these customers. The review revealed that deterioration, tree, animal/bird, lightning, and "unknown" factors were the top five causes of outages on these circuits. One of these circuits (No. 0229-04), has been ranked as CSP's overall worst circuit for the two most recent reporting periods. Another one of these circuits (No. 0230-03), has been ranked as one of CSP's overall worst five circuits for the three most recent reporting periods<sup>4</sup>.
- On May 30, 2002 the Commission received a complaint from the Carroll County Economic Development Council about numerous power outages due to the Company's not properly clearing the vegetation from its right-of-ways and due to deteriorated facilities. The Council also expressed concern about the distance from the Company's nearest service center. Staff reviewed the outage history on OP Circuit No. 1085-01, the circuit that serves the Carroll County communities of Bowerston, Dellroy, and Leesville. The top five causes of outages on this circuit were tree, unknown factors, deterioration, lightning, and animal/bird. Staff's investigation also revealed that this circuit has been ranked as one of the overall worst ten circuits in the OP's Ft. Wayne Region for the three most recent reporting periods<sup>5</sup>.
- On September 3, 2002 the Commission received a complaint in the form of a petition sent by the City of Nelsonville, including 116 petitioners in the Nelsonville area. These customers complained about the nuisance of numerous and long power outages. Staff reviewed the outage history on CSP Circuit Nos. 0101-01, 0101-02, 0101-04, 0101-05 and 0101-06, the circuits that serve these customers. Deterioration, tree, wind, lightning, and animal/bird were the top five causes of outages on these circuits. Staff's investigation also reveals that Circuit Nos. 0101-02, 0101-05 and 0101-06 have been reported as "worst performing circuits".

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<sup>4</sup> The table on page 5 titled "Repeated Listings on the Worst-Performing Circuits Report" only shows CSP Circuit No. 0230-03 being reported for 2001 (Ranked 4<sup>th</sup>) and 2002 (Ranked 5<sup>th</sup>). This circuit was also reported for the twelve-month period ending June 30, 2001 (mid-year report), ranked as the Company's overall worst circuit. The table only shows one report per calendar year period.

<sup>5</sup> The table on page 5 titled "Repeated Listings on the Worst-Performing Circuits Report" only shows OP Circuit No. 1085-01 being reported for 2001 (Ranked 10<sup>th</sup>) and 2002 (Ranked 7<sup>th</sup>). This circuit was also reported for the twelve-month period ending June 30, 2001 (mid-year report), ranked as the Company's 10th worst circuit in its Ft. Wayne Region. The table only shows one report per calendar year period.

Besides the fact that these community complaints came from rural areas of the Companies' service territories, they also involved numerous power outages caused by similar factors. Those factors are deterioration, tree, lightning, and animal/bird. Staff believes that the Companies have control over these factors and can prevent them from causing outages on their distribution circuits.

### **Tree Trimming**

ESSS Rule 27 requires each EDU to have a preventative tree trimming program. The companies are required to follow their preventative tree trimming program and to submit any proposals to change their program to the Commission Staff before implementing the changes.

Trees are perhaps the biggest potential cause of outages. An EDU's distribution reliability, therefore, depends to a great extent on the effectiveness of its preventative tree trimming program. Electric utilities have the authority and responsibility to maintain adequate tree clearance by trimming trees located within their right-of-way, which extends 15 feet on either side of the electric wires. For nearly all of the 41 circuits Staff investigated, the Companies reported significant numbers of controllable outages caused by trees located within the company's right-of-way. For several of the investigated circuits, controllable tree-caused outages were the most frequent outages on the circuit and caused the highest number of customer outage minutes.

According to AEP's tree trimming program (submitted to Staff for acceptance, as required by ESSS Rule 27), the Companies are to perform a complete tree trimming on each of their rural circuits every 4 to 6 years. During its investigation, however, Staff learned that the Companies utilize two other tree-trimming policies/procedures not included in their program. These include: (1) "hot spot" trimming (isolated trimming in response to tree-caused outages) and (2) postponing tree trimming until a circuit rises to the top 15 percent of worst performers due to tree-caused outages. According to the Companies' responses to Staff data requests, the Companies are substituting these tree trimming policies/procedures for the Companies' program (for complete tree-trimming on each circuit every four to six years). Staff believes these substitutions are not only insufficient, but also constitute unauthorized modifications to the tree trimming program previously submitted and approved under Rule 27 of the ESSS. Staff therefore considers the Companies in violation of ESSS Rule 27 (E)(2)(c), which requires that such modifications be submitted to Staff for acceptance.

### **Recommendation**

To ensure that CSP and OP both comply with ESSS Rule 27 (E)(2)(c), Staff recommends that the Companies follow the guidelines set forth in this rule when submitting modifications to their ESSS Rule 27 inspection, maintenance, repair, and replacement programs in the future.

In its investigation, Staff found that the Companies' tree trimming was insufficient to prevent the occurrence of many controllable tree-caused outages. Staff also noted several instances where controllable tree-caused outages recurred within a year after tree trimming was performed. Staff believes such recurrence indicates the Companies' prior tree trimming did not achieve sufficient clearance on all the trees that reside within its right-of-way, as required by the Companies' tree trimming program.

As an example, during the years 1999 and 2000, CSP performed tree trimming on 74 percent of Circuit No. 0187-01. Despite such prior trimming, 33 controllable tree-caused outages occurred (resulting in 397,618 customer outage minutes) on this circuit during 2001, when no additional trimming was performed. CSP has been unable to determine whether these 33 outages originated on that portion of the circuit where trimming had already occurred. In any event, the trimming that did occur was insufficient to prevent the 33 tree-caused outages.

As another example, OP reports that the last full-cycle tree trimming on Circuit No. 1041-03 was completed in 1998. During the years 2000 and 2001, this circuit experienced 92 outages caused by trees (resulting in 771,074 customer outage minutes). In 2001, OP only performed "hot spot" trimming on this circuit. Staff maintains that the 1998 trimming was not thorough if 92 tree-caused outages occurred in the second and third years following that trimming. Staff also considers "hot spot" trimming an insufficient response to such a high volume of tree-caused outages. Finally, Staff maintains that a thorough and proactive tree trimming program would have prevented most of the 92 tree-caused outages from occurring.

As a final example, OP reported that it took the following actions to address tree issues on Circuit No. 4243-01: "hot spot trimming" during 2000; "100% trimmed and sprayed" in 2001; and "no work scheduled" during 2002. Despite such activity, 19 controllable tree-caused outages (resulting in 149,820 customer outage minutes) occurred on this circuit in 2001 and 17 additional controllable tree-caused outages (resulting in 218,853 customer outage minutes) occurred in the first six months of 2002. Controllable tree-caused outages were the No. 1 cause of this circuit being reported in the most recent "worst performing circuits" report. The Company's vegetation management actions were ineffective in preventing controllable tree-caused outages less than six months after the actions were completed.

