

THE STATE OF SOUTH CAROLINA
In The Court of Appeals

APPEAL FROM BERKELEY COUNTY CIRCUIT COURT

Roger M. Young, Sr., Circuit Court Judge

Civil Action Nos.: 14-CP-08-1231, 14-CP-08-1232
Appellate Case No.: 2016-000521

RECEIVED

JAN 06 2017

SC Court of Appeals

Estate of John Fortney, Deceased,
By His Duly Appointed Personal
Representative, Constance S. Fortney,..... Appellant,

v.

Berkeley Electric Cooperative,.....Respondent.

AND

John Steven Robinson,.....Appellant,

v.

Berkeley Electric Cooperative,.....Respondent.

RECORD ON APPEAL
Volume 4 of 4

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Attorneys for Respondent

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USDA - REA

Form Approved
OMB No. 040-R2350

BORROWER DESIGNATION

S.C. 25 Berkeley

DATE PREPARED

October 17, 1990

PLAINTIFF'S
EXHIBIT
1

REVIEW RATING SUMMARY

Ratings 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 (Rating)	2. Transmission Lines (Rating)
a. Safety, Clearance, Code Compliance <u>N/A</u>	a. Right-of-way: Clearing, Erosion, Appearance, Intrusions <u>3</u>
b. Physical Condition: Structure, Major Equipment, Appearance <u>-</u>	b. Physical Condition: Structures, Conductor, Guying <u>3</u>
c. Inspection Records Each Substation (Bulletin 165-1) <u>-</u>	c. Inspection Program and Records <u>3</u>

PART II. DISTRIBUTION FACILITIES

3. Distribution Substations (Rating)	5. Distribution - Underground Cable (Rating)
a. Safety, Clearance, Code Compliance <u>3</u>	a. Grounding and Corrosion Control (Bulletin 161-23) <u>3</u>
b. Physical Condition: Structure, Major Equipment, Appearance <u>3</u>	b. Surface Grading, Appearance <u>3</u>
c. Inspection Records (Bulletin 165-1) <u>3</u>	c. Riser Pole: Hazards, Guying, Condition <u>3</u>
4. Distribution Lines - Overhead	6. Distribution Line Equipment: Conditions and Records
a. Inspection and Maintenance: Program and Records (Bulletin 161-3) <u>3</u>	a. Voltage Regulators (Bulletin 169-27) <u>3</u>
b. Compliance with Safety Codes: Clearances <u>3</u>	b. Sectionalizing Equipment (Bulletin 161-11) <u>3</u>
Foreign Structures <u>3</u>	c. Distribution Transformers (Bulletin 161-11) <u>3</u>
Attachments <u>3</u>	d. Pad Mounted Equipment
c. Observed Physical Condition from Field Checking	Safety: Locking, Dead Front, Barriers <u>3</u>
Right-of-way <u>3</u>	Appearance: Settlement, Condition <u>2</u>
Other <u>Poles</u> <u>3</u>	Other <u>Submersible equip.</u> <u>2</u>
	e. Watthour Meter Reading and Testing <u>3</u>

PART III. OPERATION AND MAINTENANCE

7. Line Maintenance and Work Order Procedures (Rating)	9. Radio and Television Interference (Rating)
a. Work Planning and Scheduling <u>3</u>	a. General Freedom from Complaints <u>3</u>
b. Work Backlogs:	b. Effective Handling of Problems that Arise <u>3</u>
Right-of-way Maintenance <u>3</u>	10. Loading and Load Balance
Pole Replacements <u>3</u>	a. Distribution Transformer Loading <u>3</u>
Idle Services - Retirement of <u>3</u>	(Optional) Ratio: Distribution Transformer kVA to Substation Peak kW <u>2.25</u> <u>3</u>
Other <u>-</u>	b. Load Control Apparatus <u>3</u>
8. Service Interruptions (Average Annual Hours/Consumer by Cause)	c. Substation and Feeder Loading <u>3</u>
PREVIOUS 5 YEARS	d. Each Phase Current within 20% of Peak Average of Three Phases, during Heavy Load Periods <u>2</u>
POWER SUPPLIER	11. Maps and Plant Records (Bulletin 40-4)
MAJOR STORM	a. Operating Maps: Accurate and Up-to-Date <u>3</u>
SCHED'D	b. Key Maps <u>3</u>
ALL OTHER	c. Circuit Diagrams <u>3</u>
TOTAL	d. Staking Sheets <u>3</u>
RATING	
19 85 0.61 0.18 -0- 1.01 1.80 3	
19 86 0.22 0.02 -0- 1.01 1.25 3	
19 87 0.01 0.01 0.01 1.04 1.07 3	
19 88 0.04 0.02 -0- .73 0.79 3	
19 89 -0- 209.32 -0- .55 209.87 3*	

PART IV. ENGINEERING

12. System Load Conditions and Losses (Rating)	14. Load Studies and Planning (Rating)
a. Annual System Losses, <u>8.35</u> % <u>3</u>	a. Long Range Plan <u>3</u>
b. Annual Load Factor, <u>34.81</u> % <u>3**</u>	b. Work Plan <u>3</u>
c. Power Factor at Monthly Peak, <u>99.28</u> % <u>3</u>	c. Sectionalizing Study <u>3</u>
d. Ratios of Individual Substation Annual Peak kW to kVA Capacity below those of Bulletin 161-22 Table II <u>3</u>	d. Load Data for Engineering Studies <u>3</u>
13. Voltage Conditions	e. Power Requirements Data <u>3</u>
a. Voltage Surveys (Bulletin 161-8) <u>3</u>	15. Safety and Job Training
b. Percent of Consumers with Service Voltage not in Range A (Bulletin 169-4) 0-3%, 3-10%, over 10% <u>3</u>	a. Responsibility for Safety Program (Bulletin 168-7) is assigned to a qualified individual <u>3</u>
c. Substation Transformer Output Voltage Spread (Bulletin 161-11) Settings Checked <u>3</u>	b. Adequate Attention to Worker Training and Competence <u>3</u>

PART V. OPERATION AND MAINTENANCE BUDGETS

Year	Previous		Present		Future					
	19 88	19 89	1990		19 91		19 92		19 93	
	Actual \$ Thous.	Actual \$ Thous.	Budget \$ Thous.	Manhours	Budget \$ Thous.	Manhours	Budget \$ Thous.	Manhours	Budget \$ Thous.	Manhours
Normal Operation	1,075	799	824		850		877		904	
Normal Maintenance	1,895	1,739	1,736		1,761		1,773		1,785	
Additional (Deferred) Maintenance										
Total	2,970	2,538	2,560		2,611		2,650		2,689	

16. Budgeting

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

(Rating)

3

b. Adequacy of Budgets For Needed Work

3

17. Discussed With Board of Directors (Check)

Yes ☒

No ☐

Remarks:

EXPLANATORY NOTES

ITEM NO.	COMMENTS
6.d. appearance & other	We have been making an effort to correct situations where our pad-mounted equipment is not plumb in order to improve its appearance. We are also striving to remove our remaining submersible equipment and re-installing pad-mounted gear.
10.d.	We are continually monitoring all of our substation circuits for load balance through the utilization of our SCADA system. Circuits found to be out of balance are corrected.

RATED BY:

E. E. Stuhla

Manager

11/29/90

Date

REVIEWED BY:

Paul Kriss

REA Field Engineer

12/20/90

Date

"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. 040 H2350

BORROWER DESIGNATION

REVIEW RATING SUMMARY

SC 25 Berkeley

DATE PREPARED

March 29, 1994

Ratings 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

a. Safety, Clearance, Code Compliance N/A (Rating) -
b. Physical Condition: Structure, Major Equipment, Appearance -
c. Inspection Records Each Substation (Bulletin 165-1) -

2. Transmission Lines

a. Right-of-way: Clearing, Erosion, Appearance, Intrusion (Rating) 3
b. Physical Condition: Structures, Conductor, Guying 3
c. Inspection Program and Records 3

PART II. DISTRIBUTION FACILITIES

3. Distribution Substations

a. Safety, Clearance, Code Compliance 3 (Rating)
b. Physical Condition: Structure, Major Equipment, Appearance 3
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 poles 3

5. Distribution - Underground Cable

a. Grounding and Corrosion Control (Bulletin 161-23) (Rating) 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 submersible equipment 2
e. Watthour Meter Reading and Testing 3

PART III. OPERATION AND MAINTENANCE

A. Line Maintenance and Work Order Procedures

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

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

PREVIOUS 5 YEARS	POWER SUPPLIER	MAJOR STORM	SCHL'D	ALL OTHER	TOTAL	RATING
19 89	-0-	209.32	-0-	.55	209.87	3*
19 90	-0-	.02	-0-	.53	.55	3
19 91	.01	.03	-0-	.47	.51	3
19 92	.01	.01	-0-	.32	.34	3
19 93	-0-	.04	-0-	.30	.34	3

B. Radio and Television Interference

a. General Freedom from Complaints (Rating) 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 2.93
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 2

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

a. Annual System Losses, 7.03 % (Rating) 3
b. Annual Load Factor, 47.82 % 3
c. Power Factor at Monthly Peak, 99 % 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
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 161-4) Settings Checked 3
169-4

14. Load Studies and Planning

a. Long Range Plan (Rating) 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 92	19 93	19 94		19 95		19 96		19 97	
	Actual \$ Thous.	Actual \$ Thous.	Budget \$ Thous.	Manhours	Budget \$ Thous.	Manhours	Budget \$ Thous.	Manhours	Budget \$ Thous.	Manhours
Normal Operation	1076	1181	1190		1253		1319		1388	
Normal Maintenance	2167	2407	2482		2658		2847		3049	
Additional (Deferred) Maintenance										
Total	3243	3588	3672		3911		4166		4437	

16. Budgeting

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

(Rolling)

3

b. Adequacy of Budgets For Needed Work

3

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

Remarks:

EXPLANATORY NOTES

ITEM NO.	COMMENTS
6.d other	Berkeley Electric Cooperative, Inc. is striving to replace our remaining submersible equipment with pad-mounted gear.
10.d	Berkeley Electric Cooperative, Inc. is continually monitoring all of our substation circuits for load balance through the utilization of our SCADA System. Circuits found to be out of balance are corrected and monitored.

RATED BY:

[Signature]

Manager

5/11/94

Date

REVIEWED BY:

USDA - RUS REVIEW RATING SUMMARY						BORROWER DESIGNATION SC-025-BERKELEY DATE PREPARED November 23, 1998																																																		
Ratings on form are: 0: Unsatisfactory -- No Records 2: Acceptable, But Should Be Improved -- See Attached Recommendations 1: Corrective Actions Are Needed 3: Satisfactory -- No Additional Action Required At This Time NA: Not Applicable																																																								
PART I. TRANSMISSION and DISTRIBUTION FACILITIES																																																								
1. Substations (Transmission and Distribution) a. Safety, Clearance, Code Compliance 3 b. Physical Condition: Structure, Major Equipment, Appearance 3 c. Inspection Records Each Substation 3 d. Oil Spill Prevention 3				4. Distribution - Underground Cable a. Grounding and Corrosion Control 3 b. Surface Grading, Appearance 3 c. Riser Pole: Hazards, Guying, Condition 3																																																				
2. Transmission Lines a. Right-of-way: Clearing, Erosion, Appearance, Intrusions 3 b. Physical Condition: Structure, Conductor, Guying 3 c. Inspection Program and Records 3				5. Distribution Line Equipment Conditions and Records a. Voltage Regulators 3 b. Sectionalizing Equipment 3 c. Distribution Transformers 3 d. Pad Mounted Equipment Safety: Locking, Dead Front, Barriers 3 Appearance: Settlement, Condition 3 Other Submersible Equipment 2																																																				
3. Distribution Lines - Overhead a. Inspection Program and Records 3 b. Compliance with Safety Codes: <table style="width: 100%; border: none;"> <tr> <td style="width: 30%;">Clearances</td> <td style="width: 10%; text-align: center;">3</td> </tr> <tr> <td>Foreign Structures</td> <td style="text-align: center;">3</td> </tr> <tr> <td>Attachments</td> <td style="text-align: center;">3</td> </tr> </table> c. Observed Physical Condition from Field Checking Right-of-way 3 Other				Clearances	3	Foreign Structures	3	Attachments	3	e. Kilowatt-hour and Demand Meter Reading and Testing 3																																														
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6. Line Maintenance and Work Order Procedures a. Work Planning & Scheduling 3 b. Work Backlogs: <table style="width: 100%; border: none;"> <tr> <td style="width: 30%;">Right-of-way Maintenance</td> <td style="width: 10%; text-align: center;">3</td> </tr> <tr> <td>Poles</td> <td style="text-align: center;">3</td> </tr> <tr> <td>Retirement of Idle Services</td> <td style="text-align: center;">3</td> </tr> <tr> <td>Other</td> <td style="text-align: center;">3</td> </tr> </table>				Right-of-way Maintenance	3	Poles	3	Retirement of Idle Services	3	Other	3	8. Power Quality a. General Freedom from Complaints 3																																												
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Retirement of Idle Services	3																																																							
Other	3																																																							
7. Service Interruptions a. Average Annual Hours/Consumer by Cause (Complete for each of the previous 5 years) <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>PREVIOUS 5 YEARS</th> <th>POWER SUPPLIER</th> <th>MAJOR STORM</th> <th>SCHED'L'D OTHER</th> <th>ALL OTHER</th> <th>TOTAL</th> <th>(Rating)</th> </tr> <tr> <th></th> <th>a.</th> <th>b.</th> <th>c.</th> <th>d.</th> <th>e.</th> <th></th> </tr> </thead> <tbody> <tr> <td>1993</td> <td>-0-</td> <td>.04</td> <td>-0-</td> <td>.30</td> <td>.34</td> <td>3</td> </tr> <tr> <td>1994</td> <td>.03</td> <td>-0-</td> <td>-0-</td> <td>.19</td> <td>.22</td> <td>3</td> </tr> <tr> <td>1995</td> <td>-0-</td> <td>.01</td> <td>-0-</td> <td>.26</td> <td>.27</td> <td>3</td> </tr> <tr> <td>1996</td> <td>.21</td> <td>.04</td> <td>-0-</td> <td>1.57</td> <td>1.82</td> <td>3</td> </tr> <tr> <td>1997</td> <td>.21</td> <td>-0-</td> <td>.01</td> <td>1.78</td> <td>2.00</td> <td>3</td> </tr> </tbody> </table>				PREVIOUS 5 YEARS	POWER SUPPLIER	MAJOR STORM	SCHED'L'D OTHER	ALL OTHER	TOTAL	(Rating)		a.	b.	c.	d.	e.		1993	-0-	.04	-0-	.30	.34	3	1994	.03	-0-	-0-	.19	.22	3	1995	-0-	.01	-0-	.26	.27	3	1996	.21	.04	-0-	1.57	1.82	3	1997	.21	-0-	.01	1.78	2.00	3	9. Loading and Load Balance a. Distribution Transformer Loading 3 b. Load Control Apparatus 3 c. Substation and Feeder Loading 2			
PREVIOUS 5 YEARS	POWER SUPPLIER	MAJOR STORM	SCHED'L'D OTHER	ALL OTHER	TOTAL	(Rating)																																																		
	a.	b.	c.	d.	e.																																																			
1993	-0-	.04	-0-	.30	.34	3																																																		
1994	.03	-0-	-0-	.19	.22	3																																																		
1995	-0-	.01	-0-	.26	.27	3																																																		
1996	.21	.04	-0-	1.57	1.82	3																																																		
1997	.21	-0-	.01	1.78	2.00	3																																																		
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PART III. ENGINEERING																																																								
11. System Load Conditions and Losses a. Annual System Losses 6.3% 3 b. Annual Load Factor 46.31% 3 c. Power Factor at Monthly Peak 97.5% 3 d. Ratios of individual Substation Annual Peak kW to kVA 3 2. Voltage Conditions a. Voltage Surveys 3 b. Substation Transformer Output Voltage Spread 3				13. Load Studies and Planning a. Long Range Engineering Plan 3 b. Construction Work Plan 2 c. Sectionalizing Study 2 d. Load Data for Engineering Studies 3 e. Load Forecasting Data 3																																																				

