17

BEFORE

THE PUBLIC UTILITIES COMMISSION OF OHIO

CHARLES F. HANLINE, JR.,	:	
	:	
Complainant,	:	Case No. 96-1010-EL-CSS
	:	
v.	:	
	:	
FIRELANDS ELECTRIC COOPERATIVE, INC.	:	
	:	
and	:	
	:	
OHIO POWER CO.,	:	
	:	
Respondents.	:	

EXPERT TESTIMONY OF MERLIN K. GROVES

In accordance with Commission Rule 4901-1-29(A)(1)(j), attached hereto is the direct expert testimony of Merlin K. Groves, to be offered on behalf of Respondent Firelands Electric Cooperative, Inc.

Respectfully submitted,

Barry L. Lubow, Trial Attorney (0021393)
Thompson Hine & Flory LLP
10 West Broad Street
7th Floor
Columbus, Ohio 43215-3435
(614) 469-3200

Attorneys for Respondent
Firelands Electric Cooperative, Inc.

CERTIFICATE OF SERVICE

The undersigned hereby certifies that a copy of the foregoing, Expert Testimony of Merlin K. Groves, was served by regular U.S. mail, postage prepaid, on this 22d day of July, 1997 upon:

David D. Carto, Esq.
Weldon, Huston & Keyser
Bank One Building
28 Park Avenue West
Mansfield, Ohio 44902

Attorney for Complainant Charles F. Hanline, Jr.

Marvin I. Resnik, Esq.
AEP Service Corp.
1 Riverside Plaza
Columbus, OH 43215-2355

Attorney for Respondent Ohio Power Co.

Barry L. Lubow

TESTIMONY OF MERLIN KEITH GROVES

Q. Would you please state your name and address?

A. My name is Merlin Keith Groves. I reside at 218 Mill Springs, Coatesville, Indiana 46121.

Q. By whom are you employed and what is your employer's address?

A. My employer is Alpha Engineering of Indiana, Inc., located at 7760 W. New York Street, Indianapolis, Indiana 46214.

Q. What is your educational background?

A. I graduated from Purdue University in June, 1968 with a Bachelors Degree in Electrical Engineering Technology. Since then, I have taken various Institute of Electrical and Electronic Engineering (IEEE) courses on a variety of electrical power topics.

Q. What is your employment history?

A. From October 1966 to March 1974 I was employed by Philip L. Burns Consulting Engineers in Indianapolis as an Electrical Technician. My job duties were to collect data for and prepare multi-year construction work plans, electric facilities designs, long-range studies and facilities coordination studies, and to perform other miscellaneous electrical engineering services for electric utilities. From March 1974 to July 1979 I was a shareholder of and employed as an electrical engineer by Alpha Engineering, Inc., with offices in Indiana and Michigan. My duties were essentially the same as they had been for Burns Consulting Engineers. In August 1979, I became a shareholder and the President of Alpha Engineering of

Indiana, Inc. My responsibilities are to prepare and supervise the preparation of utility system studies and construction plans and other electrical engineering reports and studies and perform other miscellaneous electrical power engineering services for electric distribution cooperatives, municipal electric utilities, investor owned electric utilities, and industrial entities that own or operate electric distribution facilities. Much of this work is performed in order to assess the physical adequacy of the electric service being provided and the physical facilities through which the electric service is being provided, and to make recommendations as to system improvements to improve the distribution facilities and service.

Q. Are you a registered engineer in the state of Ohio?

A. Yes I am. My license number is 41773.

Q. Are you registered in any other state?

A. Yes. I am also a registered engineer in Indiana, Maryland and Michigan.

Q. Do you belong to any professional societies?

A. I am a member of the IEEE of which I am a member of the Power Engineering Group.

Q. As a result of your educational and employment background, are you knowledgeable with regard to assessing the quality and adequacy of an electric distribution utility's electric distribution service, the facilities through which such service is provided and electric utility industry standards applicable thereto?

A. Yes, I am.

Q. Have you previously testified as an electrical engineering expert in court or before any regulatory commissions?

A. Yes. I have testified before the Indiana Utility Regulatory Commission as an electrical engineering expert on numerous occasions. I have also testified as an electrical engineering expert witness in several civil court cases.

Q. Has Alpha Engineering of Indiana, Inc. ever been retained by Firelands Electric Cooperative, Inc. to perform any services for it?

A. Yes. Alpha Engineering of Indiana, Inc. has performed a variety of electrical engineering services for the Cooperative since 1991. Besides performing regular day-to-day engineering and consulting work for the Cooperative, Alpha has prepared a number of two year construction work plans for the Cooperative, and earlier this year completed a four year construction work plan for the Cooperative. Each of the construction work plans has reviewed the Cooperative's entire electric distribution system and has made recommendations for construction work that would improve the Cooperative's electric service and facilities, reduce outages, and improve service reliability.