To the extent that many controllable tree-caused outages continue to occur, the Companies' tree trimming program is failing to meet the Rule 27 requirement for a preventative program.

### **Recommendations**

To reduce the number of controllable tree outages, Staff recommends that the Companies submit a more effective ESSS Rule 27 (E) vegetation control program.

Staff strongly suggests that the Companies consider a program that includes:

- a. Adopting a 4-year trimming cycle (as half of Ohio's EDUs have already adopted);
- b. Achieving full right-of-way clearance on each circuit within a 12-month period;
- c. Performing line patrols during the 3 years between cycles to identify fast growth likely to cause outages; and
- d. Conducting spot trimming as needed to remove such growth.

The program should include appropriate measurements and meaningful goals to gauge its effectiveness. The Companies would report their performance against these goals in their Rule 26 annual reports.

#### *Momentary Interruptions*

ESSS Rule 27(E)(1)(f) requires the Companies to maintain a preventative right-of-way vegetation control program. Such a program should mitigate against both sustained and momentary interruptions of service. Although the Staff's investigation of the 41 circuits was focused on the sustained outages experienced by the circuits, it has come to the Staff's attention (via complaints) that customers are also experiencing high numbers of momentary interruptions. Momentary interruptions occur when faults cause devices such as reclosers and circuit breakers to operate. The term "operate" means that these devices are designed to open and then close the circuit to allow the fault to clear. The operation may take up to a few seconds to clear the fault. Tree limbs coming into the circuit's phases/lines, wind causing phases/lines to come in contact with one another, and debris/objects such as toy kites coming in contact with the phases/line often are the causes of these momentary faults.

Momentary interruptions are becoming a nuisance to customers because devices such as computers, digital clocks, and electric motors with variable speed drives are so sensitive to voltage fluctuations that, when a momentary interruption occurs, these products generally shutdown and need to be reset or restarted.

As an example, Staff received a complaint from Dr. David Boyer of 5510 Red Bank Road, Galena, Ohio 43021. Dr. Boyer is a residential customer who complained about numerous momentary electric interruptions. Dr. Boyer, who is served by CSP Circuit No. 0049-02, reported experiencing 51 momentary interruptions in 2000, 45 in 2001, and 51 in the first 9 months of 2002. CSP personnel reported that they investigated the complaint and were able to account for 40 outages and momentaries in 2002. The Company also reported that this customer resides down line from a single phase recloser which could cause additional momentaries, but because the Company does not monitor this recloser it could not quantify those additional momentaries. The CSP investigator stated: "the customer's claim of experiencing 51 momentaries during 2002 is entirely believable; this is not a customer blowing things out of proportion." The investigator

reported finding areas of the circuit where vegetation was growing into the circuit; and the Company trimmed the trees to improve this customer's service. Later, CSP reported performing "spot trimming" on 107 trees and removing 8 other trees in response to the complaint.

As another example, Staff received a complaint from Ms. Beth Williams of 8552 Bennington Chapel Road, Centerburg, Ohio 43011. Ms. Williams is a residential customer of CSP, who complained of experiencing 25 electric service interruptions between the period July 9, 2002 and August 19, 2002. Upon further investigation, Staff found that the circuit serving Ms. Williams (CSP Circuit No. 0037-02) experienced 52 momentary interruptions and 11 sustained outages during the six-month period from February 4, 2002 to August 19, 2002. Staff also found that Ms. Williams and several of her neighbors were so disturbed over these service interruptions that WBNS-TV (Columbus, Ohio) interviewed these customers and ran a story on the poor service these customers were receiving. It was not until this community's complaint was publicized by the local media that the Company took action. In response to the complaint, the Company reported that "hot spot" tree trimming began on August 19, 2002 and would continue for the next several weeks. This should reduce the number of momentary outages due to trees.

A third example is a complaint that Staff received from Ms. Marilyn Pongrat of 32104 Clendening Lake Road, Freeport, Ohio 43973. Ms. Pongrat is a residential customer of OP, who complained of problems with service line outages. She reported experiencing 56 momentary outages between May 24, 2002 and September 4, 2002. Upon investigation, Staff found that the circuit serving Ms. Pongrat, OP Circuit No. 5150-01 experienced 94 sustained outages between the periods January 7, 2002 and October 7, 2002, and that 54 of those outages were caused by trees, with 30 being controllable. The Staff was unable to substantiate Ms. Pongrat's claim of experiencing the 56 momentary interruptions because when asked by the Staff, the Company responded that it does not have the ability to measure momentaries on this circuit at either the main circuit breaker or line device levels. In response to Ms. Pongrat's complaint, a Company Service Representative informed her that nearly all of the outages were caused by trees contacting the lines. The Company reported that this circuit has been foot-patrolled and tree trimmed as problems have arisen and that the circuit has also been sprayed, where permission is given, to help clear the underbrush.

In all three of these complaints, trees are the root cause of the excessive momentary interruptions. The Staff believes that the Companies have not been properly maintaining the vegetation within their right-of-ways on all three of these circuits. It also appears that the Companies are using circuit breakers and reclosers as substitutes for proper management of the vegetation within their right-of-ways.

The Staff believes it is a good practice for the Companies to install devices (such as automatic reset circuit breakers and reclosers) on circuits to prevent sustained outages whenever possible, but emphasizes that the use of these devices does not alleviate the Companies' obligation to follow their vegetation control program as required by ESSS Rule 27 (E)(1)(f).

### *Helicopter Trimming (Aerial Sawcutting)*

In 1995, the Companies began to utilize a helicopter to trim vegetation in sections of distribution circuits located in rural areas with dense vegetation inaccessible to other means of trimming. This method employs a series of saw blades suspended beneath a helicopter. In utilizing this method, the helicopter pilot attempts to guide the blades alongside the path of the circuit to clear vegetation from the Companies' right-of-ways.

There were two problems with the helicopter trimming: (1) the pilot did not have enough control of the blades to prevent them from severing the power lines; and (2) the pilot could not prevent the sawed tree limbs from falling into the electric lines. Both of these problems resulted in sustained outages to customers. One circuit in particular, OP Circuit No. 1184-02 experienced four sustained outages caused by helicopter trimming during calendar 2001. These four outages caused by the helicopter tree-trimming were the leading reason this circuit was reported as one of OP's "worst performing circuits".