PART IV. OPERATION AND MAINTENANCE BUDGETS						
YEAR	For Previous 2 Years		For Present Year	For Future 3 Years		
	19 96	19 97	19 98	19 99	2000	2001
	Actual \$ Thous.	Actual \$ Thous.	Budget \$ Thous.	Budget \$ Thous.	Budget \$ Thous.	Budget \$ Thous.
Normal Operation	1727	1546	1909	2973	3957	5267
Normal Maintenance	2340	2405	2580	3561	4131	4792
Additional (Deferred) Maintenance						
Total	4067	3951	4489	6534	8088	10059

14. Budgeting: Adequacy of Budgets For Needed Work

(Rating) 3

15. Date Discussed With Board of Directors

Date 11/23/98

EXPLANATORY NOTES

ITEM NO.	COMMENTS
5d	Berkeley Electric Cooperative, Inc. is striving to replace its remaining submersible equipment with pad-mounted gear.
9c	Berkeley Electric Cooperative, Inc. is continually monitoring all of its substation circuits for load balance through the utilization of its SCADA system. Circuits found to be out of balance are corrected and monitored.
10a, 10b	Berkeley Electric Cooperative, Inc. is currently in the process of transferring all system maps to an Autodesk Autocad System.
13b	Southern Engineering Co., Atlanta, GA is presently preparing a four (4) year work plan for Berkeley Electric.
13c	Berkeley Electric Cooperative, Inc. is continually striving to update its system sectionalizing studies.

RATED BY:	TITLE	DATE
<i>Thomas O. Myer, P.E.</i>	System Engineer	11/23/98
<i>E. E. H.</i>	Manager	11/25/98
<i>Paul Kriss</i>	RUS GFR	12/12/98

RUS FORM 300 (2/98)

USDA - RUS						BORROWER DESIGNATION	
REVIEW RATING SUMMARY						SC 25 Berkeley	
						DATE PREPARED	
						January 28, 2002	
Ratings on form are: 0: Unsatisfactory -- No Records 2: Acceptable, But Should Be Improved -- See Attached Recommendations 1: Corrective Actions Are Needed 3: Satisfactory -- No Additional Action Required At This Time NA: Not Applicable							
PART I. TRANSMISSION and DISTRIBUTION FACILITIES							
1. Substations (Transmission and Distribution)				(Rating)	4. Distribution - Underground Cable		
a. Safety, Clearance, Code Compliance				3	a. Grounding and Corrosion Control		
b. Physical Condition: Structure, Major Equipment, Appearance				3	b. Surface Grading, Appearance		
c. Inspection Records Each Substation				3	c. Riser Pole: Hazards, Guying, Condition		
d. Oil Spill Prevention				3	5. Distribution Line Equipment		
2. Transmission Lines					Conditions and Records		
a. Right-of-way: Clearing, Erosion, Appearance, Intrusions				3	a. Voltage Regulators		
b. Physical Condition: Structure, Conductor, Guying				3	b. Sectionalizing Equipment		
c. Inspection Program and Records				3	c. Distribution Transformers		
3. Distribution Lines - Overhead					d. Pad Mounted Equipment		
a. Inspection Program and Records				3	Safety: Locking, Dead Front, Barriers		
b. Compliance with Safety Codes:					Appearance: Settlement, Condition		
Clearances				3	Other		
Foreign Structures				3	e. Kilowatt-hour and Demand Meter		
Attachments				3	Reading and Testing		
c. Observed Physical Condition from Field Checking							
Right-of-way				3			
Other				3			
PART II. OPERATIONS and MAINTENANCE							
6. Line Maintenance and Work Order Procedures				(Rating)	8. Power Quality		
a. Work Planning & Scheduling				3	a. General Freedom from Complaints		
b. Work Backlogs:							
Right-of-way Maintenance				3			
Poles				3	9. Loading and Load Balance		
Retirement of Idle Services				3	a. Distribution Transformer Loading		
Other				3	b. Load Control Apparatus		
7. Service Interruptions					c. Substation and Feeder Loading		
a. Average Annual Hours/Consumer by Cause (Complete for each of the previous 5 years)							
PREVIOUS 5 YEARS	POWER SUPPLIER	MAJOR STORM	SCHED'D. c.	ALL OTHER d.	TOTAL e.	(Rating)	10. Maps and Plant Records
1996	.21	.04	-0-	1.57	1.82	3	a. Operating Maps: Accurate and Up-to-Date
1997	.21	-0-	.01	1.78	2.00	3	b. Circuit Diagrams
1998	.20	.46	-0-	1.32	1.98	3	c. Staking Sheets
1999	.09	-0-	-0-	2.33	2.42	3	
2000	.40	-0-	.03	2.30	2.73	3	
b. Emergency Restoration Plan				3			
PART III. ENGINEERING							
11. System Load Conditions and Losses				(Rating)	13. Load Studies and Planning		
a. Annual System Losses				3	a. Long Range Engineering Plan		
b. Annual Load Factor				2	b. Construction/Work Plan		
c. Power Factor at Monthly Peak				3	c. Sectionalizing Study		
d. Ratios of individual Substation Annual Peak kW to kVA				3	d. Load Data for Engineering Studies		
12. Voltage Conditions					e. Load Forecasting Data		
a. Voltage Surveys				2			
b. Substation Transformer Output Voltage Spread				3			

PART IV. OPERATION AND MAINTENANCE BUDGETS						
YEAR	For Previous 2 Years		For Present Year	For Future 3 Years		
	1999	2000	2001	2002	2003	2004
	Actual \$ Thous.	Actual \$ Thous.	Budget \$ Thous.	Budget \$ Thous.	Budget \$ Thous.	Budget \$ Thous.
Normal Operation	4,559	4,841	5,073	5,658	6,083	6,539
Normal Maintenance	3,992	4,641	4,816	5,379	5,948	6,577
Additional (Deferred) Maintenance						
Total	8,551	9,482	9,889	11,037	12,031	13,116

14. Budgeting: Adequacy of Budgets For Needed Work

(Rating) 3

15. Date Discussed With Board of Directors

Date 01-28-02

EXPLANATORY NOTES

ITEM NO.	COMMENTS
5d	Berkeley Electric Cooperative, Inc. still owns a few pieces of submersible equipment and plans to replace with pad mounted gear when appropriate. Berkeley Electric Cooperative, Inc. continually monitors all substation circuits for load balance during peak conditionsthrough the utilization of its QEI SCADA System. Circuits found out of balance are corrected and monitored. Berkeley Electric Cooperative, Inc. is currently in a transition period converting all "paper" maps to a totally automated computer system. All service trucks in the very near future will be equiped with computers with real time data. The annual load factor of 43.61% is slightly below 45%, but is appropriate for our system. Every effort will be made to improve the annual load factor. Berkeley Electric Cooperative, Inc. needs to make improvements in its record keeping in this area. A new Power Requirement Study will be prepared for Berkeley Electric Cooperative, Inc. in the first quarter of 2002 by Central Electric Power Cooperative, Inc., Columbia, SC.
9c	
10a, 10b	
11b	
12a	
13e	

RATED BY:	TITLE	DATE
Thomas O. Myers	Vice President, Engineering	1/18/02
E. E. S.	President and CEO	1/28/02
Paul Buss		

UNITED STATES DEPARTMENT OF AGRICULTURE RURAL UTILITIES SERVICE REVIEW RATING SUMMARY						BORROWER DESIGNATION SC 25 BERKELEY DATE PREPARED JANUARY 2005																																																		
Ratings on form are: 0: Unsatisfactory -- No Records 2: Acceptable, but Should be Improved -- See Attached Recommendations 1: Corrective Action Needed 3: Satisfactory -- No Additional Action Required at this Time N/A: Not Applicable																																																								
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c. Inspection Records Each Substation				c. Riser Pole: Hazards, Guying, Condition																																																				
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c. Inspection Program and Records				c. Distribution Transformers																																																				
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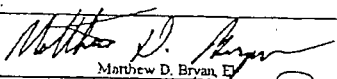
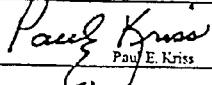
PART IV. OPERATION AND MAINTENANCE BUDGETS						
YEAR	For Previous 2 Years		For Present Year	For Future 3 Years		
	2003 Actual \$ Thousands	2004 Actual \$ Thousands	2005 Budget \$ Thousands	2006 Budget \$ Thousands	2007 Budget \$ Thousands	2008 Budget \$ Thousands
Normal Operation	\$5,577,309	\$6,330,627	\$6,103,038	\$6,347	\$6,601	\$6,865
Normal Maintenance	\$5,798,550	\$5,716,514	\$6,472,881	\$6,773	\$7,073	\$7,373
Additional (Deferred) Maintenance				40,762	40,762	40,762
Total	\$11,375,839	\$12,047,141	\$12,575,919	13,160,643	13,714,643	14,278,643

14. Budgeting: Adequacy of Budgets for Needed Work 3 (Rating)

15. Date Discussed with Board of Directors January 24, 2005 (Date)

EXPLANATORY NOTES

ITEM NO.	COMMENTS
I.1.b	Fill in eroded areas, add gravel, ground fence, repair minor oil leaks, touch up rust spots, install proper signs and identify phasing. Remove debris stored on site. Several cases where rusted insulator brackets need to be replaced. Substation inspection sheets were prepared with required corrections.
I.3.c.	Repair or replace poles, pole grounds, damaged conductor, defective lightning arrestors, guys and anchors.
I.5.d.	Repair or replace rusted and/or deteriorating pad mounted equipment.
II.7.b.	Emergency Restoration Plan to be updated with new RUS mandate.
II.9.c.	Feeders reasonably balanced during peak loads but could be improved. Feeders are monitored with existing QEI SCADA system.
III.11.b.	This load factor is appropriate for the system. Efforts will be made to improve the load factor where possible.
III.11.c.	All distribution substations at or above 90% power factor at system coincident peak.

	TITLE	DATE
RATED BY:  Matthew D. Bryan, E	Electrical Engineer	1/14/05
REVIEWED BY:  Ervin E. Strickland	President & CEO	1/24/05
REVIEWED BY:  Paul E. Kriss	RUS GFR	2/23/05

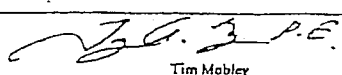
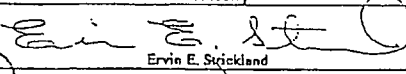
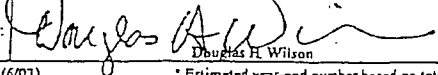
UNITED STATES DEPARTMENT OF AGRICULTURE RURAL UTILITIES SERVICE REVIEW RATING SUMMARY						BORROWER DESIGNATION SC 25 BERKELEY			
						DATE PREPARED JANUARY 2008			
Ratings on form are: 0: Unsatisfactory — No Records - 2: Acceptable, but Should be Improved — See Attached Recommendations N/A: Not Applicable 1: Corrective Action Needed 3: Satisfactory — No Additional Action Required at this Time									
PART I. TRANSMISSION and DISTRIBUTION FACILITIES									
1. Substations (Transmission and Distribution)				(Rating)	4. Distribution - Underground Cable			(Rating)	
a. Safety, Clearance, Code Compliance				3	a. Grounding and Corrosion Control			3	
b. Physical Conditions: Structure, Major Equipment, Appearance				2	b. Surface Grading, Appearance			3	
c. Inspection Records Each Substation				3	c. Riser Pole: Hazards, Guying, Condition			3	
d. Oil Spill Prevention				3					
2. Transmission Lines					5. Distribution Line Equipment: Conditions and Records				
a. Right-of-Way: Clearing, Erosion, Appearance, Intrusions				N/A	a. Voltage Regulators			3	
b. Physical Condition: Structure, Conductor, Guying				N/A	b. Sectionalizing Equipment			3	
c. Inspection Program and Records				N/A	c. Distribution Transformers			3	
					d. Pad Mounted Equipment				
					Safety: Locking, Dead Front, Barriers			3	
					Appearance: Settlement, Condition			2	
					Other			3	
3. Distribution Lines - Overhead					e. Kilowatt-hour and Demand Meter				
a. Inspection Program and Records				2	Reading and Testing			3	
b. Compliance with Safety Codes:									
Clearances				3					
Foreign Structures				3					
Attachments				3					
c. Observed Physical Condition from Field Checking:									
Right-of-Way				2					
Other				2					
PART II. OPERATIONS and MAINTENANCE									
6. Line Maintenance and Work Order Procedures				(Rating)	8. Power Quality			(Rating)	
a. Work Planning & Scheduling				3	a. General Freedom from Complaints			3	
b. Work Backlog:									
Right-of-Way Maintenance				3					
Poles				3	9. Loading and Load Balance				
Retirement of Idle Services				3	a. Distribution Transformer Loading			3	
Other				3	b. Load Control Apparatus			3	
					c. Substation and Feeder Loading			2	
7. Service Interruptions									
a. Average Annual Hours/Consumer by Cause (Complete for each of the previous 3 years)									
PREVIOUS 5 YEARS (Year)	POWER SUPPLIER a.	MAJOR STORM b.	SCHEDULED c.	ALL OTHER d.	TOTAL e.		10. Maps and Plant Records		
						(Rating)	a. Operating Maps: Accurate and Up-to-Date	3	
2006	0.07	0.12	0.11	3.52	3.82	3	b. Circuit Diagrams	3	
2005	0.29	0.00	0.18	2.98	3.45	3	c. Staking Sheets	3	
2004	2.19	7.33	0.11	3.68	13.31	2			
2003	0.40	0.02	0.35	3.10	3.87	3			
2002	0.11	0.00	0.03	2.08	2.22	3			
b. Emergency Restoration Plan				3					
PART III. ENGINEERING									
11. System Load Conditions and Losses				(Rating)	13. Load Studies and Planning			(Rating)	
a. Annual System Losses				4.24%	3	a. Long Range Engineering Plan			3
b. Annual Load Factor				41.0%	2	b. Construction Work Plan			3
c. Power Factor at Monthly Peak				98.6%	2	c. Sectionalizing Study			3
d. Ratios of Individual Substation Annual Peak kW to kVA				3	d. Load Data for Engineering Studies			3	
					e. Load Forecasting Data			3	
12. Voltage Conditions									
a. Voltage Surveys				3					
b. Substation Transformer Output Voltage Spread				3					