Recently, the Cooperative asked us to evaluate the quality and adequacy of its electric service to the residence of Mr. Charles Hanline at 3759 Paul Road near Willard, Ohio, and the physical facilities through which the Cooperative's electric service is being provided to Mr. Hanline. The Cooperative informed me that it has been providing electric service to Mr. Hanline's Paul Road residence since August 1996.

Q. Have you examined the Cooperative's electric service to Mr. Hanline's Paul Road Residence and the Cooperative's facilities through which that service is being provided?

A. Yes, I have. Attached to my testimony as Attachment 1 is a copy of my report discussing my investigation and my conclusions.

Q. What information did you review in doing your investigation?

A. I visually examined the physical facilities through which the Cooperative is providing electric service to Mr. Hanline's Paul Road residence. I also reviewed various Cooperative records, including diagrams of its distribution facilities through which the service is being supplied, outage reports, a portion of the Cooperative's annual report to the United States Rural Utilities Service regarding the Cooperative's operations and service in calendar year 1996, a portion of a report authored in November 1996 by the Rural Utilities Service's Area Field Representative regarding the Cooperative's facilities and service, as well as my own Company's recently completed four year construction work plan for the Cooperative.

Q. Based on your examination, what conclusions have you reached regarding the quality and adequacy of the Cooperative's electric service to Mr. Hanline's Paul Road Residence and the Cooperative's physical facilities through which the service is being provided?

A. It is my conclusion that the Cooperative's electric service to Mr. Hanline's Paul Road residence and the Cooperative's facilities through which the service is being

provided are both more than adequate and meet or exceed Rural Utilities Service requirements and industry standards for service and facilities, and that the Cooperative is providing Mr. Hanline's Paul Road residence with electric service that is reasonable, reliable and of a good quality.

Q. Does this conclude your testimony?

A. Yes.

Attachment 1

ALPHA ENGINEERING OF INDIANA, INC.

**EVALUATION OF ADEQUACY OF
FIRELANDS ELECTRIC COOPERATIVE, INC.'S
ELECTRICAL SERVICE TO AND FACILITIES SERVING
MR. CHARLES HANLINE'S RESIDENCE AT 3759 PAUL ROAD**

April 30, 1997

INTRODUCTION

The purpose of this report is to evaluate the quality and adequacy of Firelands Electric Cooperative, Inc.'s (the Cooperative) physical facilities serving Mr. Charles Hanline's residence at 3759 Paul Road (the Premises) and the Cooperative's electric service to the Premises, to determine if the service and facilities are adequate and reliable and meet the standards of the electric utility industry and the United States Department of Agriculture, Rural Utilities Service (RUS).

The Cooperative has advised that it began providing electric service to the Premises in August of 1996. The following items, which are discussed below, were evaluated:

Utility maps
Staking sheets
Four Year Work Plan
RUS Form 7
RUS Form 300
Substation maintenance report
Recloser maintenance sheets
Individual outage reports.

A personal inspection of the physical facilities also was made.

UTILITY MAPS

Attached to this report as Exhibit A is a Circuit Diagram Map that provides an engineering overview of the general routing, sizes, and voltages of the wires serving the Premises and the distance of the Premises from the substation serving it. Exhibit A (which is an excerpt from the Four Year Work Plan discussed below) shows the approximate location of the Premises and that the Premises is served from the Cooperative's Steuben Substation (the Substation) through Circuit 2, which is a three phase 7.2/12.5 kv line. The Premises is served from Phase C, which is one of the three phases comprising Circuit 2. All currents are well within the amperage capacity of the line. The Premises is approximately 10.5 miles form the Substation with a

calculated 5.5 volt drop on a 120 volt base. This is well within RUS standards as RUS recommends not greater than an 8.0 volt drop. The distance of the Premises from the Substation is average for an Ohio electric distribution cooperative customer and would not impair service quality or reliability. The electric distribution line serving the Premises runs beyond the Premises to provide service to other Cooperative customers.

Exhibit B is the same map with the addition of reclosers (protective devices which are discussed below) and the year the wires serving the Premises were constructed. There appears to be nothing unusual.

STAKING SHEETS

As stated above, Exhibit B shows the year the facilities serving the Premises were constructed. Staking sheets are detailed descriptions of how electric distribution facilities are to be constructed, which are prepared for use in constructing the facilities and which also indicate the approximate year the facilities are constructed. A review of Exhibit B and the staking sheets for construction of the facilities between the Substation and the Premises shows that the first two-thirds of the facilities were constructed in the 1960's and that, with the exception of one-half mile of line that is marked as having been erected in 1939, the last several miles of facilities were built in 1988. By industry standards, the facilities are fairly new.

The construction called for on the staking sheets also meets or exceeds the construction standards of the RUS and the National Electric Safety Code.