Staff has three concerns with the helicopter trimming: (1) the Company should not have allowed the vegetation to become so dense within its right-of-ways that helicopter trimming seemed to be the only solution; (2) the Company should not use helicopter tree trimming if it causes more customer outages; and (3) the Company should not have left behind the debris in its right-of-way. The debris further adds to the undergrowth problem, which prevents the Company from being able to access the lines to maintain them or to restore service in the event of an outage. ESSS Rule 4901:1-10-06 requires each EDU to comply with the National Electrical Safety Code (NESC). NESC Subsection 213<sup>6</sup> requires that the EDUs keep overhead distribution facilities accessible to the Company to inspect and maintain its equipment.

### **Recommendations**

To ensure that the Companies utilize methods of right-of-way maintenance that comply with Subsection 213 of the NESC and do not adversely impact customer service, Staff recommends that the Companies:

1. Submit a plan that effectively keeps the access to their right-of-ways clear so that there are no restrictions in maintaining their facilities and that helps minimize restoration time.

The Staff would review the plan. Once the plan is accepted, the Companies should implement the plan, measure its implementation performance/results, and report them to Staff.

2. Employ trimming methods that do not result in more service interruptions to customers.

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<sup>6</sup> Titled, "Accessibility", under Section 21 General Requirements of Part 2 Safety Rules for the Installation and Maintenance of Overhead Electric Supply and Communication Lines.

## Wind Mitigation

ESSS Rule 27 (E)(1)(b) requires the EDUs to maintain programs for inspecting, maintaining, repairing, and replacing distribution conductors (electric lines). The Companies' program objective is "to identify and correct conductor deficiencies through inspection and maintenance activities on an on-going basis." Electric utilities can exercise some control over wind-caused outages by properly maintaining the sag on and spacing of each circuit's phases and neutral (the electric wires). Of the 41 circuits investigated, 13 were found to have experienced a high number of wind-caused outages. Out of those 13 CSP and OP circuits, CSP directly addressed wind mitigation on one of its circuits (Circuit No. 0149-01) by reconductoring (re-wiring) the area of the circuit where the wind-caused outages occurred. OP employed wind mitigation on one of its circuits (Circuit No. 5009-01) by patrolling for conductor clearance problems that would make the line susceptible to wind-caused outages. The Companies, however, did not report performing any inspections on the other eleven circuits where the wind-caused outages had occurred.

For one of these other 11 circuits (OP Circuit No. 5015-04), OP's only action was to add a protection zone to the section of the circuit where a majority of the wind-caused outages occurred. This action only isolates the rest of the circuit (upstream of this section) from outages (such as those caused by wind, trees, etc.) that would be experienced in the area within or downstream of this section. Basically, the customers upstream of this section would not be impacted by outages that occurred in the area within or downstream of this section, but those customers located within this section and downstream would be impacted. Staff believes the Company's action (adding a protection zone) does not address the root cause of the problem. The action allows the outages to occur while affecting fewer (33) customers. Before the Company added the protection devices (3 fuses) these outages would have affected 101 customers. When outages occur, the Company should locate the cause and take action to prevent future occurrences. It is a good practice to properly install protection zones throughout the circuits to isolate the effects of outages but such a practice should not be a substitution for actually identifying and addressing the cause of an outage and taking corrective action to prevent further outages.

Another way an electric utility can exercise control over wind-caused outages is by properly maintaining the vegetation within its right-of-ways. As mentioned above, all 13 of the circuits experiencing wind-caused outages were also found to have high numbers of controllable tree-caused outages. When asked to explain how the Company plans to proactively address outages caused by wind on Circuit Nos. 0229-04, 0230-03, and 0187-01, CSP responded by stating that a majority of the wind-caused outages impacting the performance of these circuits had been misclassified, and should have been classified as tree-caused outages. The Company then indicated that these outages would be addressed by AEP's vegetation management program. Earlier in this report, Staff has stated its concerns about the insufficiency of tree trimming on all three of these circuits prior to the

addition of these reclassified outages. The following examples illustrate the impact of this re-classification.

- The Company reports that Circuit 0187-01 was trimmed in 1999 and 2000, yet 33 controllable tree-caused outages (resulting in 397,618 customer outage minutes) occurred on this circuit in 2001. When the misclassified wind-caused outages are added to the controllable tree-caused outages, it results in this circuit experiencing 42 controllable tree-caused outages (resulting in 697,810 customer outage minutes) during 2001.
- The Company reports that Circuit 0229-04 was trimmed in 2000 and 2001, yet 3 controllable tree-caused outages (resulting in 702,606 customer outage minutes) occurred on this circuit in 2001. When the misclassified wind-caused outages are added to the controllable tree-caused outages, it results in this circuit experiencing 7 controllable tree-caused outages (that caused 1,157,650 customer outage minutes) in 2001. Also, in the first six months of 2002, this circuit experienced an additional 3 controllable tree-caused outages and one misclassified wind-caused outage. When these outages are added to the 2001 outages, the results show that this circuit experienced 11 controllable tree-caused outages (resulting in 1,698,622 customer outage minutes) within a short period after this circuit was reportedly trimmed.
- The Company reports that Circuit 0230-03 was last trimmed in 1997 and 1998, and had herbicide applied in 2001, yet 6 controllable tree-caused outages (resulting in 518,820 customer outage minutes) occurred on this circuit in 2001. When the misclassified wind-caused outages that also occurred in 2001 are added to the controllable tree-caused outages that occurred in the first six months of 2002, the results show that this circuit experienced 18 controllable tree-caused outages (that caused 2,090,912 customer outage minutes) in just an eighteen month period. The Company's response to these outages is to "spot trim" a small portion of this circuit in 2002. Staff notes that according to the Company's tree trimming program, submitted to Staff for acceptance (as required by ESSS Rule 27), the Company should have performed scheduled full trimming of this circuit in 2001. If the Company had followed its tree trimming program schedule and completed proper vegetation management steps, it is probable that these controllable tree-caused outages would not have occurred. Because the schedule was not followed and proper trimming was not completed, the Staff considers CSP in violation of ESSS Rule 27 (E)(1), which requires that electric distribution utilities "establish and maintain written programs, procedures and schedules for the inspection, maintenance, repair, and replacement of its distribution circuits and equipment. These programs shall establish preventative requirements for the electric utility to maintain safe and reliable service." Right-of-way vegetation control is one of these required programs (ESSS Rule 27 (E)(1)(f)). Although the Companies' program requires a full cycle trim every 4 to 6 years, they failed to meet this requirement.