PART IV. OPERATION AND MAINTENANCE BUDGETS						
YEAR	For Previous 2 Years		For Present Year	For Future 3 Years		
	2006	2007	2008	2009	2010	2011
	Actual \$ Thousands	Actual * \$ Thousands	Budget \$ Thousands	Budget \$ Thousands	Budget \$ Thousands	Budget \$ Thousands
Normal Operation	\$6,473	\$8,002	\$9,023	\$10,105	\$11,318	\$12,676
Normal Maintenance	\$7,527	\$7,125	\$8,470	\$9,486	\$10,625	\$11,900
Additional (Deferred) Maintenance				\$41	\$41	\$41
Total	\$14,000	\$15,127	\$17,492	\$19,633	\$21,984	\$24,617

14. Budgeting: Adequacy of Budgets for Needed Work 3 (Rating)

15. Date Discussed with Board of Directors January 28, 2008 (Date)

EXPLANATORY NOTES	
ITEM NO.	COMMENTS
I.1.b	Fill in eroded areas, add gravel, ground fence, repair minor oil leaks, touch up rust spots, install proper signs and identify phasing. Remove debris stored on site. Substation inspection sheets were prepared with required corrections.
I.3.a	Approximately 10% of BECs poles are inspected annually by an outside contractor. Employee's are trained to visual inspect lines in there daily operations. BEC is currently in the process of a complete field inventory and GPS of their entire system. Each location on the distribution system will be visited during this project.
I.3.c	Repair or replace poles, pole grounds, damaged conductor, defective lightning arrestors, guys and anchors. Instances where ROW could be improved. Between BEC's vegetation management and conventional ROW maintenance programs, these issues should be resolved in a timely manner.
I.5.d	Rare instances where locks may need replacing. Some instances where "Warning" signs need to be installed. These minor issues will be taken care of under the existing maintenance contract. No additional deferred maintenance is required at this time.
II.7.a	2004 major storms outages are due primarily to two named tropical storms and one hurricane which created extensive outages.
II.9.c	Feeders reasonably balanced during peak loads but could be improved. Feeders are monitored with existing QEI SCADA system.
III.11.b	This load factor is appropriate for the system. Efforts will be made to improve the load factor where possible.
III.11.c	All distribution substations at or above 95% power factor at system coincident peak.

	TITLE	DATE
RATED BY:  Tim Mobley	Manager of Engineering & Technical Services	1-29-08
REVIEWED BY:  Ernie E. Strickland	President & CEO	1/29/08
REVIEWED BY:  Douglas H. Wilson	RUS GFR	2/7/08

RUS FORM 300 (6/03) * Estimated year-end number based on totals thru November 2007. PAGE 2 OF 2 PAGES

UNITED STATES DEPARTMENT OF AGRICULTURE
Rural Utilities Service

Bulletin 1730-1

SUBJECT: Electric System Operation and Maintenance (O&M)

To: RUS Electric Borrowers and RUS Electric Staff

Effective Date: Date of Approval

Expiration Date: Seven Years from Effective Date

Office of Primary Interest: Electric Staff Division

Filing Instructions: This Bulletin supersedes REA Bulletin 161-5, Electric System Review and Evaluation, dated October, 1978. File this bulletin with 7 CFR 1730.

Purpose: This bulletin contains guidelines related to electric borrowers' operation and maintenance (O&M) and outlines the Rural Utilities Service's (RUS) standard practices with respect to review and evaluation of O&M practices.

/s/

Assistant Administrator - Electric Program

January 1/26/98

Date



TABLE OF CONTENTS

1. Purpose.....	3
2. Borrower Guidelines	3
3. Review and Evaluation of O&M Practices by RUS.....	5
Exhibit A: RUS Form 300 Rating Guide.....	7

INDEX: Inspection
Maintenance
Operations and Maintenance
Records

ABBREVIATIONS

ANSI	American National Standards Institute
CAP	Corrective Action Plan
CFR	Code of Federal Regulations
CT	Current Transformer
EMF	Electric and Magnetic Fields
EPA	Environmental Protection Agency
GFR	General Field Representative
IFT	Interfacial Tension
kVA	Kilovolt-Ampere
kW	Kilowatt
kWh	kilowatt-hour
NESC	National Electrical Safety Code
O&M	Operations and Maintenance
OCR	Oil Circuit Recloser
PCB	Polychlorinated Biphenyl
PSD	Power Supply Division
PT	Potential Transformer
REA	Rural Electrification Administration
RUS	Rural Utilities Service

1. Purpose: This bulletin contains guidelines related to electric borrowers' operation and maintenance (O&M) and outlines the Rural Utilities Service's (RUS) standard practices with respect to review and evaluation of O&M practices. 7 CFR 1730 contains the policies and procedures of RUS related to electric borrowers' O&M practices and RUS' review and evaluation thereof.

2. Borrower Guidelines

2.1 Records: Each borrower is responsible for maintaining records of the physical and electrical condition of its electric system. Any or all of these records may be reviewed by RUS during its review and evaluation. Such records include, but are not limited to:

- (a) Service interruption reports and summaries of experience (including power supply outages.)
- (b) Overhead and underground line inspection and maintenance records, including pole inspection and line patrol records.
- (c) Substation inspection and maintenance records.
- (d) Recloser and sectionalizer records.
- (e) Line Voltage regulator records.
- (f) Distribution transformer records.
- (g) Watt-hour and demand meter records.
- (h) Right-of-way maintenance records.
- (i) Line Voltage and current records.
- (j) Up-to-date system maps.

- (k) System losses.
- (l) Idle services.
- (m) External system impacts (including EMF questions, stray voltage, radio and television interference, etc.)--records of inquiries and resulting actions.

2.2 Emergency Restoration Plan: Each borrower should have a written plan detailing how to restore its system in the event of a system wide outage resulting from a major natural disaster or other causes. This plan should include how to contact emergency agencies, borrower management and other key personnel, contractors and equipment suppliers, other utilities, and any others that might need to be reached in an emergency. It should also include recovery from loss of power to the headquarters, key offices, and/or operation center facilities. It should be readily accessible at all times under any and all circumstances.

2.3 System Ratings: RUS Form 300, Review Rating Summary, includes a numerical rating system as follows:

- 0: Unsatisfactory - no records
- 1: Unsatisfactory - corrective action needed
- 2: Acceptable, but could be improved - see attached recommendations
- 3: Satisfactory - no additional action required at this time
- N/A: Not applicable

Exhibit A provides a guide for the conditions normally needed to justify a rating of 3 for each of the items on RUS Form 300. The explanatory notes section of RUS Form 300 should include a list of all items rated as unsatisfactory (ratings 0 or 1) along with comments indicating the action or implementation that is proposed. This is in addition to the corrective action plan (CAP) required by 7 CFR 1730. Additional expenditures required for deferred maintenance should be

indicated in the O&M Budgets, Part IV of RUS Form 300. These may be distributed over a period of 2 or 3 years as indicated on the form.

3. Review and Evaluation of O&M Practices by RUS

3.1. RUS will conduct a periodic review and evaluation of each borrower's operation and maintenance programs and practices. The purpose of this review is to assess loan security and to determine borrower compliance with RUS policy as outlined in part 7 CFR 1730.

3.2. Distribution Borrowers: The General Field Representative (GFR) is responsible, within the GFR's assigned territory, for initiating and conducting a periodic review and evaluation of each distribution borrower's operation and maintenance programs, practices, and records. This review and evaluation is to be done at least once every 3 years.

3.2.1 The GFR may inspect facilities as well as records, and may also observe construction and maintenance work in the field. Key borrower personnel responsible for the facilities being inspected should accompany the GFR during such inspections.

3.2.2 If adequate information is available, the GFR will complete the review and evaluation and consult with the borrower regarding its programs and records for operation, maintenance, and system improvements. The GFR's signature on the Form 300 signifies concurrence with the borrower's analysis, ratings, and explanatory notes unless indicated otherwise.

3.2.3 If adequate information is not available, the GFR's review and evaluation will be deferred until the borrower has remedied the deficiencies identified by the GFR.

3.2.4 Upon completion of the O&M review and evaluation, the GFR will communicate his/her findings to the borrower.

3.3 Power Supply Borrowers: The Power Supply Division (PSD) is responsible for initiating and conducting a periodic review and evaluation of each power supply borrower's operation and maintenance programs, practices, and records . PSD will consult with the borrower and arrange a scheduled time for the review and evaluation. PSD will determine the frequency of this review and evaluation.

3.3.1 The GFR will, upon request by PSD, assist in the review and evaluation, particularly with respect to transmission, subtransmission, and substation facilities.

EXHIBIT A
RUS FORM 300 RATING GUIDE
CONDITIONS NORMALLY NEEDED TO JUSTIFY A RATING OF 3

PART I - TRANSMISSION and DISTRIBUTION FACILITIES

1. Substations (Transmission and Distribution)

- a. Safety, Clearance, Code Compliance: No violations of RUS or NESC requirements including clearance or separations in any substation. All substations accessible by authorized personnel only. Operating manual available for each substation.
- b. Physical Condition: Structure, Major Equipment, Appearance: Rare instances of rust, weeds, dangerous insects, and bird nesting. No leaks, no temporary bus being used on an ongoing basis, only minor material associated with maintenance of the substation equipment stored in yard. No debris, no openings under fence greater than 3 inches (76 mm), no broken insulators, parallel power transformers properly fault protected. Circuit, phases & airbreak switch handles are properly identified.
- c. Inspection Records Each Substation: Written monthly inspection reports completed and reviewed by responsible personnel for all substations. Infrared inspection of all connectors at least every five years. Dielectric, dissolved gas, and interfacial tension (IFT) tests of oil filled equipment performed at least every five years or within one year of exposure to a through fault which causes the transformer protective devices to de-energize the transformer. Annual power factor test of all equipment rated 230 kV or above. Relays are functionally tested annually and cleaned, calibrated, and tested every three years.
- d. Oil Spill Prevention: Oil spill prevention and mitigation plans prepared and available for all substations.

CONDITIONS NORMALLY NEEDED TO JUSTIFY A RATING OF 3

2. Transmission Lines

- a. Right-of-Way - Clearing, Erosion, Appearance, Intrusions: No uncontrolled erosion. Gates or gaps at all fence crossings. Structures and lines not impacted by untrimmed right of way. Structures generally accessible by service vehicles.
- b. Physical Condition - Structure, Conductor, Guying: All structures vertical and guys taut. No broken insulators or crossarms, and no unauthorized attachments. Essentially all structures numbered. Structures and attachments conform to NESC requirements.
- c. Inspection Program and Records: Walking, riding, or aerial line patrol of all lines (including those on private right-of-way) performed at least annually. Records maintained for pole inspection and line patrol and deficiencies corrected on a timely basis. Above and below ground pole inspection performed on cycle based upon decay zone using experienced inspectors.

3. Distribution Lines - Overhead

- a. Inspection and Maintenance - Program and Records: Above and below ground pole inspection performed on cycle based upon decay zone using experienced inspectors. Records of all poles inspected, treated, rejected and changed out readily available in summary form. All overhead lines (including those on private right-of-way) patrolled annually (walking, riding, or aerial); more frequently if experience dictates. Records maintained for pole inspection and line patrol with deficiencies corrected in a timely manner. Pole and equipment changeout program in place to keep rejected poles and failed equipment to a minimum.
- b. Compliance with Safety Codes - Clearances: All facilities staked prior to construction by personnel familiar with NESC requirements. Line patrols identify changed conditions requiring greater clearances.

CONDITIONS NORMALLY NEEDED TO JUSTIFY A RATING OF 3

Compliance with Safety Codes - Foreign Structures: Utility has policy and practice of immediately remedying foreign structures which conflict with primary lines upon observation.

Compliance with Safety Codes - Attachments: All overhead attachments meet NESC separation and clearance requirements. Up-to-date joint-use and pole rental agreements are in effect. Unauthorized attachments and violations of the NESC promptly remedied.

- c. Observed Physical Condition from Field Checking - Right-of-way: Structures and lines not impacted by untrimmed right-of-way. Right-of-way re-trimming cycles to be dictated by local conditions.

Observed Physical Condition from Field Checking - Other: Rare instances of leaning poles, slack guys, broken grounds, loose hardware and superfluous material on structures. No broken crossarms or insulators, and no pole steps on wood poles. Installation of miscellaneous distribution equipment meets NESC requirements. Neutral properly identified when located on crossarm.

4. Distribution - Underground Cable

- a. Grounding and Corrosion Control: Ground rods located at each transformer plus at least four per mile (1.6 km), not including grounds at individual services, in accordance with the NESC. Record system kept of visible cable condition when excavated. Periodic testing at selected locations of underground cable and grounding points for evidence of corrosion. Appropriate and timely actions taken to correct any unsatisfactory conditions.
- b. Surface Grading, Appearance: Rare instances of earth settling which could create hazards to the general public and timely action taken to correct any deficiency.

CONDITIONS NORMALLY NEEDED TO JUSTIFY A RATING OF 3

- c. Riser Poles: Hazards, Guying, Condition: Cut-outs mounted per RUS requirements.
Riser cable covered with conduit to within 4 feet (1.2m) of the bottom of the potheads.
Adequate surge protection installed.
- 5. **Distribution Line Equipment: Conditions and Records**
 - a. Voltage Regulators: Voltage regulators inspected and maintained in accordance with the manufacturer's recommended timetable. Regulators checked for proper operation at least semi-annually. Knowledge of and compliance with EPA requirements with respect to PCB contaminated oil and equipment. Dielectric, dissolved gas, and IFT tests of oil filled equipment performed every five years or within one year of exposure to a through fault which causes the protective devices to de-energize the regulator.
 - b. Sectionalizing Equipment: Oil circuit reclosers (OCR's) and breakers inspected and maintained in accordance with the manufacturer's recommended timetable. Records reflect inspection results, maintenance performed, and date.
 - c. Distribution Transformers: Complete records kept as to size, location, and date installed. Knowledge of and compliance with EPA requirements with respect to PCB contaminated oil and equipment. Transformer loading analysis performed periodically as needed.
 - d. Pad Mounted Equipment - Safety - Locking, Dead Front, Barriers: All padmount enclosures meet RUS dead-front requirements (secondary barriers, recessed penta-head nut, and separate pad-lock.). Grounding in accordance with RUS and NESC requirements. "Danger" signs inside all enclosures and "Warning" signs on the exterior in accordance with ANSI Z535.