FOUR YEAR WORK PLAN

Earlier this year, Alpha Engineering completed a comprehensive study of the Cooperative's entire distribution system, in order to schedule construction for the upcoming four years. One part of the study analyzes a computer model to show the existing and proposed ampere loading and voltage drops along the lines. The annual peak amperes on the three phase feeder at the Substation is 69 amps. The wire size is 3/0 ACSR with a current carrying capacity of 300 amperes per phase. The single phase #6A wire serving the Premises' tap has a peak load of 16 amps. The current carrying capacity of the #6A is 120 amps. The voltage drop on the 10.5 miles of line to the Premises was calculated at 5.5 volts on a 120 volt base. RUS permits 8.0 volts before an improvement is required. The Work Plan was conducted to suggest improvements that could be made to the Cooperative's entire distribution system. No improvements were recommended to be made to the facilities serving Mr. Hanline's Premises, as no deficiencies were found. Additional items found in the Work Plan are discussed later in this report.

RUS FORM 7

Near the beginning of every year, the Cooperative is required to file with the RUS a report, known as the RUS Form 7 year end report, discussing the Cooperative's operations for the prior year. Attached as Exhibit C to this report is one page from the Cooperative's RUS Form 7 for 1996. Exhibit C, Part H gives the average interruption hours per consumer per year. The total for 1996 was 1.28 hours. The power and energy that the Cooperative sells is received by the Cooperative over the transmission lines of Ohio Edison. As indicated in Part H of Exhibit C, under the headings "Present Year" and "Power Supplier", .45 hours of the 1.28 average outage hours per consumer in 1996, or approximately ⅓, were attributable to transmission problems occurring prior to delivery onto the Cooperative's distribution system and are not attributable to any inadequacy in the Cooperative's physical facilities. Even so, the 1.28 average outage hours per consumer in 1996 is well within RUS standards. The total maximum annual interruption hours per RUS guidelines is 5.0 hours. To the extent there have been any outages to the Premises since service began last August, problems with Ohio Edison's transmission system would be one possible cause that would need to be considered. Another possible cause of any problems with service at the Premises could be problems in the Premises' own internal wiring.

RUS FORM 300

Exhibit D is an excerpt from a review form completed by an area RUS Field Engineer in November 1996 assessing the adequacy of the Cooperative's facilities, operation and maintenance. In Part II, regarding the Cooperative's physical facilities, all items were categorized by RUS as three (satisfactory, best rating) except for items 3(a) and 3(b). As reflected on the second page of Exhibit D, item 3(a) related to RUS wanting the Cooperative to increase the ground clearance to energized parts of its substation voltage regulators, a safety issue that would have had no effect on the quality of the Cooperative's service to the Premises, and item 3(b) related to a cracked concrete footer at a substation not serving the Premises.

In Part III, regarding the Cooperative's system operation and maintenance, the RUS gave the Cooperative a three on every item except the Cooperative's average annual outage hours per customer in the years 1992 and 1995. As indicated on the RUS' report, 13.94 of the 15.61 average outage hours in 1992 were due to a major storm, and in 1995 1.50 of the 7.09 average outage hours were due to a major storm and another 4.92 of them were due to problems experienced by the Cooperative's transmission supplier. Leaving out these outages, the average customer outage hours for 1992 and 1995 were, respectively, .95 and .67 hours for the year. Transmission supplier outages are out of the Cooperative's control. Although major storms are out of the Cooperative's control directly, the Cooperative has been planning additional three phase ties between substations as well as performing extra maintenance to keep the number of members involved in any outage to a minimum.

SUBSTATION MAINTENANCE REPORT

The Cooperative prepares substation maintenance reports on a monthly basis. Besides looking for visual defects, readings of the substation reclosers and voltage regulators are taken. A voltage regulator maintains the voltage coming from a substation at a level acceptable for use by the customers. Each time a regulator operates it is adjusting up or down the amount of voltage coming from the substation to keep it at or near the desired level. The regulator serving Mr. Hanline's Premises is set to maintain voltage at 122 volts, plus or minus 2 volts. This is well within industry and RUS standards for residential service. The RUS has stated that if a regulator is operating more than 200 times per day on average it is working at an above average level and will need above average maintenance. A weak transmission system could cause a regulator to operate up to 100 times or more per day. From August 29, 1996 through May 20, 1997 (273 days), the regulator for Circuit 2, Phase C (the line providing service to Mr. Hanline's Premises) operated on average only nine times per day, indicating that little adjustment is needed to keep the voltage at the proper level. Even through the regulators showed full boost (16 steps) during two months (September 1996 and October 1996), the minimum voltage at the Substation was recorded at 122 volts; therefore, no voltage fluctuation problems should have been experienced at the Premises. The Cooperative is maintaining its regulators on a satisfactory schedule. The Cooperative also maintains lightning arresters on the line serving the Premises, including one located right by the Premises, at the road.