Staff believes that both CSP and OP failed to comply with ESSS Rule 27 (E)(1)(b) by not following the objective of their distribution conductor inspection and maintenance program. Staff also believes that CSP failed to comply with ESSS Rule 27 (E)(1)(f) by not following the guidelines of its right-of-way vegetation control program.

### **Recommendations**

To ensure that the Companies' improve their mitigation efforts, the Staff recommends that the Companies:

- a. Thoroughly inspect a circuit immediately after any wind-caused outage to identify conductor clearance problems that would make the line susceptible to wind-caused outages. If the inspection identifies conductor clearance problems, immediate corrective action should be taken;
- b. Identify conductor clearance problems that would make the line susceptible to wind-caused outages when performing distribution circuit inspections as required by ESSS Rule 27 (D)(1). If conductor clearance problems are identified, implement immediate corrective action;
- c. Institute a policy that promotes identifying the root cause of an outage and taking action to prevent further outages rather than using protection zones (sectionalizing devices) as a substitute;
- d. Implement the vegetation management program as recommended in the section above titled "Tree Trimming" to prevent trees from being a factor that results in a wind-caused outage; and
- e. Correctly classify "tree related" outages caused during wind conditions as "tree-caused" outages.

### **Animal Mitigation**

ESSS Rule 27 (E) requires each EDU to establish and maintain preventative inspection and maintenance programs for distribution circuits and equipment to maintain safe and reliable service. EDUs can exercise some control over animal-caused outages by installing animal guards at various locations along their distribution circuits and also by adequately managing vegetation located within their right-of-ways. Out of the 41 circuits investigated, 21 were found to have experienced a high number of animal-caused outages. Of those 21 circuits, 20 also experienced a high number of controllable tree-caused outages. Therefore, the Staff concludes that there is a strong relationship between the number of animal-caused outages and the Companies' management of vegetation within their right-of-ways. Vegetation located within the right-of-ways allows animals access to the Companies equipment and facilities. As an example, overhanging limbs and branches allows animals such as squirrels and raccoons to climb down onto the conductor and poles, which gives them access to the equipment.

The Companies state that since they have no way to predict exactly which locations are more subject to animal contact, their policy is to install animal guards when responding

to animal-caused outages and when installing new equipment. For 11 of the 21 circuits, however, the Companies did not report installing any animal guards. When asked what was done to address the outages, they simply referred to the animal-mitigation policy. This leads Staff to believe that the Companies are not following their animal mitigation policy. As additional support for this conclusion, CSP Circuit Nos. 0229-04 and 0230-04 experienced 11 and 7 animal-caused outages respectively in 2001, yet the Company addressed these outages by only installing one animal guard on each of these circuits.

### **Recommendations**

To ensure that the Companies' improve their animal mitigation efforts, the Staff recommends that the Companies:

1. Implement the vegetation management program as recommended in the section above titled "Tree Trimming";
2. Strictly follow the Companies' policy, as stated above, on installing animal guards; and
3. Modify their inspection and maintenance program to require that distribution equipment is properly protected from animal contact when performing distribution circuit and substation inspections as required by ESSS Rule 27 (D). If equipment is found to be unprotected, the Company should install animal protection.

### **Deterioration/Corrosion and Equipment/Hardware Failure**

ESSS Rule 27(D)(1) requires the EDUs to inspect at least one-fifth of their distribution circuits and equipment annually. In addition, the rule requires each EDU to develop and implement preventative programs to maintain safe and reliable service to its distribution customers. The Companies' preventative maintenance programs, established according to the requirements of ESSS Rules 26 and 27, require the Companies to prioritize circuit inspections and corrective actions based on circuit reliability performance.

According to the Companies' worst-circuits report for calendar 2001, most of the 41 circuits Staff selected to investigate had experienced outages caused by deterioration and corrosion, while several of them had outages caused by equipment/hardware failure. Such outages are considered controllable, and the Companies could have addressed these outages proactively so as to prevent future occurrences. Unfortunately, it appears the Companies were reacting to each outage as it occurred instead of taking preventative measures.

As an example, the table below shows the reporting periods when CSP Circuit No. 0131-02 was listed on the worst-circuit report as well as the associated numbers of outages caused by deterioration / corrosion.

<b>CSP Circuit Number 0131-02</b>	
<b>Reporting Period</b>	<b>Outages Caused by Deterioration /Corrosion</b>
Year-ending Dec/98	9
Year-ending Jun/00	12
Year-ending Dec/01	19
Total	40

Note that the number of deterioration/corrosion-caused outages increased during each of the three periods until calendar 2001, when there were 19 such outages resulting in 4,508 customer outage hours. Staff believes that had CSP performed a thorough inspection on this circuit and corrected all identified deficiencies prior to 1998, most of these 40 outages would not have occurred.

As another example, although its Circuit No. 4243-01 experienced 17 outages caused by hardware failure during years 2000 and 2001 combined, OP did not report any remedial action for these outages in its 2001 worst circuits report. When Staff asked for an explanation, OP responded that most of these outages represented a small percentage of customer outage minutes on this circuit. Staff then analyzed the 17 hardware failure-caused outages and found that 9 of them did have a significant impact on customers, as listed in the table below.

<b>OP Circuit Number 4243-01 - Years 2000 and 2001</b>		
<b>Hardware Failures Having Significant Customer Impact</b>		
<b>Date of Outage</b>	<b>Customers Affected</b>	<b>Length of Outage</b>
2/18/00	29	2 Hr. 46 Min.
3/18/00	51	2 Hr. 55 Min.
4/14/00	45	1 Hr. 12 Min.
4/18/00	35	2 Hr. 33 Min.
5/29/00	42	4 Hr. 30 Min.
7/12/00	1	26 Hr. 6 Min.
10/05/01	384	4 Hr. 44 Min.
12/17/01	42	3 Hr. 57 Min.
12/23/01	280	5 Hr. 3 Min.

Staff notes this circuit was again reported as a worst-performing circuit for the year ending June 2002, during which it experienced another 6 hardware failure-caused outages which resulted in 3,436 customer outage hours.

### **Recommendation**

The guidelines included in the Companies' inspection and maintenance programs require the Companies to prioritize those circuits that have reliability issues. To ensure that the Companies follow these guidelines and also ensure that they take a more preventative approach to outages

caused by deterioration/corrosion and equipment/hardware failures, Staff recommends that the Companies:

1. Comply with the Companies' existing program requirement to prioritize the inspection of "worst performing circuits" and to correct the identified deficiencies on the priority circuits list; and
2. Submit a standard timeline for correcting all deficiencies identified on the 20 percent of their circuits required to be inspected each year.