Pad Mounted Equipment - Appearance - Settlement, Condition: Rare instances of leaning or undermined enclosures. Prompt action taken to correct deficiencies.

CONDITIONS NORMALLY NEEDED TO JUSTIFY A RATING OF 3

- e. Watt-hour and Demand Meter Reading and Testing: All meters tested in accordance with state regulations (where applicable) or ANSI C12.1. PT, CT and demand meters are generally tested on at least a 3 year cycle. Complete records kept as to size, location, and date installed.

PART II - OPERATION AND MAINTENANCE

6. Line Maintenance and Work Order Procedures

- a. Work Planning and Scheduling: All lines staked prior to construction by personnel familiar with NESC requirements. Work order inspections performed in accordance with 7 CFR 1724, Electric Engineering, Architectural Services and Design Policies and Procedures (i.e., within 6 months of completion of construction.) Utility promptly provides inspector with written notice that clean-up work has been completed. Construction Work Plan projects completed in time to meet load level requirements. New service connections completed in reasonable time frames.

Work Backlogs - Right-of-way Maintenance: Adequate resources being provided to address re-clearing on timely basis. Right-of-way re-trimming cycles to be dictated by local conditions.

Work Backlogs - Poles: All reject poles replaced within 6 months of inspection. "Danger" and "Hazard" poles replaced as soon as possible.

Work Backlogs - Idle Services - Retirement of: Policy and procedures in place to address retirement of idle services so that ratio of idle services to total is less than 10% unless specific local conditions dictate otherwise.

CONDITIONS NORMALLY NEEDED TO JUSTIFY A RATING OF 3

Work Backlogs - Other: Job orders from line inspection completed in reasonable time frames.

7. Service Interruptions

- a. Average Annual Hours/Consumer by Cause: Rating to consider the effect of all types of outages, including planned. Evidence of concern would be when total outages exceed 5 hours or power supply outages exceed 1 hour per consumer per year. Outages accounted for in accordance with RUS Bulletin 161-1.
- b. Emergency Restoration Plan: Emergency restoration plan readily available and covers multiple scenarios, including loss of power to the headquarters, key offices, and/or operations centers.

8. Power Quality

General Freedom from Complaints: Minimal complaints with respect to television and radio interference, voltage flicker, neutral-to-earth voltage, harmonics, and EMF. Complaints generally resolved quickly and effectively. Summary of complaints maintained and analyzed periodically.

9. Loading and Load Balance

- a. Distribution Transformer Loading: Loading ratio (kVA to peak kW) may range from 2 to 4, depending upon levels of load management, seasonal customers, as well as other factors.
- b. Load Control Apparatus: Have records of individual controllers showing location, type of load being controlled, and any maintenance. Load control results summarized.

CONDITIONS NORMALLY NEEDED TO JUSTIFY A RATING OF 3

- c. Substation and Feeder Loading: All feeders balanced at each substation to within 20% during peak loads.

10. Maps and Plant Records

- a. Operating Maps - Accurate and Up-to-Date: Consumers can be identified by location with a set of maps carried by all service personnel. Maps depict roads, grid lines, waterways, railroads, and other landmarks necessary to locate consumers. Maps are of a functional size and permit location of consumers irrespective of date of service. Detail maps are current and up to date, generally 1 year old or less.
- b. Circuit Diagrams: Current and up-to-date map (generally 2 years old or less) depicting a multiple line layout of distribution facilities of the utility. The location and sizes of substations, line regulators, reclosers, capacitors, and substation boundaries are clearly shown. Primary voltage drops are indicated at the ends of primary feeder lines. All transmission lines are located and identified as to voltage and ownership.
- d. Staking Sheets: Staking sheets are prepared for projects prior to construction. The sketch and construction units are consistent. North arrow and grid reference are present. Spans lengths are correctly listed and all line angles and guy lead lengths are stated. Final staking sheets are consistent with the "as-built" conditions.

PART III - ENGINEERING

11. System Load Conditions and Losses

- a. Annual System Losses: System losses are appropriate for the conditions encountered. Reasonable efforts made to reduce system losses.

CONDITIONS NORMALLY NEEDED TO JUSTIFY A RATING OF 3

- b. Annual Load Factor: Load factor is appropriate for the conditions encountered, generally at least 45%. Reasonable efforts made to improve load factor, where possible.
- c. Power Factor at Monthly Peak: Each distribution substation maintains a power factor between 0.95 lagging and 0.95 leading at time of power supply coincident peak demand.

12. Voltage Conditions

- a. Voltage Surveys: Sufficient number of recording and/or indicating voltmeters are available and utilized to monitor specific locations where voltage conditions warrant special attention. Annual graphs or statistical analyses are kept for each meter for the most recent 5 year period.
- b. Substation Transformer Output Voltage Spread: All substations include automatic voltage regulators or voltage regulating transformers. Each substation has continuous voltage recording which is monitored monthly by computer analysis. Regulated substation output voltage and line regulators are maintained so that Range A service voltage per RUS Bulletin 169-4 is provided to all consumers.

13. Load Studies and Planning

- a. Long Range Engineering Plan: System planning study is current, meets the requirements of 7 CFR 1710, can be used as a guide for preparing the next Construction Work Plan, and is prepared in accordance with RUS Bulletin 1724D-101A.
- b. Construction Work Plan: Work Plan is up-to-date, meets the requirements of 7 CFR 1710, and is prepared in accordance with RUS Bulletin 1724D-101B.
- c. Sectionalizing Study: System sectionalizing is reviewed and updated as needed concurrently with each Construction Work Plan and with significant change in fault current conditions.

CONDITIONS NORMALLY NEEDED TO JUSTIFY A RATING OF 3

- d. Load Data for Engineering Studies: A completely integrated data base automatically assigns consumers, and their load (kWh or kW) to specific geographical locations that are associated with specific distribution line sections. Data is sufficiently accurate that the difference between the calculated and measured substation kW is less than 5%.
- e. Power Requirements Data: Power requirements study is current and completed in compliance with the requirements stated in 7 CFR 1710.

PART IV - OPERATION AND MAINTENANCE BUDGETS

14. Budgeting

Adequacy of Budgets For Needed Work: Utility prepares an annual budget with specific item quantities and dollars prior to the beginning of each year for each department. The O&M budget is broken down to show each program, the quantities of work to be accomplished and the timing during the year when the proposed work is to be performed.

Code of Federal Regulations

Title 7. Agriculture

Subtitle B. Regulations of the Department of Agriculture

Chapter XVII. Rural Utilities Service, Department of Agriculture (Refs & Annos)

Part 1730. Electric System Operations and Maintenance (Refs & Annos)

Subpart B. Operations and Maintenance Requirements

7 C.F.R. § 1730.21

§ 1730.21 Inspections and tests.

Currentness

(a) Each borrower shall conduct all necessary inspections and tests of the component parts of its electric system, annually exercise its ERP, and maintain records of such inspections and tests. For the purpose of this part, "Exercise" means a borrower's Tabletop execution of, or actual implementation of, the ERP to verify the operability of the ERP. Such Exercise may be performed singly by an individual borrower, or as an active participant in a multi-party (to include utilities, government agencies and other participants or combination thereof) Tabletop execution or actual full implementation of the ERP. For the purpose of this part, "Tabletop" means a hypothetical emergency response scenario in which participants will identify the policy, communication, resources, data, coordination, and organizational elements associated with an emergency response.

(b) The frequency of inspection and testing will be determined by the borrower in conformance with applicable laws, regulations, national standards, and Prudent Utility Practice. The frequency of inspection and testing will be determined giving due consideration to the type of facilities or equipment, manufacturer's recommendations, age, operating environment and hazards to which the facilities are exposed, consequences of failure, and results of previous inspections and tests. The records of such inspections and tests will be retained in accordance with applicable regulatory requirements and Prudent Utility Practice. The retention period should be of a sufficient time period to identify long-term trends. Records must be retained at least until the applicable inspections or tests are repeated.

(c) Inspections of facilities must include a determination of whether the facility complies with the National Electrical Safety Code, National Electrical Code (as applicable), and applicable State or local regulations and whether additional security measures are considered necessary to reduce the vulnerability of those facilities which, if damaged or destroyed, would severely impact the reliability and security of the electric power grid, cause significant risk to the safety and health of the public and/or impact the ability to provide service to consumers over an extended period of time. The electric power grid, also known as the transmission grid, consists of a network of electrical lines and related facilities, including certain substations, used to connect distribution facilities to generation facilities, and includes bulk transmission and subtransmission facilities as defined in § 1710.2 of this title. Any serious or life-threatening deficiencies shall be promptly repaired, disconnected, or isolated in accordance with applicable codes or regulations. Any other deficiencies found as a result of such inspections and tests are to be recorded and those records are to be maintained until such deficiencies are corrected or for the retention period required by paragraph (b) of this section, whichever is longer.

Credits

[69 FR 60540, Oct. 12, 2004]

SOURCE: 59 FR 66440, Dec. 27, 1994; 63 FR 3450, Jan. 23, 1998, unless otherwise noted.

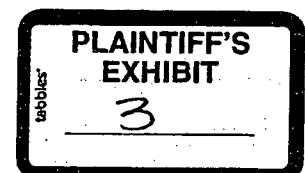
AUTHORITY: 7 U.S.C. 901 et seq., 1921 et seq., 6941 et seq.

Current through August 4, 2011; 76 FR 47352

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Recognized as an
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Committee

C2-1993

1993 NATIONAL ELECTRICAL SAFETY CODE



Published by
The Institute of Electrical and Electronics Engineers, Inc.
August 3, 1992

PLAINTIFF'S
EXHIBIT

7

Section 21. General Requirements

210. Referenced Sections

The Introduction (Section 1), Definitions (Section 2), References (Section 3), and Grounding Methods (Section 9) shall apply to the requirements of Part 2.

211. Number 211 not used in this edition.

212. Induced Voltages

Rules covering supply-line influence and communication-line susceptiveness have not been detailed in this code. Cooperative procedures are recommended in the control of voltages induced from proximate facilities. Therefore, reasonable advance notice should be given to owners or operators of other proximate facilities that may be adversely affected by new construction or changes in existing facilities.

213. Accessibility

All parts that must be examined or adjusted during operation shall be arranged so as to be accessible to authorized persons by the provision of adequate climbing spaces, working spaces, working facilities, and clearances between conductors.

214. Inspection and Tests of Lines and Equipment

A. When In Service

1. Initial Compliance With Rules
Lines and equipment shall comply with these safety rules when placed in service.
2. Inspection
Lines and equipment shall be inspected at such intervals as experience has shown to be necessary.
3. Tests
When considered necessary, lines and equipment shall be subjected to practical tests to determine required maintenance.
4. Record of Defects
Any defects affecting compliance with this code revealed by inspection or tests, if not promptly corrected, shall be recorded; such records shall be maintained until the defects are corrected.
5. Remedying Defects
Lines and equipment with recorded defects that could reasonably be expected to endanger life or property shall be promptly repaired, disconnected, or isolated.

B. When Out of Service

1. Lines Infrequently Used
Lines and equipment infrequently used shall be inspected or tested as necessary before being placed into service.
2. Lines Temporarily Out of Service
Lines and equipment temporarily out of service shall be maintained in a safe condition.
3. Lines Permanently Abandoned
Lines and equipment permanently abandoned shall be removed or maintained in a safe condition.

- I. The clearances and spacing required shall be maintained at the values and under the conditions specified in Section 23 of the applicable edition. See Rule 013.

231. Clearances of Supporting Structures From Other Objects

Supporting structures, support arms and equipment attached thereto, and braces shall have the following clearances from other objects. The clearance shall be measured between the nearest parts of the objects concerned.

A. From Fire Hydrants

Not less than 3 ft (900 mm).

RECOMMENDATION: Where conditions permit, a clearance of not less than 4 ft (1.20 m) is recommended.

B. From Streets, Roads, and Highways

1. Where there are curbs: supporting structures, support arms, or equipment attached thereto, up to 15 ft (4.6 m) above the road surface shall be located a sufficient distance from the street side of the curbs to avoid contact by ordinary vehicles using and located on the traveled way. In no case shall such distance be less than 6 in (150 mm).
2. Where there are no curbs, supporting structures should be located a sufficient distance from the roadway to avoid contact by ordinary vehicles using and located on the traveled way.
3. Location of overhead utility installations on highways with narrow rights-of-way or on urban streets with closely abutting improvements are special cases that must be resolved in a manner consistent with the prevailing limitations and conditions.
4. Where a governmental authority exercising jurisdiction over structure location has issued a permit for, or otherwise approved, specific locations for supporting structures, that permit or approval shall govern.

C. From Railroad Tracks

Where railroad tracks are parallel to or crossed by overhead lines, all portions of the supporting structures, support arms, anchor guys, and equipment attached thereto less than 22 ft (6.7 m) above the nearest track rail shall be located not less than 12 ft (3.6 m) from the nearest track rail. See Rule 234I.

EXCEPTION 1: A clearance of not less than 7 ft (2.13 m) may be allowed where the supporting structure is not the controlling obstruction, provided sufficient space for a driveway is left where cars are loaded or unloaded.

EXCEPTION 2: Supports for overhead trolley-contact conductors may be located as near their own track rail as conditions require. If very close, however, permanent screens on cars will be necessary to protect passengers.

EXCEPTION 3: Where necessary to provide safe operating conditions that require an uninterrupted view of signals, signs, etc., along tracks, the parties concerned shall cooperate in locating structures to provide the necessary clearance.

EXCEPTION 4: At industrial sidings, a clearance of not less than 7 ft (2.13 m) shall be permitted, provided sufficient space is left where cars can be loaded or unloaded.

232. Vertical Clearances of Wires, Conductors, Cables, and Equipment Above Ground, Roadway, Rail, or Water Surfaces

A. Application

The vertical clearances specified in Rule 232B1 apply under the following conductor temperature and loading conditions, whichever produces the largest final sag.

1. 120 °F (50 °C), no wind displacement.
2. The maximum conductor temperature for which the line is designed to operate, if greater than 120 °F (50 °C), with no wind displacement.
3. 32 °F (0 °C), no wind displacement, with radial thickness of ice, if any, specified in Rule 250B for the loading district concerned.

EXCEPTION: The conductor temperature and loading condition for trolley and electrified railroad contact conductors shall be 60 °F (15 °C), no wind displacement, final unloaded sag, or initial unloaded sag in cases where these facilities are maintained approximately at initial unloaded sags.

NOTE: The phase and neutral conductors of a supply line are normally considered separately when determining the sag of each due to temperature rise.

B. Clearance of Wires, Conductors, Cables, and Equipment Mounted on Supporting Structures

1. Clearance to Wires, Conductors, and Cables

The vertical clearance of wires, conductors, and cables above ground in generally accessible places, roadway, rail, or water surfaces, shall be not less than that shown in Table 232-1.

2. Clearance to Unguarded Rigid Live Parts of Equipment

The vertical clearance above ground or roadway surfaces for unguarded rigid live parts such as potheads, transformer bushings, surge arresters, and short lengths of supply conductors connected thereto, which are not subject to variation in sag, shall be not less than that shown in Table 232-2.