The Substation oil circuit recloser for Circuit 2, Phase C (discussed below) showed no counter operations from August 29, 1996 to April 30, 1997.

RECLOSER MAINTENANCE SHEETS

An oil circuit recloser (also known as an OCR) protects an aerial line from damage caused by phase wires coming in contact with other phases, or ground or neutral conductors. In a faulting situation the recloser opens (thereby shutting down the circuit) and can reclose three times, and then trips open and stays open if the faulting condition still exists. This process occurs fairly rapidly. Since 80-90% of faults on aerial lines are due to temporary causes such as lightning or temporary contact by animals or tree limbs, the fault usually corrects itself before the recloser locks open. A recloser may cause electricity to noticeably "blink" during reclosing operations. Anything less would not affect service. After a recloser lockout, the Cooperative then locates and removes the fault and restores services by closing the recloser. This results in outages of a shorter duration than would occur if a circuit were fused or allowed to burn clear. Occasional power "blinks" are common and expected in the electric utility industry, and do not necessarily mean that there is a service problem.

There are four reclosing devices in series on the line serving Mr. Hanline. This includes a recloser unit at the Substation. The number of reclosers affords the Premises extra protection against long outages caused by a fault.

Based on recloser readings, during the five-year period from February 1992 to June 1997 the line serving Mr. Hanline may have experienced approximately 39 operations, the overwhelming bulk of which would have been without a recloser tripping open. The actual number of total operations is not known; however, it is unlikely to have exceeded 39. Many of these could have been during the 1992, 1995 or other storms. This small number of operations over an extended period indicates that the line serving the Premises is not subject to a faulting problem. The 10.5 mile length of line from the Substation to the Premises is mostly on open ground and only runs through or above a few trees. The single phase 7200 volt service line running from the road to Mr. Hanline's house is underground. I did not observe any conditions threatening to cause a fault.

A recloser is recommended to be maintained every 50 operations (minimum) according to RUS standards. The Cooperative has its substations on a three year maintenance rotation and the line recloser maintenance is on a five year schedule. Given the limited number of operations the reclosers have had, this is well within the RUS standard and is a typical schedule for an electric distribution cooperative.

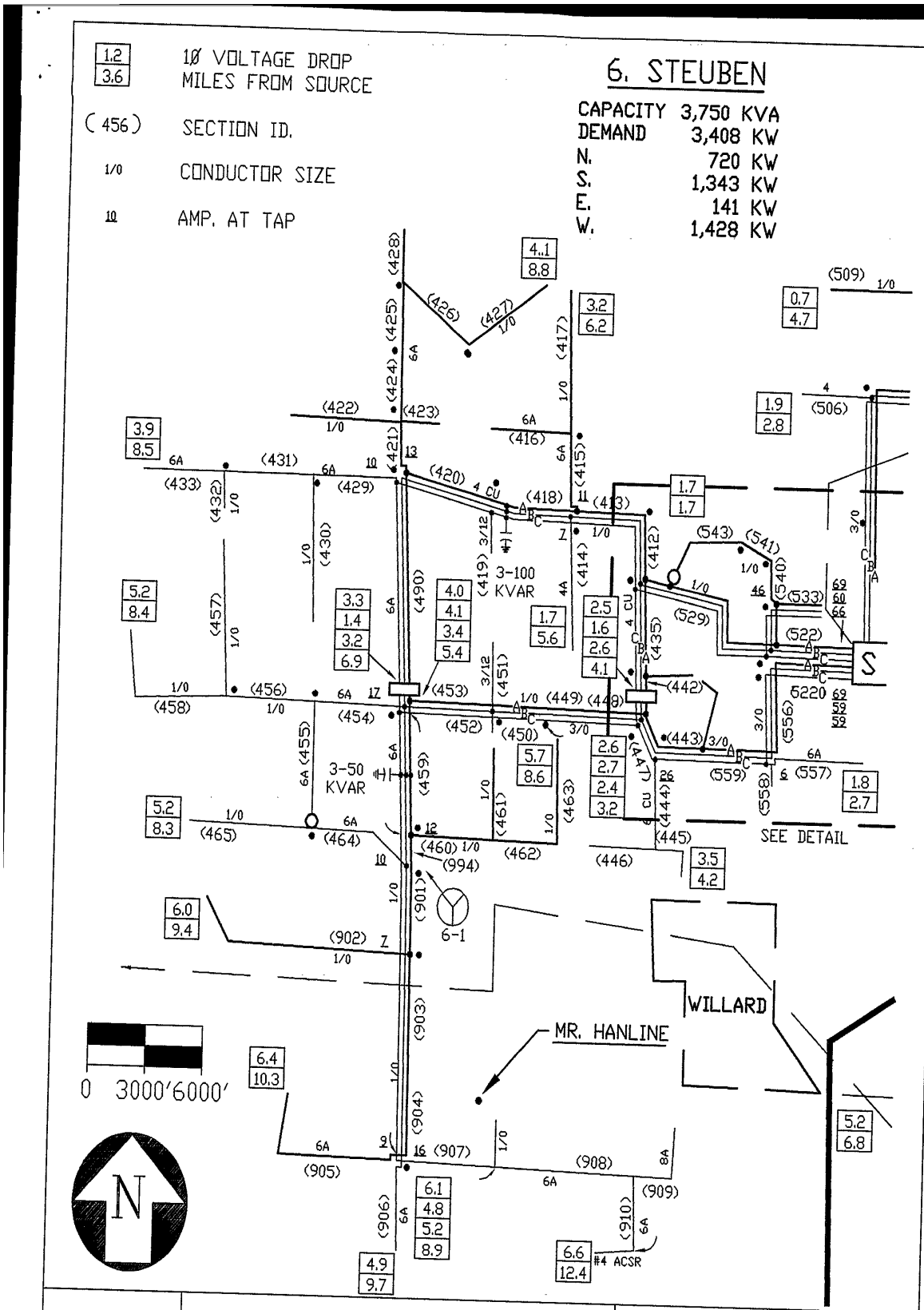
Since Mr. Hanline's Premises are near the end of the electrical circuit running from the Substation, his exposure to an outage caused by a recloser tripping open may be greater than someone closer to the Substation. However, the existence of three line recloser locations on the line serving the Premises should keep the maximum number of members on and keep Mr. Hanline's outages to a minimum.