### **Pole Inspections and Treatment**

ESSS Rule 27 (E)(1)(a) prescribes that the EDUs establish and implement preventative inspection, maintenance, repair and replacement programs for the poles that form the foundation of their overhead distribution system. According to the Companies, the objective of their pole inspection and maintenance program is "to extend the service life of the Companies' pole assets through maintenance treatment applications and pole reinforcements." Wood poles are the foundation that supports the overhead electric equipment and facilities used to provide electric service to a majority of CSP and OP's rural customers.

#### *Pole Deterioration*

The Companies have reported that pole inspections and treatment have been performed on 10 of the 41 circuits Staff investigated. Staff is concerned about the unfavorable results of these inspections.

For example, upon reviewing the results of the pole inspections performed on CSP's Circuit No. 0158-03, Staff found that out of 197 poles inspected, 48 (almost 25 percent) were identified as "reject" poles (a "reject" pole is one that is found to be needing replaced or structurally reinforced). Additionally, the pole inspections performed on the circuits fed from CSP's 0170 substation show that out of 3,575 poles inspected, 476 (13 percent) were identified as reject poles. The results for CSP's Circuit No. 0131-02, show that 202 (11 percent) of the 1,829 poles inspected were identified as rejects. Finally, pole inspections performed in the McConnelsville and Crooksville areas of OP's service territory, which includes OP Circuit 4012-04, shows that out of 4,374 poles inspected, 370 (8.5 percent) were found to be rejects. Staff is surprised by the high numbers of reject poles. Staff believes this is the result of the Companies not maintaining a pole inspection program for a number of years prior to the effective date of ESSS Rule 27. Staff also believes this deterioration not only has a major impact on the reliability and performance of the Companies' systems but also is a threat to public and employee safety.

### *Prioritization of Pole Inspections*

CSP's ESSS Rule 27 preventative pole inspection and treatment program guidelines require the Company to prioritize those areas where performance and reliability have been issues. In its review, however, Staff found that the Company did not prioritize some of its "worst performing circuits" for pole inspections.

For example, the Company completed pole inspection and treatment on Circuit No. 230-02 prior to scheduling pole inspections and treatment for two other circuits which have been repeatedly reported as "worst performing circuits" (Circuit No. 229-04 and Circuit No. 230-03 each serving over 1,200 customers). Circuit No. 230-02 (which was inspected first) has never been reported as a "worst performing circuit". The Company reports that it has scheduled these two "worst performing circuits" for later inspections and treatment in 2003 and 2004, respectively.

As another example, one of the 10 circuits inspected, OP Circuit No. 4217-02, was reported as the worst circuit on the Company's worst-performing circuits report for the last three years (2000 – 2002). Despite this fact, the Company did not prioritize the scheduling of this circuit's pole inspection and treatment until 2002.

Because the Companies did not follow their guidelines for prioritizing circuits for pole inspections and treatment, the Staff considers both CSP and OP in violation of ESSS Rule 27 (E)(1), which requires that EDUs "establish and maintain written programs, procedures and schedules for the inspection, maintenance, repair, and replacement of its distribution circuits and equipment. These programs shall establish preventative requirements for the electric utility to maintain safe and reliable service." Pole inspections and treatment is one of these required programs. (ESSS Rule 27 (E)(1)(a))

### **Recommendations**

To ensure that CSP and OP both comply with ESSS Rule 27 (E)(1)(a), Staff recommends that the Companies follow the prioritization guidelines set forth in their pole inspection and treatment program.

### *Record-Keeping Issues*

One of the ways Staff attempted to assess the condition of the 41 circuits Staff had selected was to review the results of pole inspections. For 3 of the circuits inspected, however, the Company claims it is unable to specifically report the number of poles it inspected and the number of poles it determined needed to be reinforced or replaced. These circuits are identified as CSP Circuit Nos. 0149-01 and 0170-01, and OP Circuit No. 4012-04. For Circuit Nos. 0149-01 and 0170-01, CSP claims that several circuits

were inspected that originated from substations (0149) and (0170). For OP Circuit No. 4012-04, the Company claims that the circuits in the McConnellsville Area and Crooksville Area were combined in the 2000 pole inspection data. Because of these claims, the Companies are unable to distinguish the number of poles inspected for any one particular circuit.

However, as the result of an audit it performed in 2001 of the Companies' pole inspection program, Staff believes that the Companies have the capability to identify how many and what poles were inspected on each of their circuits as well as how many were found to be faulty. If the Companies did not maintain appropriate pole inspection records that enable them to associate the poles inspected with their respective circuits, then it would be difficult for the Companies to conduct their pole inspection program as well as to effectively prescribe and implement remedial action for "worst performing circuits".

### **Recommendations**

Staff recommends that the Companies correct their record-keeping to reflect the pole inspections and resulting actions for each circuit.

### *Contractor Issues*

While performing the audit on CSP and OP's distribution pole program, Staff learned that the Companies hired contractors to perform their pole inspections and treatment for years 2000 through 2003. In addition to reporting the results of the pole inspections, the contractors were also required to report the following defects found with the pole being inspected as well as the poles adjacent to it:

- Broken or split cross arm
- Broken conductor strand
- Broken/missing ground wire molding
- Broken/missing guy guard
- Broken insulator
- Lightning damage
- Leaking oil from equipment such as transformers
- Overload signal on transformer
- Slack or broken guys
- Broken or damaged cutout
- Fire damage
- Broken ground wire
- Identification No. missing
- Damaged lightning arrester
- Loose hardware
- Loose tie wire
- Pulled/damaged anchor
- Leaning poles
- Unauthorized attachments

According to the transcripts of testimony admitted to the record in Case No. 02-0046-EL-CSS, Brian Tomlin vs. Columbus Southern Power Company, CSP Witness Caroline Irion testified that the work performed by one of the pole contractors was unreliable. Ms. Irion stated that the contractor was performing the ground line inspections but not performing the above-ground line inspections or the inspections of the attached equipment and hardware of the pole being inspected and on adjacent poles as the contract required. (Volume II, Page 117-120)

### **Recommendation**

Staff recommends that the Companies fully enforce their pole inspection and treatment contract.

### **Lightning Mitigation**

ESSS Rule 27 (D)(1) requires each EDU to inspect at least one-fifth of its distribution circuits and equipment annually. In addition, each EDU is also required to develop and implement preventative programs to maintain safe and reliable service to its distribution customers. Although the Companies are not required to have a program specifically targeted at lightning mitigation, the Companies do have a lightning mitigation policy.