3. Clearance to Equipment Cases

The vertical clearance of equipment cases above ground or roadway surfaces shall be not less than that shown in Table 232-2.

4. Street and Area Lighting

- a. All exposed ungrounded conductive parts of luminaires and their supports that are not insulated from current-carrying parts shall be maintained at not less than 20 in (500 mm) from the surface of their supporting structure.

EXCEPTION 1: This may be reduced to 5 in (125 mm) if located on the side of the structure opposite the designated climbing space.

EXCEPTION 2: This does not apply where the equipment is located at the top or other vertical portion of the structure that is not subject to climbing.

- b. Insulators, as specified in Rule 279A, should be inserted at least 8 ft (2.45 m) from the ground in metallic suspension ropes or chains supporting lighting units of series circuits.

C. Additional Clearances for Wires, Conductors, Cables, and Unguarded Rigid Live Parts of Equipment

Greater clearances than specified by Rule 232B shall be provided where required by Rule 232C1.

1. Voltages Exceeding 22 Kilovolts

- a. For voltages between 22 and 470 kV, the clearance specified in Rule 232B1 (Table 232-1) or Rule 232B2 (Table 232-2) shall be increased at the rate of 0.4 in (10 mm) per kilovolt in excess of 22 kV. For voltages exceeding 470 kV, the clearance shall be determined by the method given in Rule 232D. All clearances for lines over 50 kV shall be based on the maximum operating voltage.

EXCEPTION: For voltages exceeding 98 kV ac to ground or 139 kV dc to ground, clearances less than those required above are permitted for systems with known maximum switching-surge factors (see Rule 232D).

- b. For voltages exceeding 50 kV, the additional clearance specified in Rule 232C1a shall be increased 3% for each 1000 ft (300 m) in excess of 3300 ft (1000 m) above mean sea level.

- c. For voltages exceeding 98 kV ac to ground, either the clearances shall be increased or the electric field or the effects thereof shall be reduced by other means, as required, to limit the steady-state current due to electrostatic effects to 5 mA, rms, if the largest anticipated truck, vehicle, or equipment under the line were short-circuited to ground. The size of the anticipated truck, vehicle, or equipment used to determine these clearances may be less than but need not be greater than that limited by federal, state,

FT

Table 232-1

Vertical Clearance of Wires, Conductors, and Cables Above Ground, Roadway, Rail or Water Surfaces⁽²⁵⁾

(Voltages are phase to ground for effectively grounded circuits and those other circuits where all ground faults are cleared by promptly de-energizing the faulted section, both initially and following subsequent breaker operations. See the definitions section for voltages of other systems. See Rules 232B1, 232C1a, and 232D4.)

Nature of surface underneath wires, conductors, or cables	Insulated ^① communication conductors and cable; messengers; surge-protection wires; grounded guys; neutral conductors meeting Rule 230E1; supply cables meeting Rule 230C1 (ft)	Noninsulated communication conductors; supply cables of 0 to 750 V meeting Rules 230C2 or 230C3 (ft)	Supply cables over 750 V meeting Rules 230C2 or 230C3; open supply conductors, 0 to 750 V (ft)	Open supply conductors, over 750 V to 22 kV (ft)	Trolley and electrified railroad contact conductors and associated span or messenger wires ^①	
					0 to 750 V to ground (ft)	Over 750 V to 22 kV to ground (ft)
Where wires, conductors, or cables cross over or overhang						
1. Track rails of railroads (except electrified railroads using overhead trolley conductors) ^{②⑬⑳}	23.5	24.0	24.5	26.5	22.0 ^④	22.0 ^④
2. Roads, streets, and other areas subject to truck traffic ^⑫	15.5	16.0	16.5	18.5	18.0 ^③	20.0 ^③
3. Driveways, parking lots, and alleys	15.5 ^{⑦⑩}	16.0 ^{⑦⑩}	16.5 ^⑦	18.5	18.0 ^③	20.0 ^③
4. Other land traversed by vehicles, such as cultivated, grazing, forest, orchard, etc. ^⑤	15.5	16.0	16.5	18.5	—	—
5. Spaces and ways subject to pedestrians or restricted traffic only ^④	9.5	12.0 ^①	12.5 ^①	14.5	16.0	18.0
6. Water areas not suitable for sailboating or where sailboating is prohibited ^⑨	14.0	14.5	15.0	17.0	—	—
7. Water areas suitable for sailboating including lakes, ponds, reservoirs, tidal waters, rivers, streams, and canals with an unobstructed surface area of ^{⑦⑩⑬}						
a. Less than 20 acres	17.5	18.0	18.5	20.5	—	—
b. Over 20 to 200 acres	25.5	26.0	26.5	28.5	—	—
c. Over 200 to 2000 acres	31.5	32.0	32.5	34.5	—	—
d. Over 2000 acres	37.5	38.0	38.5	40.5	—	—
8. Public or private land and water areas posted for rigging or launching sailboats	Clearance above ground shall be 5 ft greater than in 7 above, for the type of water areas served by the launching site					
Where wires, conductors, or cables run along and within the limits of highways or other road rights-of-way but do not overhang the roadway						
9. Roads, streets, or alleys	15.5 ^{⑬⑭}	16.0 ^⑫	16.5	18.5	18.0 ^③	20.0 ^③
10. Roads in rural districts where it is unlikely that vehicles will be crossing under the line	13.5 ^{⑩⑫}	14.0 ^⑩	14.5 ^⑩	16.5	18.0 ^③	20.0 ^③

(continued on next page)

Footnotes for Table 232-1

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① Where subways, tunnels, or bridges require it, less clearance above ground or rails than required by Table 232-1 may be used locally. The trolley and electrified railroad contact conductor should be graded very gradually from the regular construction down to the reduced elevation.

② For wires, conductors, or cables crossing over mine, logging, and similar railways that handle only cars lower than standard freight cars, the clearance may be reduced by an amount equal to the difference in height between the highest loaded car handled and 20 ft, but the clearance shall not be reduced below that required for street crossings.

③ This footnote not used in this edition.

④ In communities where 21 ft has been established, this clearance may be continued if carefully maintained. The elevation of the contact conductor should be the same in the crossing and next adjacent spans. (See Rule 225D2 for conditions that must be met where uniform height above rail is impractical.)

⑤ In communities where 16 ft has been established for trolley and electrified railroad contact conductors 0 to 750 V to ground, or 18 ft for trolley and electrified railroad contact conductors exceeding 750 V, or where local conditions make it impractical to obtain the clearance given in the table, these reduced clearances may be used if carefully maintained.

⑥ This footnote not used in this edition.

⑦ Where the height of attachment to a building or other installation does not permit service drops to meet these values, the clearances over residential driveways only may be reduced to the following: (feet)

- | | |
|--|------|
| (a) Insulated supply service drops limited to 300 V to ground | 12.5 |
| (b) Insulated drip loops of supply service drops limited to 300 V to ground | 10.5 |
| (c) Supply service drops limited to 150 V to ground and meeting Rules 230C1 or 230C3 | 12.0 |
| (d) Drip loops only of service drops limited to 150 V to ground and meeting Rules 230C1 or 230C3 | 10.0 |
| (e) Insulated communication service drops | 11.5 |

⑧ Where the height of attachment to a building or other installation does not permit service drops to meet these values, the clearances may be reduced to the following: (feet)

- | | |
|---|------|
| (a) Insulated supply service drops limited to 300 V to ground | 10.5 |
| (b) Insulated drip loops of supply service drops limited to 300 V to ground | 10.5 |
| (c) Supply service drops limited to 150 V to ground and meeting Rules 230C1 or 230C3 | 10.0 |
| (d) Drip loops only of supply service drops limited to 150 V to ground and meeting Rules 230C1 or 230C3 | 10.0 |

⑨ Spaces and ways subject to pedestrians or restricted traffic only are those areas where riders on horseback, vehicles, or other mobile units exceeding 8 ft in height, are prohibited by regulation or permanent terrain configurations or are otherwise not normally encountered nor reasonably anticipated.

⑩ Where a supply or communication line along a road is located relative to fences, ditches, embankments, etc., so that the ground under the line would not be expected to be traveled except by pedestrians, the clearances may be reduced to the following values: (feet)

- | | |
|---|------|
| (a) Insulated communication conductor and communication cables | 9.5 |
| (b) Conductors of other communication circuits | 9.5 |
| (c) Supply cables of any voltage meeting Rule 230C1 and supply cables limited to 150 V to ground meeting Rules 230C2 or 230C3 | 9.5 |
| (d) Insulated supply conductors limited to 300 V to ground | 12.5 |
| (e) Guys | 9.5 |

⑪ No clearance from ground is required for anchor guys not crossing tracks, rails, streets, driveways, roads, or pathways.

⑫ This clearance may be reduced to 13 ft for communication conductors and guys.

⑬ Where this construction crosses over or runs along alleys, driveways, or parking lots, this clearance may be reduced to 15 ft.

⑭ This footnote not used in this edition.

⑮ This footnote not used in this edition.

⑯ Adjacent to tunnels and overhead bridges that restrict the height of loaded rail cars to less than 20 ft, these clearances may be reduced by the difference between the highest loaded rail car handled and 20 ft, if mutually agreed to by the parties at interest.

⑰ For controlled impoundments, the surface area and corresponding clearances shall be based upon the design high-water level. For other waters, the surface area shall be that enclosed by its annual high-water mark, and clearances shall be based on the normal flood level. The clearance over rivers, streams, and canals shall be based upon the largest surface area of any 1-mi-long segment that includes the crossing. The clearance over a canal, river, or stream normally used to provide access for sailboats to a larger body of water shall be the same as that required for the larger body of water.

⑱ Where an overwater obstruction restricts vessel height to less than the applicable reference height given in Table 232-3, the required clearance may be reduced by the difference between the reference height and the overwater obstruction height, except that the reduced clearance shall be not less than that required for the surface area on the line-crossing side of the obstruction.

⑲ Where the US Army Corps of Engineers, or the state, or surrogate thereof has issued a crossing permit, clearances of that permit shall govern.

⑳ See Rule 234I for the required horizontal and diagonal clearances to rail cars.

㉑ For the purpose of this rule, trucks are defined as any vehicle exceeding 8 ft in height. Areas not subject to truck traffic are areas where truck traffic is not normally encountered nor reasonably anticipated.

㉒ This footnote not used in this edition.

㉓ This footnote not used in this edition.

㉔ Communication cables and conductors may have a clearance of 15 ft where poles are back of curbs or other deterrents to vehicular traffic.

㉕ The clearance values shown in this table are computed by adding the applicable Mechanical and Electrical (M&E) value of Table A-1 to the applicable Reference Component of Table A-2a of Appendix A.

Section 42. General Rules for Employees

420. Personal General Precautions

A. Rules and Emergency Methods

1. Employees shall carefully read and study the safety rules, and may be called upon at any time to show their knowledge of the rules.
2. Employees shall familiarize themselves with approved methods of first aid, rescue techniques, and fire extinguishment.

B. Qualifications of Employees

1. Employees whose duties require working on or in the vicinity of energized equipment or lines shall perform only those tasks for which they are trained, equipped, authorized, and so directed.

Inexperienced employees shall: (a) work under the direction of an experienced and qualified person at the site, and (b) perform only directed tasks.

2. If an employee is in doubt as to the safe performance of any assigned work, the employee shall request instructions from the employee's supervisor or person in charge.
3. Employees who do not normally work on or in the vicinity of electric supply lines and equipment but whose work brings them into these areas for certain tasks shall proceed with this work only when authorized by a qualified person.

C. Safeguarding Oneself and Others

1. Employees shall heed warning signs and signals and warn others who are in danger or in the vicinity of energized equipment or lines.
2. Employees shall report promptly to the proper authority any of the following:
 - a. Line or equipment defects such as abnormally sagging wires, broken insulators, broken poles, or lamp supports
 - b. Accidentally energized objects such as conduits, light fixtures, or guys
 - c. Other defects that may cause a dangerous condition
3. Employees whose duties do not require them to approach or handle electric equipment and lines shall keep away from such equipment or lines and should avoid working in areas where objects and materials may be dropped by persons working overhead.
4. Employees who work on or in the vicinity of energized lines shall consider all of the effects of their actions, taking into account their own safety as well as the safety of other employees on the job site, or on some other part of the affected electric system, the property of others, and the public in general.
5. No employee shall approach or take any conductive object, without a suitable insulating handle, closer to any exposed energized part than allowed by Rule 431 (communication) or Rule 441 (supply) as applicable.
6. Employees should exercise care when extending metal ropes, tapes, or wires parallel to and in the proximity of energized high-voltage lines because of induced voltages. When it is necessary to measure clearances from energized objects, only devices approved for the purpose shall be used.

D. Energized or Unknown Conditions

Employees shall consider electric supply equipment and lines to be energized, unless they are positively known to be de-energized. Before starting work, employees shall perform preliminary

inspections or tests to determine existing conditions. Operating voltages of equipment and lines should be known before working on or in the vicinity of energized parts.

E. Ungrounded Metal Parts

Employees shall consider all ungrounded metal parts of equipment or devices, such as transformer cases and circuit breaker housings, to be energized at the highest voltage to which they are exposed, unless these parts are known by test to be free from such voltage.

F. Arcing Conditions

Employees should keep all parts of their bodies as far away as practical from switches, brushes, commutators, circuit breakers, or other parts at which arcing may occur during operation or handling.

G. Liquid-Cell Batteries

1. Employees shall ascertain that battery areas are adequately ventilated before performing work.
2. Employees should avoid smoking, using open flames, or using tools that may produce sparks in the vicinity of liquid-cell batteries.
3. Employees shall use eye and skin protection when handling an electrolyte.
4. Employees shall not handle energized parts of batteries unless necessary precautions are taken to avoid short circuits and electrical shocks.

H. Tools and Protective Equipment

Employees shall use the personal protective equipment, the protective devices, and the special tools provided for their work. Before starting work, these devices and tools shall be carefully inspected to make sure that they are in good condition.

I. Clothing

1. Employees shall wear clothing suitable for the assigned task and the work environment. See Rule 410A2.
2. When working in the vicinity of energized lines or equipment, employees should avoid wearing exposed metal articles.