INDIVIDUAL OUTAGE REPORT

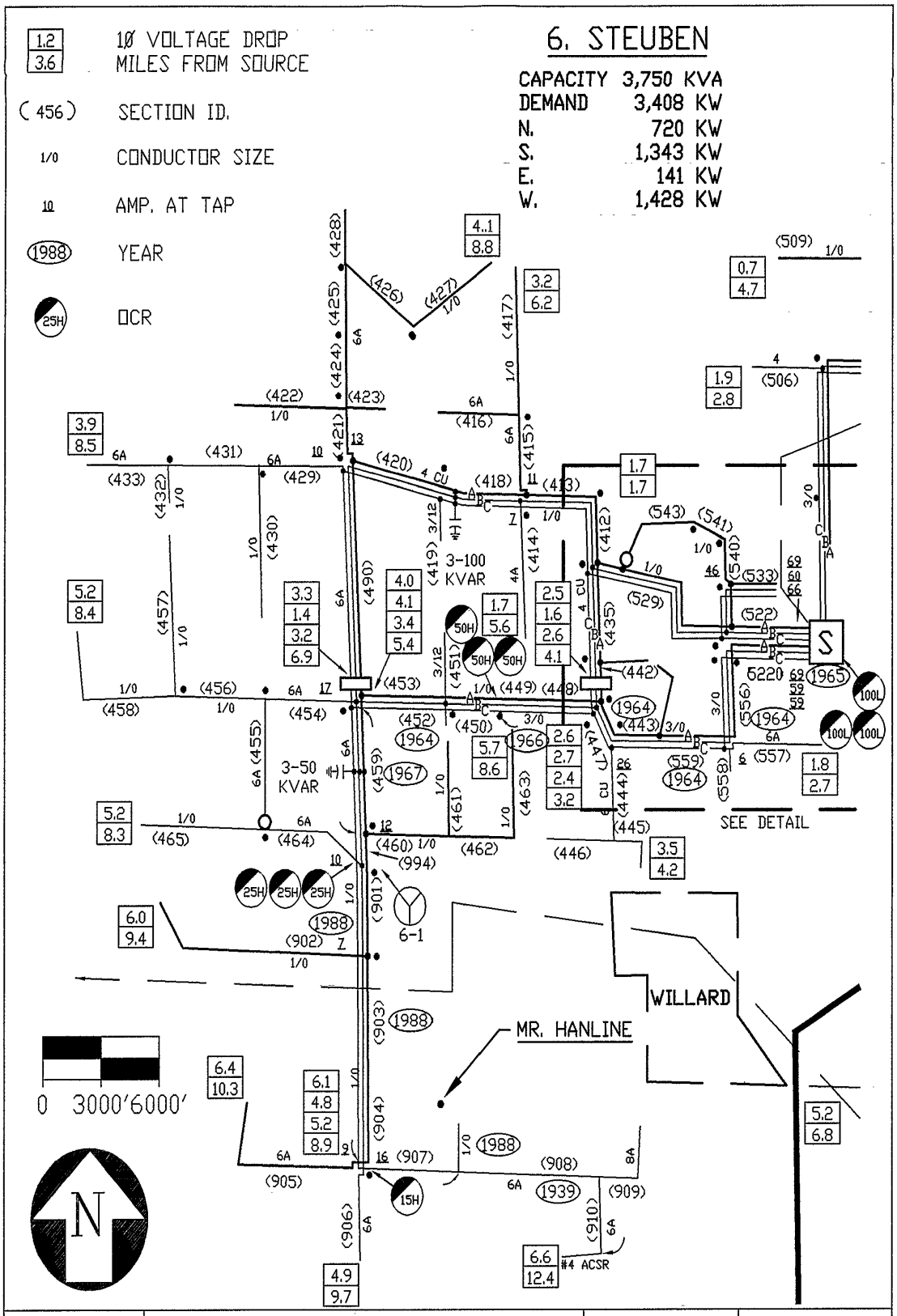
These are recorded outages and complaints called in. Only one listing was made by the Cooperative from July 1996 through the date of this report. This was a power "blink" caused by the Cooperative's transmission supplier on February 26, 1997. As of the date of this report, the Cooperative had no record of Mr. Hanline ever notifying the Cooperative of any problem with the service to the Premises. To the extent that Mr. Hanline or any other customer served on this line has had service problems not experienced by other customers served on the lines, it is common for such problems to be attributable to problems with the customer's own internal house wiring or facilities.