EDUs can exercise some control over lightning-caused outages by installing lightning arresters at various locations along their distribution circuits. In the course of protecting the distribution system, the lightning arrester may itself be damaged by lightning and thus be rendered inoperable. Therefore, the extent of a circuit's lightning protection depends not only on the number of lightning arresters installed on the circuit but also on how many remain operable.

Nearly all of the 41 circuits Staff investigated had experienced some lightning-caused outages during the year 2001. During that period, for example, OP Circuit No. 4217-02 experienced 12 lightning-caused outages resulting in over a half million customer outage minutes. As a more recent example, eight of the 23 outages incurred by OP Circuit No. 4217-02 during a 4-month period from May to September 2002 were caused by lightning.

As part of its investigation, Staff attempted to assess the degree of lightning protection on the circuits that had experienced lightning-caused outages. Accordingly, Staff asked the Companies how many lightning arresters had been installed on the circuit and how many of those lightning arresters were still operable. The Companies could not provide any data, except for a few circuits which had been recently inspected. The Companies could neither report how many lightning arresters had been installed nor how many had been rendered inoperative. To illustrate the impact of this deficiency, Staff found that for one of the circuits which the Company had inspected, OP Circuit No. 1041-03, sixty-four (64) lightning arresters were found to be inoperative.

## **Recommendation**

Staff recommends that the Companies:

1. Modify their Rule 27 (D) inspection program to also include determining the number and location of operable and inoperable lightning arresters, and to replace inoperable lightning arresters<sup>7</sup>; and
2. Install lightning arresters on any unprotected equipment (i.e., transformers, reclosers, voltage regulators, capacitors, sectionalizing equipment, and etc.) found during the inspections.

### *Mitigation in Response to Lightning-Caused Outages*

According to the Company's prior "worst performing circuit" reports, OP used line patrols to locate bad arresters when circuits experienced a high number of lightning-caused outages. As an example, OP reported that Circuit No. 4012-04 to have experienced 15 lightning-caused outages in calendar year 1999 and 12 such outages in the subsequent reporting period. To address these outages (per the latter report), the Company issued orders to inspect the quantity and operability of arresters (and for grounding) on this circuit and correct deficiencies as needed. The Company reported that these actions should decrease the number of lightning-caused outages. Staff agrees with the Company's response to the lightning-caused outages experienced on Circuit No. 4012-04. However, Staff believes the Company should have taken this action in 1999, after the first series of lightning-caused outages, instead of waiting until after there were an additional 12 lightning-caused outages during the following reporting period. The Staff believes that some of these latter outages could have been prevented by a more timely inspection.

## **Recommendation**

Staff recommends that the Companies modify their lightning-mitigation policies to require that after a circuit has experienced a high number of lightning-caused outages, the circuit must be inspected for the quantity and operability of lightning arresters, for grounding, and that any deficiencies must be corrected.

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<sup>7</sup>In one area of OP's service territory, its managers ordered just such an inspection specifically to locate bad lightning arresters. For OP Circuit No. 2314-01, Staff asked the Company about specific outages that were caused by deterioration. One of those outages was reported as caused by a "deteriorated" lightning arrester originally installed to protect a distribution transformer. In response, the Company ordered that the circuit be patrolled specifically for bad lightning arresters beginning on October 30, 2002 and to be completed by the end of the year.

## **Load Transfer**

ESSS Rule 27 (E) prescribes that the EDUs establish and implement preventative inspection, maintenance, repair and replacement programs. In its investigation of CSP's "worst performing circuits", Staff identified an instance where the Company is planning to transfer a section of its "worst performing circuit" to another circuit. Although this circuit experienced a number of outages caused by deterioration, animal, tree and lightning on Circuit No. 0229-04, the Company did not plan remedial action for these specific outage causes. Instead, the Company plans to transfer this section (including 437 residential customers) to CSP Circuit No. 0113-01 (also referred to as Elliott 0113-01). The Company reports that this transfer is planned for late 2003 and will reduce the remaining customers' exposure to outages on Circuit No. 0229-04, but it will increase the outage exposure for those customers that are already served by Elliott 0113-01. To mitigate this exposure, the Company plans to add circuit protection to the transferred section. This means that if an outage occurs on the section being transferred, the installed protection devices will isolate the effects of the outage to only those customers that were transferred without reducing their exposure to outages.

Staff finds that this transfer does not improve the service to those 437 customers being transferred. The Staff is not opposed to EDUs transferring customers from one circuit to another if it improves the service rendered to those customers being transferred. In this case, rather than improving the service provided to those customers, the transfer only masks the problem. Staff is concerned that such a masking might become a routine "remedy" that perpetuates customer outage problems.

## **Recommendations**

Staff recommends that the Companies take preventative actions to address the root causes of controllable outages on all circuits, including any section planned for transfer.

## **Outage Restoration**

ESSS Rule 11 requires EDUs to report their "worst performing circuits", the outage causes, and remedial actions. Two of CSP's worst circuits were reported due to an outage caused by the failure of a single pole. On November 6, 2001 at approximately 1:30 a.m., a thirty-one hour outage occurred on CSP Circuits 0136-02 and 0136-03. This outage actually caused both of these circuits to be reported as "worst performing circuits" for calendar year 2001. A total of 1,545 customers (including a Bob Evans Sausage factory) suffered the entire length of the outage, which was caused by a single broken pole. This is a critical pole location because of the quantity of hardware and equipment attached, including 4 sets of crossarms (two sets for each circuit), a single-phase primary line, a single-phase transformer, service drops, two down guys and a missing down guy.

Because of this outage's impact on both of these circuits, Staff asked for the Company to provide a detailed chronology of restoration efforts. The Staff reviewed the chronology and found the following:

- It took CSP 2 hours to locate the source of the fault causing this outage. Staff believes that when the circuit breakers on both circuits were discovered to be locked out, the servicer that was called out to patrol should have been searching in the areas known to be critical that would affect both circuits, such as this pole. Staff believes that CSP was too slow in discovering the origin of the fault that caused the outage.
- It took CSP more than 3 hours to get a replacement pole to the fault site. This leads the Staff to believe that CSP's restoration personnel did not have adequate access to materials and supplies in order to expedite the restoration of the circuits affected by this outage. Not having the proper splicing hardware available was more evidence that Company personnel did not have adequate access to materials and supplies.
- CSP reported that at "7:30 a.m. in the morning of the day the outage occurred, two more Line Mechanics were sent to assist after they reported to work at their normal start time." Staff believes that between 3:30 a.m. and 4:30 a.m., the Company knew the size and scope of the restoration efforts and should have called these 2 Line Mechanics to report to the site at that time rather than wait till they reported to work (at 7:30 a.m.). Knowing the criticality of the pole to the operation of the 2 circuits affected, Staff believes that the Company should have dedicated more manpower to the restoration efforts (than the 7 line personnel involved). Staff believes that 31 hours is too long to restore service when all that is basically required is the replacement of one pole.