J. Ladders and Supports

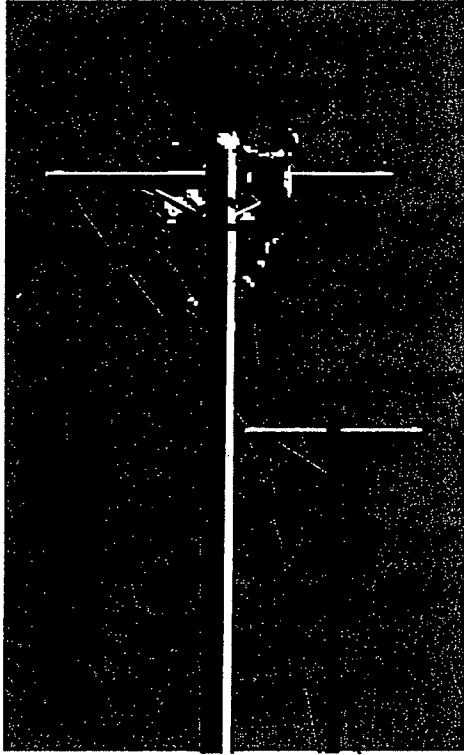
1. Employees shall not support themselves, or any material or equipment, on any portion of a tree, pole structure, scaffold, ladder, walkway, or other elevated structure or aerial device, etc., without it first being determined, to the extent practical, that such support is adequately strong, in good condition, and properly secured in place.
2. Portable wood ladders intended for general use shall not be painted except with a clear nonconductive coating, nor shall they be longitudinally reinforced with metal.
3. Portable metal ladders intended for general use shall not be used when working on or in the vicinity of energized parts.
4. If portable ladders are made partially or entirely conductive for specialized work, necessary precautions shall be taken to ensure that their use will be restricted to the work for which they are intended.

K. Safety Straps

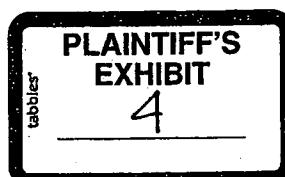
1. An employee working in an elevated position shall use a suitable safety strap or other approved means to prevent falling.
2. Safety straps or other similar devices shall be inspected before use by the employee to ensure that they are in safe working condition.

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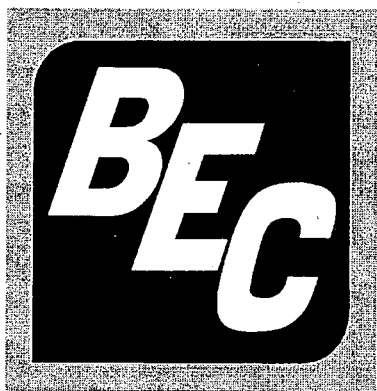
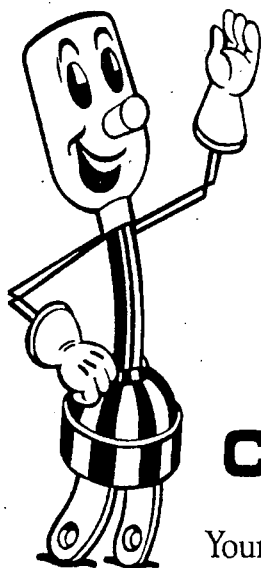
Safety Manual 2006



**"SAFETY TAKES PRECEDENCE OVER
ALL OTHER REQUIREMENTS"**



BERKELEY ELECTRIC



COOPERATIVE

Your Touchstone Energy® Partner 

The information contained within this safety manual are
the minimum safety requirements
Berkeley Electric Cooperative may require additional
protective measures.

I have received a safety manual and the contents have been reviewed with me. I understand that I am responsible for knowing and following all safety rules and safe work practices. I also acknowledge that receipt of this manual does not constitute a contract of employment.

Employee Signature: _____

Date: _____

Contents reviewed by: _____

Date: _____

SAFETY MANUAL

Berkeley Electric Cooperative accepts this safety manual as the minimum standards for employees. The purpose of this manual is to promote safe and consistent work practices for Berkeley Electric Cooperative. Be it further resolved that the Cooperative must establish policies, practices and programs as the system deems necessary to maintain a safe working environment.

Every effort has been made to provide the most accurate and authoritative information possible in regard to the subject matter addressed in this document. Due to the constantly changing nature of laws and regulations, BEC does not assume any liability for errors or omissions within this document. If specific information is needed concerning a particular issue, please contact the Loss Control and Training Department at BEC.

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FOREWORD

The safety rules contained within this manual are the result of government regulations, established safe work practices and numerous investigations of many tragic injuries. Work-related injuries are very costly, in human life, suffering, and in dollars. Hopefully we can learn from the mistakes of others through the study of this manual and become more aware of the hazards we face each day. Unsafe acts of people cause well over 95 percent of all injuries. We must work together to eliminate unsafe acts and thereby eliminate the related injuries. Most injuries can be prevented with proper job planning, training, and a positive safety attitude.

Don't take chances with your life and the future of your family.

DEFINITIONS

Administrative Authority: The governmental authority exercising jurisdiction over application of this code.

Affected Employee: An employee whose job requires him or her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout or tag out, or whose job requires him or her to work in an area in which such servicing or maintenance is being performed.

Alive or Live (energized): Electrically connected to a source of potential difference, or electrically charged so as to have a potential significantly different from that of the earth in the vicinity. The term "live" is sometimes used in place of the term "current-carrying," where the intent is clear, to avoid repetition of the longer term.

Ampacity: The current-carrying capacity, expressed in amperes, of an electric conductor under stated thermal conditions.

Anchorage: A secure point of attachment to which the fall protection system is connected.

ANSI American: National Standards Institute

Approved: The term "approved" when used in connection with methods, tools, or equipment, refer to those methods, tools or equipment approved by OSHA, ANSI, NESC or the Cooperative.

ASTM American: Society for Testing and Materials

Attendant: An employee assigned to remain immediately outside the entrance to an enclosed or other space to render assistance as needed to employees inside an enclosed space.

Authorized Person: One who has the authority to perform specific duties under certain conditions or who is carrying out orders from responsible authority.

Automatic: Self-acting, operating by its own mechanism when actuated by some impersonal influence – as, for example, a change in current strength; not manual; without personal intervention. Remote control that requires personal intervention is not automatic, but manual.

Automatic Circuit Recloser: A self-controlled device for automatically interrupting and reclosing an alternating current circuit with a predetermined sequence of opening and reclosing followed by resetting, hold closed, or lockout operation.

Backfill (noun): Materials such as sand, crushed stone, or soil, that are placed to fill an excavation.

Barrier: A physical obstruction such as tapes, screens, or cones intended to warn and limit access to a hazardous area.

Barrier: A physical obstruction which is intended to prevent contact with energized lines or equipment.

Belt, Line-Worker's Body: A belt that consists of a belt strap and "O" rings, and may include a cushion section or a tool saddle.

Body Harness Straps: Are secured about an employee in a manner that distributes the arresting forces over at least the thighs, shoulders and pelvis, with provisions for attaching a lanyard, lifeline, or deceleration device.

Bond: An electrical connection from one conductive element to another for the purpose of minimizing potential differences or providing suitable conductivity for fault current or for reducing leakage current and electrolytic action.

Bonding: The electrical interconnecting of conductive parts, designed to maintain a common electrical potential.

Bushing: An insulating structure including a through conductor, or providing a passageway for such a conductor, with provision for mounting on a barrier, conducting or otherwise, for the purpose of insulating the conductor from the barrier and conducting current from one side of the barrier to the other.

Cable: A conductor with insulation, or a stranded conductor with or without insulation and other coverings (single-conductor cable) or a combination of conductors insulated from one another (multiple-conductor cable).

Spacer Cable: A type of electric supply line construction consisting of an assembly of one or more covered conductors, separated from each other and supported from a messenger by insulating spacers.

Cable Jacket: A protective covering over the insulation, core, or sheath of a cable.

Cable Sheath: A protective covering applied to cables.

NOTE: A cable sheath may consist of multiple layers of which one or more is conductive.

Cable Terminal: A device that provides insulated egress (path) for the conductors. *Syn:* termination.

Chemical: Means any element, chemical compound or mixture of elements and/or compounds.

Chemical: Name means the scientific designation of chemical.

Circuit: The term means a conductor or system of conductors through which an electric current is intended to flow.

Circuit Breaker: A switching device capable of making, carrying, and breaking currents under normal circuit conditions and also making, carrying for a specified time, and breaking currents under specified abnormal conditions such as those of short circuit.

Clearance (For Work): Authorization to perform specific work or permission to enter a restricted area.

Clearance (From Hazard): Adequate separation or protection by the use of devices to prevent incidental contact by persons or objects on approach to a point of danger.

Clearance (Hot Line): An assurance that the automatic reclosing features of a circuit have been made inoperative.

Clear Live Line Tool Distance: The minimum distance for the use of live-line tools held by linemen when performing live-line work.

Climbing: The vertical movement (ascending and descending) and horizontal movement to access or depart the worksite.

Combustible Liquid: Means any liquid having a flashpoint at or above 100 F, but below 200 F, except any mixture having components with flashpoints of 200 F or higher.

Common Use: Simultaneous use by two or more utilities of the same kind.

Communication Lines: The conductors and their supporting or containing structures which are used for public or private signal or communication service, and which operate at potentials not exceeding 400 volts to ground or 740 volts between any two points of the circuit, and the transmitted power of which does not exceed 150 watts. When operating at less than a nominal voltage 90 volts, no limit is placed on the transmitted power of the system. Under specified conditions, communication cables may include communication circuits exceeding the preceding limitation where such circuits are also used to supply power solely to communications equipment.

NOTE: Telephone, telegraph, railroad signal, data clock, fire, police-alarm, community television antenna, and other systems conforming to the above are included. Lines used for signaling purposes, but not included under the above definition, are considered as supply lines of the same voltage and are to be so installed.

Company/Cooperative: The employer. The entity having jurisdiction and control over the operation of the utility.

Competent Person: One who is capable of identifying existing and predicting hazards in surrounding or work conditions which are unsanitary, hazardous, or dangerous to employees and who has authorization to take prompt corrective measures to eliminate them.

Conductor: A material, usually in the form of a wire, cable, or buss bar suitable for carrying an electric current.

Conductor Shielding: An envelope that encloses the conductor of a cable and provides an equipotential surface in contact with the cable insulation.

Conduit: A structure containing one or more ducts.

NOTE: Conduit may be designated as iron-pipe conduit, tile conduit, etc. If it contains only one duct it is called single-duct conduit; if it contains more than one duct it is called multiple-duct conduit, usually with the number of ducts as a prefix, for example, two-duct multiple conduit.

Conduit System: Any combination of duct, conduit, conduits, manholes, handholds, and vaults joined to form an integrated whole.

Confined Space: A place such as a manhole, underground vault, condenser generator, tank, tunnel or any other space that is entered through a manhole opening or other restricted opening that is not designed for human occupancy or that may become difficult to leave.

Current-Carrying Part: A conducting part intended to be connected in an electric circuit to a source of voltage. Noncurrent-carrying parts are those not intended to be so connected.

Dead (de-energized): Free from any electrical connection to a source of potential difference and from electrical charges: Not having a potential difference from that of earth.

NOTE: The term is used only with reference to current-carrying parts which are sometimes alive (energized).

Designated Person: A qualified person designated to perform specific duties under the conditions existing. A designated person must also have the authority to control all elements of the job.

Disconnecting or Isolating Switch: A mechanical switching device used for changing the connections in a circuit, or for isolating a circuit or equipment from a source of power.

NOTE: It is required to carry normal load current continuously, and also abnormal or short-circuit current for short intervals as specified. It is also required to open or close circuits either when negligible current is broken or made, or when no significant change in the voltage across the terminals of each of the switch poles occurs. *Syn:* disconnecter, isolator.

Duct: A single enclosed raceway for conductors or cable.

Employee: Any person employed by the Cooperative on either the permanent or temporary payroll.

Employer: See Company/Cooperative.

Effectively Grounded: Intentionally connected to earth through a ground connection or connections of sufficiently low impedance and having sufficient current-carrying capacity to limit the buildup of voltages to levels below that may result in undue hazard to persons or to connected equipment.

Electric Line Trucks: A truck used to transport employees, tools, and material, and to serve as a traveling workshop for electric power line construction and maintenance work. It is sometimes equipped with a boom and auxiliary equipment for setting poles, digging holes, and elevating materials or men.

Electric Supply Equipment: Equipment that produces, modifies, regulates, controls, or safeguards a supply of electric energy. *Syn:* supply equipment.

Electric Supply Lines: Those conductors used to transmit electric energy and their necessary supporting or containing structures. Signal lines of more than 400 volts are always supply lines within the meaning of the rules, and those of less than 400 volts may be considered as supply lines, if so run and operated throughout.

Emergency: An emergency occurs when an unusual condition exists that endangers life and/or property.

Enclosed: Surrounded by a case, cage, or fence, which will protect the contained equipment and limit the likelihood, under normal conditions, of dangerous approach or incidental contact by persons or objects.

Enclosed Space: A working space such as a manhole, vault or enclosure that has limited means of access or entry that is designed for periodic employee entry under normal operating conditions. Under normal operating conditions an enclosed space does not contain a hazardous atmosphere. Under abnormal conditions an enclosed space could contain a hazardous atmosphere.

Energized: Electrically connected to a source of potential difference, or electrically charged so as to have a potential significantly different from that of earth in the vicinity.

Equipment: A general term which includes fittings, devices, appliances, fixtures, apparatus, and similar terms, used as part of, or in connection with, an electric supply or communications system.

Equipotential Zone 1910.269(n)(3): Temporary protective grounds shall be placed at such locations and arranged in such a manner as to prevent each employee from being exposed to hazardous differences in electrical potential.

Excavations: Any opening made in the ground, street or sidewalk in connection with Cooperative work, such as holes, trenches, ditches or tunnels.

Exposed: (a) Exposed circuit or lines are those in such a position that in case of failure of supports or insulation, contact with another circuit or line may result (b) Exposed equipment is an object or device that can be inadvertently touched or approached nearer than a safe distance by any person. The term is applied to objects not suitably guarded or isolated.

Fall Arrest System: The assemblage of equipment, such as a lineworker's body belt, aerial belt, or full body harness in conjunction with a connecting means, with or without an energy absorbing device, and an anchorage to limit the forces a worker can experience during a fall.

Fall Prevention System: A system, which may include a positioning device system, intended to prevent a worker from falling from an elevation.

Fall Protection Program: A program intended to protect workers from injury due to falls from elevations.

Fall Protection System (hardware): Consists of either a fall prevention system or a fall arrest system.

Fiber-Optic Cable-Communication: A fiber-optic cable meeting the requirements for a communication line and located in the communication space of overhead or underground facilities.

Fiber-optic Cable – Supply: A fiber-optic cable located in the supply space of overhead or underground facilities.

Fireproofing (of cables): The application of a fire-resistant covering.

Flammable: Any liquid having a flashpoint below 100 F or 37.8 C.

Flashpoint: Means the minimum temperature at which a liquid gives off a vapor in sufficient concentration to ignite when tested.

Generating Station: A facility wherein electric energy is produced by conversion from some other form of energy (for example, chemical, nuclear, solar, mechanical, or hydraulic) by means of suitable apparatus. This includes all generating station auxiliaries and other associated equipment required for the operation of the plant. Not included are stations producing power exclusively for use with communications systems.

Governmental: Any type of political agency having control over an area. Included are federal, state, county, township, city, etc.

Grounded: Connected to or in contact with earth or connected to some extended conductive body that serves instead of the earth.