SUMMARY

It is my conclusion that the Cooperative's physical electric distribution facilities serving Mr. Hanline's Premises, its electric service to the Premises, and the Cooperative's service and maintenance of those facilities all meet or exceed industry and RUS standards. There is no physical evidence that service to the Premises has been or is substandard.



	Alpha Engineering of Indiana, Inc. Consulting Engineers Indianapolis, Indiana	EXHIBIT A	1 OF 1
HANLINE.DWG		CIRCUIT DIAGRAM MAP	



	Alpha Engineering of Indiana, Inc. Consulting Engineers Indianapolis, Indiana	EXHIBIT B	1 OF 1
HANLINE.DWG		CIRCUIT DIAGRAM MAP	

EXHIBIT C

USDA - RUS

FINANCIAL AND STATISTICAL REPORT

INSTRUCTIONS - *See RUS Bulletin 1717B-2*

BORROWER DESIGNATION: OHIO 83 HURON

PERIOD ENDED: DECEMBER 1996

RUS USE ONLY

PART F. ANALYSIS OF ACCUMULATED PROVISIONS FOR DEPRECIATION - TOTAL ELECTRIC PLANT

ITEM	DISTRIBUTION PLANT (a)	GENERAL PLANT (b)	TRANSMISSION PLANT (c)	OTHER PLANT (d)
1. Balance Beginning of Year	3,966,769.81	833,612.06	74,378.69	
2. Additions - Depreciation Accruals Charged to:				
a. Depreciation Expense	418,988.45	159,236.72	.03	
b. Clearing Accounts and Others				
c. Subtotal (a + b)	418,988.45	159,236.72	.03	
3. Less - Plant Retirements:				
a. Plant Retired	84,683.36	75,262.80		
b. Removal Costs	37,193.25			
c. Subtotal (a + b)	121,876.61	75,262.80		
4. Plus Salvaged Materials	9,457.19	14,440.00		
5. TOTAL (2c - 3c + 4)	306,569.03	98,413.92	.03	
6. Other Adjustments - Debit or Credit				
7. Balance End of Year (1 + 5 +/- 6)	4,273,338.84	932,025.98	74,378.72	

PART G. MATERIALS AND SUPPLIES

ITEM	BALANCE BEGINNING OF YEAR (a)	PURCHASED (b)	SALVAGED (c)	USED (NET) (d)	SOLD (e)	ADJUSTMENT (f)	BALANCE END OF YEAR (g)
1. Electric	306,324.25	353,832.30	10,537.70	400,217.80	16,936.23	1500.34	255,040.56
2. Other (155 + 156)	15,233.86	15,378.57	----	----	15,506.56	----	15,105.87

3. Ratio of Inventory Turnover-Electric: Item 1d / (1a + 1g = / 2) = 1.43

4. Inventory - Electric as Percent of Total Utility Plant: 1g / Item 42e, Part E X 100 = 1.48

PART H. SERVICE INTERRUPTIONS

ITEM	AVERAGE HOURS PER CONSUMER BY CAUSE				TOTAL
	POWER SUPPLIER (a)	EXTREME STORM (b)	PREARRANGED (c)	ALL OTHER (d)	(e)
1. Present Year	.45	----	.03	.80	1.28
2. Five-Year Average	1.28	3.09	.03	.83	5.23

PART I. EMPLOYEE-HOUR AND PAYROLL STATISTICS

1. Number of Full Time Employees	26	4. Payroll - Expensed	944,383.52
2. Employee - Hours Worked - Regular Time	60,250	5. Payroll - Capitalized	233,128.35
3. Employee - Hours Worked - Overtime	4,226	6. Payroll - Other	----