#### *Location of Service Centers*

For 13 out of the 41 circuits being investigated, the Companies reported that the distance between the areas served (by each of these circuits) and location of the service centers (that support the maintenance and outage restoration needs of these circuits) contributes to longer restoration times. Two of these 13 circuits were CSP circuits and the other 11 were OP circuits.

Staff requested that CSP explain how it planned to address the long restoration problem for Circuit No. 0131-02, located in the Athens District. The Company responded that it plans to implement more aggressive management of outages by assigning a duty supervisor and a back-up supervisor to manage after-hours outages. In Staff's opinion, this does not correct the root cause of the long restoration problem.

When asked how OP plans to address this problem with each of their 11 affected circuits, the Company's responded, for example (with respect to Circuit No. 5009-01): "there are no plans to make changes to the existing procedures for circuit maintenance or outage restoration for this circuit based on this circuit's locations." This response also fails to correct the root cause of the long restoration problem.

## **Recommendations**

To improve outage restoration, the Staff recommends that the Companies:

1. Submit a plan to improve:
  - a. Training their line personnel to better identify fault locations;
  - b. Equipping service centers and service vehicles with appropriate materials and supplies to expedite maintenance and outage restoration; and
  - c. Applying appropriate manpower levels to respond to outage fault areas in order to expedite restoration.

The Staff would review the plan. Once the plan is accepted, the Companies should implement the plan, measure its implementation performance/results, and report them to Staff.

2. Conduct a study to determine how to organize the Companies' service centers to optimize response time and minimize the distance factor in delaying outage restoration, and file the study with the Commission for public comment by interested parties.

## **Inspections and Maintenance of Reclosers**

ESSS Rule 27 (E)(1)(d) prescribes that the EDUs establish and implement preventative inspection, maintenance, repair and replacement programs for line reclosers. In addition, ESSS Rule 4901:1-10-06 requires each EDU to comply with the National Electrical Safety Code (NESC). NESC Subsection 214<sup>8</sup> requires that the EDU's overhead distribution facilities be inspected at such intervals as experience has shown to be necessary. The Companies' procedures for inspecting battery operated reclosers require the inspections of batteries (for proper charge) every six months.

While investigating OP Circuit No. 4243-01, Staff found that "dead batteries" in two recloser units were the root cause of four outages on this circuit between the period of July 26, 2001 and December 15, 2001. These outages affected 728 customers for a total of 191,501 customer outage minutes. Since the dead batteries in the two reclosers were not replaced until January 8, 2002, these reclosers did not properly function for approximately a six-month period. The Staff believes these outages could have been prevented had the Company followed its six-month cycle for inspecting the batteries. Furthermore, if the Company had performed such an inspection prior to the July 26, 2001 outage, none of the outages subsequent to the inspection would have occurred.

Even without the inspection, the Company should have recognized that the recloser needed to be inspected when the faults bypassed the reclosers and caused the by-pass fuses to operate, causing the October 14, 2001 and December 15, 2001 outages. These

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<sup>8</sup> Titled, "Inspection and Tests of Lines and Equipment", under Section 21 General Requirements of Part 2 Safety Rules for the Installation and Maintenance of Overhead Electric Supply and Communication Lines.

outages should have prompted the Company to inspect each of these reclosers, but as the evidence shows, the Company waited three and one-half weeks after the latter outage occurred to inspect the reclosers (and discover the dead batteries).

Although the condition and battery status of the reclosers should have been identified and corrected through the Company's six-month battery inspection cycle for reclosers, the Company failed to follow this procedure. Staff believes that OP failed to comply with ESSS Rule 6 which adopts the NESC Code, including Subsection 214, which requires the Company to inspect its overhead distribution facilities at such intervals as experience has shown to be necessary (i.e., six-month cycle for inspecting recloser batteries).

### **Recommendations**

To ensure that OP properly maintains its in-service distribution line reclosers, Staff recommends that the Company follow its procedures for the six-month battery inspections for reclosers.

CSP's ESSS Rule 27 (E)(1)(d) inspection, maintenance, repair, and replacement program guidelines for line reclosers requires the Company to annually inspect all of its in-service line reclosers (including the recording of the annual count of number of operations). During its investigation of Dr. Boyer's complaint<sup>9</sup>, the Staff learned from the Company that it does not monitor a recloser that is located upstream from Dr. Boyer's residence.

Staff believes that CSP failed to comply with ESSS Rule 27 (E)(1)(d) for not inspecting and maintaining all distribution line reclosers.

### **Recommendations**

To ensure that CSP properly inspects and maintains its in-service distribution line reclosers, Staff recommends that the Company follow the guidelines set forth in its inspection and maintenance program for line reclosers.

### **Overload Mitigation**

During its investigation of the 41 circuits, Staff found that in 2000 and 2001 these circuits experienced 82 outages caused by overloaded equipment. An additional 14 outages occurred with causes categorized as "station" and "operations incidents" (each of these outages affected a large number of customers during periods of peak usage).

As an example, Staff found that on August 27, 2001 a station transformer serving OP Circuit No. 4012-04 became severely overloaded and caused an outage (affecting 745 customers). Again, on December 25, 2001 this station transformer became overloaded and caused an outage that affected 186 customers. Both of these outages occurred during peak usage periods. As part of its remedial actions, the Company reported that it planned to upgrade this transformer in June 2003. Staff asked the Company why it was postponing the upgrade of this substation transformer until 2003. In response, the Company stated: "The station transformer loading is monitored and loading factors are applied to determine when the station transformer will become overloaded". The

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<sup>9</sup> As described in the "Momentary Interruptions" section on Page 13.

Company's monitoring shows that during the summer of 2003 this station transformer will become overloaded.

**Recommendation**

To provide assurance that the Companies' facilities maintain adequate capacity to handle future load, Staff recommends that the Companies should provide a comprehensive statement of their policies and procedures for anticipating overload situations and upgrading distribution facilities (including substations) to minimize the occurrence of overload outages.

**Record-Keeping**

ESSS Rule 11 requires EDUs to report their "worst performing circuits", the outage causes, and remedial actions. In addition, ESSS Rule 3 (B) requires that EDUs maintain records for three years that are sufficient to demonstrate compliance with the ESSS Rules. During its investigation, Staff found a number of instances where the Companies were not maintaining adequate records to demonstrate compliance with certain ESSS Rules. The first such instance involved the year 2001 outage data reported for OP Circuit No. 4295-01. Staff's Data Request dated April 19, 2002, asked the Company to provide this circuit's outage history for the years 2000 and 2001, and include the date and time of the event, cause of event, weather conditions, number of customers affected, duration of event, and customer outage minutes. Staff found that what had been reported for ESSS Rule 11 for Calendar Year 2001 did not match the data the Company supplied in response to that data request. The following table illustrates those differences.