Grounded Effectively: See: effectively grounded

Grounded System: A system of conductors in which at least one conductor or point is intentionally grounded, either solidly or through a non-interrupting current-limiting device.

Guarded: Covered, fenced, enclosed, or otherwise protected, by means of suitable covers or casing, barrier rails or screens, mats or platforms, designed to limit the likelihood under normal conditions, of dangerous approach or accidental contact by persons or objects.

NOTE: Wires, that are insulated, but not otherwise protected, are not normally considered to be guarded.

Ground (Reference): Conductive body, usually earth, to which an electric potential is referenced.

Ground (Noun): A conductive connection whether intentional or incidental, by which an electric circuit or equipment is connected to reference ground.

Ground (Verb): Connecting or establishment of a connection, whether by intention or incident of an electric circuit or equipment to reference ground.

Grounding electrode (ground electrode) A conductor embedded in the earth, used for maintaining ground potential on conductors connected to it, and for dissipating into the earth current conducted to it.

Grounding Electrode Resistance: The resistance of the grounding electrode to earth.

Grounding Electrode Conductor (grounding conductor): A conductor used to connect equipment of the grounded circuit of a wiring system to a grounding electrode.

Grounded Conductor The term means a system or circuit conductor which is intentionally grounded.

Handhole: An access opening, provided in equipment or in a below-the-surface enclosure in connection with underground lines, into which personnel reach but do not enter, for the purpose of installing, operating, or maintaining equipment or cable or both.

Harness: A component with a design of straps that is fastened about the worker in a manner so as to contain the torso and distribute the fall arrest forces over at least the upper thighs, pelvis, chest, and shoulders with means for attaching it to other components and subsystems.

NOTE: Wherever the word "harness" is used in this code, it refers to full body harness.

Hazard Warning: Means any words, pictures, symbols or the combination thereof appearing on a label or other appropriate form of warning that convey the hazards of the chemicals in the containers.

Hazardous Atmosphere: An atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from an enclosed space), injury or acute illness from one or more of the following causes:

1. Flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit. (LFL)

2. Airborne combustible dust at a concentration that meets or exceeds its LFL.

NOTE: The concentration may be approximated as a condition in which the dust obscures vision at a distance of 5 feet or less.

3. Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent.

4. Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in Subpart G, Occupational Health and Environmental Control, or in Subpart Z, Toxic and Hazardous Substances, of this part and which could result in employee exposure in excess of its dose or permissible exposure limit.

NOTE: An atmospheric concentration of any substance that is not capable of causing death, incapacitation, impairment of ability to self-rescue, injury or acute illness due to its health effects is not covered by this provision.

5. Any other atmospheric condition that is immediately dangerous to life or health.

NOTE: For air contaminants for which OSHA has not determined a dose or permissible exposure limit, other sources of information such as Materials Safety Data Sheets that comply with the Hazard Communication Standard, S 191 0.1200 of the Part, published information, and internal documents can provide guidance in establishing acceptable atmospheric conditions.

Hazardous Chemical: Means any chemical that is a physical hazard or a health hazard.

Health Hazards: Means any chemical that could cause acute or chronic health effects that may occur in exposed employees.

High Winds: A wind of such velocity that the following hazards would be present:

1. An employee would be exposed to being blown from elevated locations, or
2. An employee or material handling equipment could lose control of material being handled, or
3. An employee would be exposed to other hazards not controlled by the standard involved.

NOTE: Winds exceeding 40 miles per hour, or 30 miles per hour if material handling is involved, are normally considered as meeting this criteria unless precautions are taken to protect employees from the hazardous effects of the wind.

Hold Tag: A card or tag type device, usually having a dominant color red which warns against the operation of a particular switch, device, valve, circuit, tool or machine. These tags must be respected; equipment or items so tagged must not be activated or used without full and proper authority from a responsible person.

Hotline Tools and Ropes: Those tools and ropes which are especially designed for work on energized high voltage lines and equipment. Insulated aerial equipment especially designed for work on energized high voltage lines and equipment shall be considered hot line.

Immediate Use: Means that the hazardous chemical will be under control of and used only by the person who transfers it from a labeled container, and only within the work shift in which it is transferred.

Immediately Dangerous to Life or Health (IDLH): Any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a permit space.

NOTE: Some materials -hydrogen fluoride gas and cadmium vapor, for example may produce immediate transient effect that, even if sudden, possible fatal collapse 12-72 hours after exposure. The victim "feels normal" from recovery from transient effects until collapse. Such materials in hazardous quantities are considered to be "immediately" dangerous to life or health.

In Service: Lines and equipment are considered in service when connected to the system and intended to be capable of delivering energy or communication signals, regardless of whether electric loads or signaling apparatus are presently being served from such facilities.

Insulated: Separated from other conducting surfaces by a dielectric substance (including air space) offering a high resistance to the passage of current.

NOTE: When any object is said to be insulated, it is understood to be insulated for the conditions to which it is normally subjected. Otherwise, it is, within the purpose of these rules, un-insulated.

Insulation (as applied to cable): That which is relied upon to insulate the conductor from other conductors of conducting parts or from ground.

Insulation Shielding: An envelope that encloses the insulation of a cable and provides an equipotential surface in contact with cable insulation.

Insulator: Insulating material in a form designed to support a conductor physically and electrically separate it from another conductor or object.

Isolated: Not readily accessible to persons unless special means of access are used.

Isolated by Elevation: Elevated sufficiently so that persons may safely walk underneath.

Jacket: A protective covering over the insulation, core, or sheath of a cable.

Joint Use: Simultaneous use by two or more kinds of utilities.

Lanyard: A flexible line or webbing, rope, wire rope, or strap that generally has a connector at each end for connecting the line-worker's body belt, aerial belt, or full body harness to an energy absorbing device, life-line, or anchorage.

Limited Access Highways: As used herein, limited access highways include both fully controlled highways and partially controlled highways where access is controlled by a governmental authority for purposes of improving traffic flow and safety. Fully controlled access highways have no grade crossings and have carefully designed access connections.

Line-Clearance Tree Trimmer: An employee who, through related training or on-the-job experience or both, is familiar with the special techniques and hazards involved in line-clearance tree trimming.

NOTE: 1. An employee who is regularly assigned to a line-clearance tree-trimming crew and who is undergoing on-the-job training and who, in the course of such training, has demonstrated an ability to perform duties safely at his or her level of training and who is under the direct supervision of a line-clearance tree-trimmer is considered to be a line-clearance tree trimmer for the performance of those duties.

NOTE: 2. A line clearance tree trimmer is not considered to be a "qualified employee" under this section unless he or she has the training required for qualified employee under paragraph (a) (ii) of this section. However, under the electrical safety-related works practices standard in 8ubpart 8 of this part, a line-clearance tree trimmer is considered to be a "qualified employee". Tree trimming performed by such "qualified employees" is not subject to the electrical safety related work practice requirements contained in 81910.311 through 81910.335 of this part. (See also note following 81910.332 (b) (3) of this Part for information regarding the training an employee must have to be considered a qualified employee under 81910.331 through 81910.335 of this part.)

Line-Clearance Tree Trimming: The pruning, trimming, repairing, maintaining, removing, or clearing of trees or the cutting of brush that is within 10 feet of electric supply lines and equipment.

Manhole: A subsurface enclosure that personnel may enter and which is used for the purpose of installing, operating, and maintaining submersible equipment and/or cable.

Manhole Cover: A removable lid that closes the opening to a manhole or similar subsurface enclosure.

Manhole Grating: A grid that provides ventilation and a protective cover for a manhole opening.

Manual: Capable of being operated by personal intervention.

Material Safety Data Sheet (MSDS): Means written or printed material concerning a hazardous chemical.

Minimum Approach Distance: The closest distance a qualified or unqualified person is permitted to approach either an energized or a grounded object.

UTCD: Manual on Uniform Traffic Control Devices

NFPA: National Fire protection Association

Out of Service: Lines and equipment are considered out of service when disconnected from the system and not intended to be capable of delivering energy or communications signals. OSHA Occupational Safety and Health Administration

Pad-mounted Equipment: A general term describing enclosed equipment, the exterior of which enclosure is at ground potential, positioned on a surface-mounted pad.

Person In Charge: Used in a general sense to indicate any person, regardless of classification, who is directly in charge of a specific job or jobs.

Personal Protective Equipment (PPE): Approved equipment designed to eliminate personal injury.

Physical Hazard: Means a chemical for which there is scientifically valid evidence that is a combustible liquid, a compressed gas explosive, flammable, and organic peroxide, and oxidizer, pyrophoric, unstable (reactive) or water reactive.

Positioning Device System: A system of equipment or hardware that, when used with its line-worker's body belt or full body harness, allows a worker to be supported on an elevated vertical surface, such as a pole or tower, and work with both hands free.

Positioning Strap: A strap with snaphook(s) to connect to the "O" rings of a line-worker's body belt or full body harness.

Prestressed-Concrete Structures: Concrete structures that include metal tendons that are tensioned and anchored either before or after curing of the concrete.

Primary Compartment: A compartment containing current-carrying devices above 600 volts.

Primary Voltage: Any electrical circuit that normally operates at more than 600 volts.

Proximity: A specific distance where an employee may be incidentally or inadvertently exposed to a hazard.

Public Member: Any individual not an employee or representative of the Company.

Pulling Iron: An anchor secured in the wall, ceiling, or floor of a manhole or vault to attach rigging used to pull cable.

Pulling Tension: The longitudinal force exerted on a cable during installation.

Qualified: Having adequate knowledge of the installation, construction, or operation of apparatus and the hazards involved.

Qualified Climber: A worker who, by reason of training and experience, understands the methods and has routinely demonstrated proficiency in climbing techniques and familiarity with the hazards associated with climbing.

Qualified Person: The term means a person, who by reason of experience or training is familiar with the operation to be performed and the hazards involved.

Raceway: Any channel designed expressly and used solely for holding conductors.

Random Separation: Installed with no deliberate separation.

Reduced Visibility: Times when normal visibility is reduced because of adverse weather conditions such as fog, heavy rainfall, snow, dawn or dusk.

Remotely Operable (as applied to equipment): Capable of being operated from a position external to the structure in which it is installed or from a protected position within the structure.

Responsible Party: Means someone who can provide additional information on the hazardous chemical and appropriate emergency procedure, if necessary.

Road: The paved or unpaved surface of a roadway upon which vehicles are intended to travel. When the road is paved, the entire surface is included.

Rural Districts: All places not urban. This may include thinly settled areas within city limits.

Safety Rules: A positive rule requiring compliance by all employees. Deviation from safety rules is not permitted and may be subject to disciplinary action.

Sag: The distance measured vertically from a conductor to the straight line joining its two points of support. Unless otherwise stated in the rule, the sag referred to is the sag at the mid-point of the span.

SCADA (Supervisory Control and Data Acquisition): Electronic equipment used to provide remote control (Supervisory Control) and information retrieval (Data Acquisition) from remote locations by either telephone lines, radio signals or power line carriers.

Secondary Compartment: A compartment containing current-carrying devices below 600 volts.

Secondary Voltage: Any supply voltage less than 600 volts.

Separation: The distance between two objects, measured surface to surface.

Service Drop: The overhead conductors between the electric supply or communication line and the building or structure being served.

Shall: When the word "shall" appears in the wording of a rule, the rule is to be obeyed as written.

Should: When the word "should" appears in the wording of a rule, the rule is recommended but is not compulsory.

Shoulder: The portion of the roadway contiguous with the traveled way for accommodation of stopped vehicles for emergency use and for lateral support of base and surface course.

Side-Wall Pressure: The internal force exerted on an insulated cable during installation around sharp bends, angles or turns.

Snap-Hook: A self-closing device with a keeper latch, or other similar arrangement that will remain closed until manually opened. Such devices include self-closing, single-action, double-action or double-locking snap hooks.

Span Length: The horizontal distance between two adjacent supporting points of a conductor.

Span Wire (Overhead Guy): An auxiliary suspension wire that serves to support one or more trolley contact conductors or a light fixture and the conductors that connect it to a supply system.

Structure Conflict (Slapping Conductor): A line so situated with respect to a second line that the overturning of the first line will result in contact between its supporting structures or conductors and the conductors of the second line, assuming that no conductors are broken in either line.

Substation: An enclosed assemblage of equipment, e.g., switches, circuit breakers, busses, and transformers, under the control of qualified person, through which electric energy is passed for the purpose of switching or modifying its characteristics.

Supporting Structure: The main supporting unit (usually a pole or tower).

Switch: A device for opening and closing or changing the connection of a circuit. A switch is understood to be manually operable, unless otherwise stated.

Switchboard: A type of switchgear assembly that consists of one or more panels with electric devices mounted thereon, and associated framework.

Tag: Incident prevention tag (Danger, People at work, etc.) of a distinctive appearance used for the purpose of personnel protection to indicate that the operation of the device to which it is attached is restricted.

Tailboard Discussion (Tailgate): A short informal discussion of the work to be accomplished and the safety measures to be incorporated. It is normally conducted by the supervisor or person in charge of the crew and performed before every job.

Tension, Unloaded (1) initial: The longitudinal tension in a conductor prior to the application of any external load. (2) final -The longitudinal tension in a conductor after it has been subjected for an appreciable period to the loading prescribed for the loading district in which it is situated, or equivalent loading, and the loading removed. Final unloaded tension shall include the effect of inelastic deformation (creep).

Termination: See: Cable termination

Transferring (as applied to fall protection): The act of moving from one distinct object to another (e.g., between a ladder and a roof).

Transformer Vault: An isolated enclosure either above or below ground with fire-resistant walls, ceiling, and floor, in which transformers and related equipment are installed, and which is not continuously attended during operation. See also: vault.

Transitioning (as applied to fall protections): The act of moving from one location to another on equipment or a structure.

Traveled Way: The portion of the roadway for the movement of vehicles, exclusive of shoulders and full-time parking lanes.

Underground Residential Distribution (URD): The facilities necessary to furnish underground service, generally to residential and commercial-type customers, usually through directly buried cable.

Unsafe Conditions: Dangerous, hazardous, defective or unusual conditions that could cause injury.

Urban Districts: Thickly settled areas (whether in cities or suburbs) or where congested traffic often occurs. A highway, even though in thinly settled areas, on which the traffic is often very heavy, is considered as urban.

Utility: An organization responsible for the installation, operation, or maintenance of electric supply or communications systems.

Utility Interactive System: An electric power production system that is operating in parallel with and capable of delivering energy to a utility electric supply system.

Utilization Equipment: Equipment, devices, and connected wiring that utilize electric energy for mechanical, chemical, heating, lighting, testing, or similar purposes and are not a part of supply equipment, supply lines, or communication lines.

Unstable Material: The term means earth material, other than running, that because of its nature or the influence of related conditions cannot be depended upon to remain in place without extra support, such as would be furnished by a system of shoring.

Vault: A structurally solid enclosure above or below ground with access limited to personnel qualified to install, maintain, operate, or inspect the equipment or cable enclosed. The enclosure may have openings for ventilation, personnel access, cable entrance, and other openings required for operation of equipment in the vault.