PART J. PATRONAGE CAPITAL

ITEM	THIS YEAR (a)	CUMULATIVE (b)
1. General Retirement	237,498.95	2,393,067.87
2. Special Retirements	108,542.44	1,390,120.72
3. Total Retirements (1 + 2)	346,041.39	3,783,188.59
4. Patronage Capital Assigned		7,366,755.25
5. Patronage Capital Assignable		1,048,704.01

PART K. DUE FROM CONSUMERS FOR ELECTRIC SERVICE

1. AMOUNT DUE OVER 60 DAYS: $ 29,238.96

2. AMOUNT WRITTEN OFF DURING YEAR: $ 21,702.11

PART L. kWh PURCHASED AND TOTAL COST

ITEM (a)	RUS USE ONLY SUPPLIER CODE (b)	kWh PURCHASED (c)	TOTAL COST (d)	AVERAGE COST PER kWh (cents) (e)	INCLUDED IN TOTAL COST: FUEL COST ADJUSTMENT (f)	INCLUDED IN TOTAL COST: WHEELING AND OTHER CHARGES (or Credits) (g)
BUCKEYE POWER, INC.		117,400,154	3,845,492.01	3.2755	1,856,697.11	
Total		117,400,154	3,845,492.01		1,856,697.11	

EXHIBIT D

United States Department of Agriculture | Rural Economic and Community Development | Rural Utilities Service | Washington, DC 20250

November 17, 1996

S O&M Review
Ohio 83 Huron

Mr. Gary L. Wyckoff, Manager
Firelands Electric Cooperative, Inc.
P.O. Box 32
New London, Ohio 44851-0032

Dear Gary:

In accordance with RUS Bulletin 161-5, a review and evaluation of your electric system and facilities as related to system operations and maintenance was made on November 5 and 6, 1996. The objectives of this review are to carry out RUS's responsibilities for loan security, to assure that your electrical system is being operated and maintained in a safe and satisfactory manner, and that you are providing an acceptable quality of service to your members.

My review indicates that your facilities are generally, being adequately operated and maintained and that you have an effective operations and maintenance program supported by proper records. As a result, I have only the following comments:

1. Comments concerning the substations visited during this S O&M review are attached. In addition, you have several substations, where a **fence barricade** has been installed around the voltage regulator installations. The adequacy of these barricades should be discussed with your consulting engineer.

2. The short section of 69kV transmission line on private R/W should be patrolled annually and proper inspection records need to be maintained covering the transmission line.

3. The remaining rejected poles identified during the accelerated 1995 pole inspection need to be replaced by the Spring of 1997.

4. Alpha Engineering should provide you with a written report covering their workorder inspections.

I encourage you, your staff, and your Board of Trustees to continue to maintain a satisfactory maintenance program supported by proper and detailed records. Also, I wish to express my appreciation to Darwin, Oliver, Tracy, John and you for your cooperation and assistance with this review.

A copy of this letter and of RUS Form 300 are being forwarded to the Northern Regional Division for their information.

Sincerely,

William F. McDevitt
RUS Field Representative

cc: Brian D. Jenkins, Deputy Director-NRD-RUS

Attachment

No further funds may be advanced under this program unless this report is completed and filed as required (7 USC 901 et seq.)"

USDA — REA

Form Approved
OMB No. 0572-0025
Expires 10/31/91

REVIEW RATING SUMMARY

BORROWER DESIGNATION: Ohio 83 Huron

DATE PREPARED: 11-6-96

atings on form are: 0: No records 1: Corrective Actions Are needed
2: No action required, but might be improved 3: Satisfactory NA: Not applicable

PART I. TRANSMISSION

1. Transmission Substations 69KV Metering Point *(Rating)*
   a. Safety, Clearance, Code Compliance . . . 3
   b. Physical Condition: Structure, Major Equipment, Appearance . . . 3
   c. Inspection Records Each Substation *(Bulletin 165-1)* . . . 3

2. Transmission Lines *(Rating)*
   a. Right-of-way; Clearing, Erosion, Appearance, Intrusions . . . 3
   b. Physical Condition: Structures, Conductor, Guying . . . 3
   c. Inspection Program and Records . . . 3

PART II. DISTRIBUTION FACILITIES

3. Distribution Substations *(Rating)*
   a. Safety, Clearance, Code Compliance . . . 2
   b. Physical Condition: Structure, Major Equipment, Appearance . . . 2
   c. Inspection Records *(Bulletin 165-1)* . . . 3

4. Distribution Lines - Overhead
   a. Inspection and Maintenance: Program and Records *(Bulletin 161-3)* . . . 3
   b. Compliance with Safety Codes: Clearances . . . 3
      Foreign Structures . . . 3
      Attachments . . . 3
   c. Observed Physical Condition from Field Checking
      Right-of-way . . . 3
      Other . . . 3

5. Distribution - Underground Cable *(Rating)*
   a. Grounding and Corrosion Control *(Bulletin 161-23)* . . . 3
   b. Surface Grading, Appearance . . . 3
   c. Riser Pole: Hazards, Guying, Condition . . . 3