<b>ESSS Rule 11 Report Calendar Year 2001</b>			<b>Data Request 4/19/02</b>	
<b>Outage Cause</b>	<b>Counts</b>	<b>Outage Minutes</b>	<b>Counts</b>	<b>Outage Minutes</b>
Deterioration/Corrosion	9	407,652	9	39,418
Unknown	6	267,178	6	14,908
Trees Out of ROW	11	122,470	11	134,362
Trees Inside ROW	24	67,519	21	52,862
Lightning	8	21,005	5	23,134
Other	7	1,040	7	1,004
Scheduled/Planned	3	827	3	371,051
Fire/Police	1	696	1	16,443
Overload	2	290	2	592
Animal/Bird	1	66	1	445
Object on Line	1	65	1	432
<b>TOTAL</b>	<b>73</b>	<b>888,808</b>	<b>67</b>	<b>654,651</b>

As the above table indicates, the data in the response to the data request portrays a much better performing circuit than reported in the 2001 ESSS Rule 11 report (with 6 fewer outages, 234,157 fewer customer outage minutes, and a major shift from deterioration/corrosion and unknown-caused customer outage minutes to the scheduled/planned outage cause category). None of the data reported for customer outage minutes match across the two reports.

When Staff asked the Company to reconcile the differences in these reports, the Company responded that the data for this circuit in the ESSS Rule 11 report was produced separately from the other circuits in the report because the data was obtained in an "ad-hoc" manner. The Company tried to duplicate this report but was unable to reproduce the results of the original report. The Company claimed that a filter for "major storms" was applied in error. As a result, the Company informed Staff that it should consider the Company's response to the April 19 Data Request to be the correct outage data for this circuit.

Staff believes, however, that if the Company applied the wrong filter, causing major storm data to be included, this would result in an increased number of outages and customer outage minutes being reported, but it did not. Making the report "run" without the major storm filter did not change the number of outages for the other categories where there was also a major shift in customer outage minutes. There were only 2 categories of outage causes (Trees Inside ROW and Lightning) where the number of outages was reduced. Outages for the Lightning category were reduced from 8 to 5, whereas the customer outage minutes increased from 21,005 to 23,134. Staff believes that the outages should have been reduced, but the customer outage minutes should not have increased. Staff also believes that running the data without the use of the major storm filter should not have increased the customer outage minutes from 827 to 371,051 for the scheduled/planned outage cause category.

Because the Company is unable to account for the major shifts in the data, Staff is unable to accept the data reported in response to Staff's April 19 data request. The data reported in the response appears to make a poor performing circuit look as if it was actually a good performer because (it was made to appear that) the circuit was reported due to scheduled/planned outages.

Staff believes that the OP failed to comply with ESSS Rule 3 (B) by not maintaining records for three years that are sufficient to demonstrate compliance with ESSS Rule 11 (C)(4).

### **Recommendation**

To ensure that OP complies with ESSS Rule 3 (B), Staff recommends that the Company maintains records for three years that are sufficient to demonstrate compliance with ESSS Rule 11 (C)(4).

### *Line Patrol*

ESSS Rule 27 (D)(1) requires each EDU to inspect at least one-fifth of its distribution circuits and equipment annually. In addition, ESSS Rule 27 (F) requires each EDU to maintain records sufficient to demonstrate compliance with its distribution facilities inspection, maintenance, repair and replacement programs.

Upon reviewing OP's mitigation actions for Circuit No. 2308-02, specifically where the Company claims to have scheduled and performed a visual inspection of this circuit during 2002, Staff asked the Company to provide the start and completion dates for the circuit patrol. The Company responded that the actual dates were unavailable. Staff believes that if the Company did not keep a record of the start and completion dates of this patrol, then it would be unable to know when to schedule the next visual patrol of this circuit in order to comply with ESSS Rule 27 (D)(1). Staff also asked the Company to provide the results of the patrol. The Company responded that repairs were made when problems were found, but no detailed records were maintained.

In summary, the Company has no records to demonstrate that the visual patrol ever took place. Staff believes that the Company should maintain records of the results of all its inspections in order to document and substantiate that maintenance has been completed to improve the performance of the circuit and to plan future inspections, maintenance, repair and replacement, as required by ESSS Rule 27.

Because OP admits not maintaining records specific to the visual inspection of this circuit, Staff believes the Company failed to comply with ESSS Rule 27 (F) for not maintaining records sufficient to demonstrate compliance with its distribution facilities inspection programs as required by Section (D)(1) of this rule.

### **Recommendations**

To ensure that OP complies with ESSS Rule 27 (F), Staff recommends that the Company:

1. Maintains records sufficient to demonstrate compliance with its distribution facilities inspection programs as required by ESSS Rule 27 (D)(1); and
2. Refrains from using its claimed visual inspection of Circuit No. 2308-02 to demonstrate compliance with ESSS Rule 27 (D)(1) for the reporting period calendar year 2002.

### *Recording Weather Conditions*

ESSS Rule 10 (B)(3) requires the EDUs to exclude performance data during a "major storm" from the calculation of their annual system performance data, proposed performance targets, and any revised performance targets. In addition, ESSS Rule 11 (B)(1) requires the EDUs to exclude performance data during a "major storm" from their calculation of circuit performance and from any revised method of calculating circuit performance.

In the previous section titled "Use of Recloser Devices and Circuit Breakers", the Staff discussed its investigation of a customer complaint from Dr. David Boyer. An additional finding from that investigation was that the Companies recently converted their Columbus District outage management system to a "state of the art" system called PowerOn. One disadvantage of this new system is that it is unable to record pertinent weather information when momentary interruptions of service and sustained outages occur.

The Staff considers weather information very useful in determining the factors that impact the performance of circuits. Staff used this information to assess the 41 circuits that have been included as part of this investigation. Without this weather information, Staff does not know how the Companies will be able to comply with ESSS Rule 10 (B)(3) and ESSS Rule 11 (B)(1).

### **Recommendation**

To ensure that CSP and OP both comply with ESSS Rule 10 (B)(3) and ESSS Rule 11 (B)(1), Staff recommends that the Companies maintain records of weather conditions at the time momentary interruptions or sustained outages occur on their circuits.