6. Distribution Line Equipment: Conditions and Records
   a. Voltage Regulators *(Bulletin 169-27)* . . . 3
   b. Sectionalizing Equipment *(Bulletin 161-11)* . . . 3
   c. Distribution Transformers *(Bulletin 161-11)* . . . 3
   d. Pad Mounted Equipment
      Safety: Locking, Dead Front, Barriers . . . 3
      Appearance: Settlement, Condition . . . 3
      Other . . . 3
   e. Watthour Meter Reading and Testing . . . 3

PART III. OPERATION AND MAINTENANCE

7. Line Maintenance and Work Order Procedures *(Rating)*
   a. Work Planning and Scheduling . . . 3
   b. Work Backlogs:
      Right-of-way Maintenance . . . 3
      Pole Replacements . . . 3
      Idle Services - Retirement of . . . 3
      Other . . . 3

8. Service Interruptions (Average Annual Hours/Consumer by Cause)

PREVIOUS 5 YEARS	POWER SUPPLIER a.	MAJOR STORM b.	SCHEL'D c.	ALL OTHER d.	TOTAL e.	RATING
1995	4.92	1.50	.03	.64	7.09	1
1994	-0-	-0-	.05	.96	1.01	3
1993	.29	-0-	.01	.82	1.12	3
1992	.72	13.94	.01	.94	15.61	1
1991	-0-	-0-	.03	1.13	1.16	3

9. Radio and Television Interference *(Rating)*
   a. General Freedom from Complaints . . . 3
   b. Effective Handling of Problems that Arise . . . 3

10. Loading and Load Balance
   a. Distribution Transformer Loading . . . 3
      (Optional) Ratio: Distribution Transformer kVA to Substation Peak kW 3.99 . . . 3
   b. Load Control Apparatus . . . 3
   c. Substation and Feeder Loading . . . 3
   d. Each Phase Current within 20% of Peak Average of Three Phases, during Heavy Load Periods . . . 3

11. Maps and Plant Records *(Bulletin 40-4)*
   a. Operating Maps: Accurate and Up-to-Date . . . 3
   b. Key Maps . . . 3
   c. Circuit Diagrams . . . 3
   d. Staking Sheets . . . 3

PART IV. ENGINEERING

12. System Load Conditions and Losses *(Rating)*
   a. Annual System Losses, 7.32 % . . . 3
   b. Annual Load Factor, 6.06 % . . . 3
   c. Power Factor at Monthly Peak, 98 % . . . 3
   d. Ratios of Individual Substation Annual Peak kW to kVA Capacity below those of Bulletin 161-22 Table II _____ . . . 3

13. Voltage Conditions
   a. Voltage Surveys *(Bulletin 161-8)* . . . 3
   b. Percent of Consumers with Service Voltage not in Range A *(Bulletin 169-4)* 0 - 3%, 3 - 10%, over 10% . . . 3
   c. Substation Transformer Output Voltage Spread *(Bulletin 169-4)* Settings Checked . . . 3

14. Load Studies and Planning *(Rating)*
   a. Long Range Plan . . . 3
   b. Work Plan . . . 3
   c. Sectionalizing Study . . . 3
   d. Load Data for Engineering Studies . . . 3
   e. Power Requirements Data . . . 3

15. Safety and Job Training
   a. Responsibility for Safety Program *(Bulletin 168-7)* is assigned to a qualified individual . . . 3
   b. Adequate Attention to Worker Training and Competence . . . 3

PART V. OPERATION AND MAINTENANCE BUDGETS

Year	Previous		Present		Future					
	19 94	19 95	19 96		19 97		19 98		19 99	
	Actual $ Thous.	Actual $ Thous.	Budget $ Thous.	Manhours	Budget $ Thous.	Manhours	Budget $ Thous.	Manhours	Budget $ Thous.	Manhours
Normal Operation	343	265	245		257		270		284	
Normal Maintenance	656	674	600		683		716		752	
Additional (Deferred) Maintenance										
Total	999	939	845		940		986		1036	

16. Budgeting

(Rating)

a. Needed Work Can Be Done With Present Staff or Contracted 3

b. Adequacy of Budgets For Needed Work 3

17. Discussed With Board of Directors *(Check)* Yes ☒ No ☐

Remarks: At next Board Meeting.

EXPLANATORY NOTES

ITEM NO.	COMMENTS
3.a.	Need to check and rectify NESC clearance problems on voltage regulators and VSA's.
3.b.	Concrete footers cracking at Ashland Sub.
10.c.	Several substation transformers will be upgraded over the next four years.
14.a.	New LRP to be prepared in 1997.
14.c.	Alpha Engineering preparing new coordination study.

RATED BY: Gary L Lynch, Manager 11-6-96 Date

REVIEWED BY: William F. McDevitt, REA Field Rep 11/6/96 Date