Vicinity: Defined with respect to the hard hat rule. An employee is in the vicinity of an operation when he has arrived at that site for purpose of operation, discussion with employees engaged in the operation, or any purpose related to the work in progress.

Voltage: The effective (rms) potential difference between any two conductors or between a conductor and ground. Voltages are expressed in nominal values unless otherwise indicated. The nominal voltage of a system or circuit is the value assigned to a system or circuit of a given voltage class for the purpose of convenient designation. The operating voltage of the system may vary above or below this value.

Voltage of an Effectively Grounded Circuit: The highest nominal voltage available between any conductor of the circuit and ground unless otherwise indicated.

Voltage of a constant-current circuit: The highest normal full-load voltage of the circuit.

Voltage of a circuit not effectively grounded: The highest nominal voltage available between any two conductors of the circuit.

NOTE: If one circuit is directly connected to and supplied from another circuit of higher voltage (as in the case of an autotransformer), both are considered to be of the higher voltage, unless the circuit of the lower voltage is effectively grounded, in which case its voltage is not determined by the circuit of higher voltage. Direct connection implies electric connection as distinguished from connection merely through electromagnetic or electrostatic induction.

Warning Signs: For the purpose of these rules, a warning sign is any sign or similar means of alerting an employee or the public of an actual or possible hazard. Included are "Danger" signs, "Caution" signs, traffic control signs, instructional signs and informational signs.

Wire Gages: Throughout these rules the American Wire Gage (AWG), formerly known as Brown & Sharpe (B&S), is the standard gage for copper, aluminum, and other conductors, excepting only steel conductors, for which the Steel Wire Gage (Stl WG) is used.

Worksite (as applied to fall protection): The location on the structure or equipment where, after the worker has completed the climbing (horizontally and vertically), the worker is in position to perform the assigned work or task.

SECTION I
Safety Responsibility

A. MANAGEMENT'S RESPONSIBILITY

Management's first consideration in the daily operations of providing electric service is the safety of the employees and the public. Training of employees and education of the public in safety are vital parts of the overall safety program. The organization's safety program must also include safe electrical installation and construction of all facilities.

- b. Setting a good example is an excellent way for management to show the employees, consumers, and the general public of their interest in safety. Follow all safety rules, all of the time, train by example. Make certain that your electric power facilities are safe. Check all primary and secondary installations constantly for possible hazards and correct the hazards immediately. Management should also inform consumers of hazardous conditions found on their property, and offer suggestions for correction of the deficiencies.
- c. Management is ultimately responsible for the implementation and management of the safety program. Management must ensure that all safety and health rules are enforced. Management must ensure that all regulatory compliance issues are adequately addressed. Management must ensure that all employees have been adequately trained for their specific job duties. Management must certify that each employee has received the required training on safe work practices and safety related procedures related to their job.
- d. Safety Rule Enforcement is not entirely a matter of discipline, but one of constant observation and concern on the part of Management. One of the first steps towards rule observance is that all management know and follow the rules thereby always setting a good example. If an employee has been adequately trained and violates the safety rules or commits unsafe acts it is management's responsibility to take swift disciplinary action to deal with these violations. Safety rule violations should be handled in a timely manner like any other performance problem and according to the cooperatives' disciplinary policies.
- e. Management shall determine, through regular supervision and through inspections conducted on at least an annual basis, that each employee is complying with the safety related work practices. (191 O.269 (a2)(iii))
- f. Ensure that job briefings are being performed.

Job briefings must at least cover the following five subjects:

- Hazards Associated With The Job

- Work Procedures Involved
- Special Precautions
- Energy Source Controls
- Personal Protective Equipment Required

Documentation of job briefings is strongly recommended.

- g. The general manager/CEO is responsible for the implementation of policies, rules and their intent.
- h. The general manager/CEO or his designee is responsible for the distribution and presentation of the written monthly report on safety/loss control activities to the board. It is Management's responsibility to ensure that all employees are properly trained and qualified to perform all required work assignments safely.
- j. The general manager/CEO should attend and participate in monthly safety meetings whenever their schedule permits.
- k. Management shall require supervisors to observe employees and enforce all safety rules, regardless of workload and conditions.
- l. Management or its representatives shall fully investigate all incidents and take proper corrective steps to prevent recurrence of similar incidents.
- m. Management shall insure compliance with all federal, state and local standards/laws that affect the safety and health of its employees and the general public.

B. PERSON'S IN CHARGE RESPONSIBILITIES

- a. Persons in charge shall fully understand the safety rules in this manual and comply with them, regardless of workload or conditions.
- b. Persons in charge are at all times responsible for the execution of the work in a safe manner and for the job performance of all employees under their direction.
- c. Persons in charge will participate in all incident investigations of those employees under their direction, and shall make recommendations for proper corrective steps to prevent recurrence of similar incidents.
- d. Persons in charge shall ensure that all employees under their direction have received training and fully understand the rules in this safety manual.
- e. Persons in charge shall conduct a tailgate safety meeting before starting any job. The following items shall be covered and documented at each job briefing/tailgate:
 - Hazards associated with the job.
 - Work procedures involved.
 - Special precautions.
 - Energy source controls.
 - Personal protective equipment requirements.

- f. Persons in charge shall be responsible for the proper use of safety devices and equipment by employees under their supervision.
- g. Persons in charge shall make certain that no work is assigned to an individual who is untrained, unqualified or incapable of performing the work safely.
- h. Persons in charge shall be responsible to ensure that all vehicles, equipment, tools (including personal tools) and personal protective equipment (PPE) are in proper working condition.
- i. Persons in charge shall ensure adequate warning of any condition which might endanger other workers or the general public. All unsafe conditions that cannot be immediately corrected shall not be left unguarded. Before leaving every job, persons in charge shall ensure that the work area is left in a safe condition.

C. RESPONSIBILITY OF EMPLOYEES

- a. Everyone shares the responsibility for safety. Each employee is responsible for his/her own safety, the safety of his/her fellow workmen and the general public. (NESC, section 42, 420-423)
- b. Employees shall become familiar with and use all the personal protective equipment and safety devices provided for their protection. (191 O.132)(f) (2)
- c. Employees shall immediately report all unsafe equipment, unsafe tools and hazardous conditions. (NESC, Section 42, (420) (c))
- d. Employees shall wear seat belts (where provided) at all times while mechanized equipment is in operation. (1926.601 (b)(9) and 1926.602(a)(2))
- e. Every employee shall become thoroughly familiar with the contents of this manual as they apply to the work activities.
- f. Where conditions are not covered by this manual, or the job is not completely understood the employee shall obtain specific instructions from his supervisor before proceeding with the work.
- g. All employees have a responsibility to report to work in a good physical and mental condition ready to perform any duties associated with the job. Any supervisor or foreman having reasonable grounds to suspect that an employee is either mentally or physically unfit for the work assigned, shall prohibit such employee from working until satisfactory medical or other evidence indicating his fitness is secured. The use of illegal drugs and the abuse of legal drugs! Alcohol in the work place are prohibited. Employees aware of another employee engaging in this type activity shall report the incident to their immediate supervisor.
- h. Each employee shall use reasonable care in the performance of his duties and act in such a manner as to assure at all times maximum safety to themselves, fellow employees and the public.

- i. Each employee shall carefully study those safety rules applying to their duties. Safety rules shall be obeyed; ignorance will not be accepted as an excuse for their violation. Employees may be periodically examined on their knowledge of the rules.
- j. The cooperative and all employees are responsible for compliance with all Occupational Safety and Health rules. Serious fines and penalties may result from violation of these rules by an employee. As stated in the Occupational Safety and Health Act, "Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct"
- k. Safety Manuals shall be retained by the employee throughout his employment and shall be returned if his/her services are terminated.
- l. If an employee is called upon to perform work that he considers hazardous and not properly protected, he shall bring the matter to the attention of his supervisor before proceeding.
- m. These rules represent minimum requirements and are not intended to cover all conditions and emergencies; the earnest cooperation of all employees with their supervisors is requested in meeting conditions not covered in these rules.
- n. Before starting a job, each employee shall thoroughly understand the work to be done, his/her part in it and the safety rules that apply. Job briefings shall be conducted before starting work at the job-site to determine hazardous conditions. (See: Job Briefings, Section A, f. of management's responsibility)
- o. No phase of operations is of greater importance than incident prevention. The degree of safety and the results accomplished are directly proportional to the effort expended to control the conditions, practices and human actions (unsafe acts) that are responsible for incident.
- p. In an emergency involving hazard to life, a supervisor, foreman or employee in charge of any work may modify or suspend such portion of this manual as may be considered temporarily necessary to permit proper handling of the emergency. The person so acting shall be fully accountable.
- q. No horseplay, harassment, or sexual harassment will be tolerated .
- r. Before proceeding with a job, you shall satisfy yourself that the work can be performed without injury.
- s. It is your responsibility to attend training in first aid/CPR when such training is provided by the employer.
- t. It is your responsibility to attend all safety meetings held on the employer's time, and to take an active part in these meetings

D. INCIDENT REPORTING/INVESTIGATION

1. Reporting Employee Injuries

- a. Injuries, no matter how slight, shall be reported to Management immediately. (S.C. Workers' Compensation Law)
- b. All minor injuries shall be properly treated and a report made to the employee's supervisor. An incident investigation shall be completed and documented as soon as possible. (S.C. Workers' Compensation Law)
- c. When the services of a physician are necessary, a physician designated by the cooperative shall be used whenever possible. Injuries shall be reported to management immediately.
- d. An "Employers First Report of Injury" (S.C. Workers Compensation Commission Form) must be filed on any employee who is injured on the job or has a job related illness if the employee is treated by either a doctor, hospital or clinic. The immediate supervisor will investigate each incident. The results of this investigation should be recorded on the "Incident Investigation" form and submitted to the proper person or safety coordinator. A copy of the supervisor's incident investigation report should be forwarded to BEC's Loss Control Department.
- e. All fatalities and in-patient hospitalization of three or more employees resulting from a single work-related incident must be reported to the Occupational Safety and Health Administration (OSHA) within 8 hours of the incident. The report may be either in person or by telephone and shall be made at the direction of the CEO. The report shall relate the following information: (OSHA 1904.8)
 - 1. Establishment name
 - 2. Location of incident
 - 3. Time of the incident
 - 4. Number of fatalities or hospitalized employees
 - 5. Contact person
 - 6. Phone number
 - 7. Brief description of the incident.
- f. Fatalities and serious incidents should be investigated promptly by a formal committee. BEC's Loss Control and Training Department will provide assistance when requested. Formal incident investigation committees should be selected by management. The need for other formal incident investigations shall be determined by management after preliminary information is obtained. Any incident may be formally investigated if management deems it necessary.
- g. OSHA required injury/illness records shall be maintained. (OSHA 1904.2)
- h. Near-miss incidents should be reported and investigated.

2. Reporting Cooperative Vehicle Incidents

- a. The driver shall report accurately and immediately all damage to a vehicle. Additional reports shall be made to the police or state authority as required.
- b. The driver shall not discuss an incident with other parties but shall secure all pertinent facts and information. The driver shall answer questions when asked by proper authorities but under no circumstances shall admit fault or negligence or sign any statement for anyone.
- c. Should the other driver demand immediate action, they shall be referred to the employee's supervisor. The driver, when involved in an incident, shall stop, call the authorities, and give their name and address, and the employer's name and address. He shall also secure the name and address of others involved in the incident and of witnesses to the incident. The cooperative's driver shall also note position of the vehicle after the collision in reference to edge of road, sidewalk line, center of intersection, etc. Photograph the scene and the vehicles if possible.
- d. If any person is injured as the result of a vehicle incident employees shall see that necessary emergency aid is provided. (S.C. Dept of Public Safety)
- e. If the incident involved a COL vehicle and was "recordable" per O.O.T. guidelines make sure it is entered on the cooperative's vehicle incident register and that a copy of the state form is included in the incident register file. (49CFR 390.15)

3. Property Damage Incidents

- a. Any property damage or loss such as a theft, fire, or structure damage shall be reported immediately and an investigation report completed.

E. SAFETY TRAINING

- a. Employees shall be trained in and familiar with the safety related work practices, safety procedures, and other safety requirements that pertain to their respective job assignments. Employees shall also be trained in and familiar with any other safety practices, including applicable emergency procedures such as pole top, manhole, and bucket truck rescue, that are related to their work and are necessary for their safety. (1910.269 (a) (2))
- b. Qualified employees shall also be trained and competent in:
 1. The skills and techniques necessary to distinguish exposed live parts from other parts of electric equipment,
 2. The skills and techniques necessary to determine the nominal voltage of exposed live parts,

3. The minimum approach distances specified in this section corresponding to the voltages to which the qualified employee will be exposed, and
4. The proper use of the special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools for working on or near exposed energized parts of electric equipment. (1910.269(a)(2)(ii))

NOTE: A person must have this training in order to be considered a qualified person.

- c. The employer shall determine, through regular supervision and through inspections conducted on at least an annual basis that each employee is complying with the safety-related work practices. (1910.269(a)(2)(iii))
- d. An employee shall receive additional training (or retraining) under any of the following conditions:
 1. If the supervisor's annual inspections indicate that the employee is not complying with the safety-related work practices, or
 2. If new technology, new types of equipment, or changes in procedures necessitate the use of safety-related work practices that are different from those which the employee would normally use, or
 3. If he or she must employ safety-related work practices that are not normally used during his or her regular job duties.
- e. Tasks that are performed less often than once per year require retraining or review before the performance of the work practices involved.
- f. Training shall establish employee proficiency in the work practices required, and introduce the procedures necessary for compliance.
- g. The employer shall certify that each employee has received the required training. This certification shall be made when the employee demonstrates proficiency in the work practices involved and shall be maintained for the duration of the employee's employment.

NOTE: Employment records that indicate that an employee has received the required training are an acceptable means of meeting this requirement.

F. PROTECTING THE PUBLIC (NESC SECTION 42, 420)

- a. The public shall be kept away from locations where work activity presents a hazard.
- b. Hazards, such as manholes, pole holes, trenches or excavations shall be protected by proper barricades. Where exposed to traffic at night they shall be protected with warning devices that are illuminated with warning flashing light or arrow boards that are located as to be visible to traffic and the public.

- c. When it is necessary to warn traffic, flagman or warning devices shall be stationed far enough on each side of the hazard to give vehicles enough time to stop and comply with state and local regulations. When flagmen are used, they shall wear approved traffic safety vest containing re-flectorized material.
- d. When it is necessary to leave reels, equipment or other obstructions unattended, the following precautions shall be taken:
 - 1. They shall not be left adjacent to fire plugs or directly in front of entrances to private or public property.
 - 2. They shall be locked, blocked or otherwise secured.
 - 3. They shall be adequately protected by approved warning devices.
- e. When chiseling, chipping or welding is done in locations where the public may be exposed to hazards, shields shall be placed around the work and the area shall be roped off or barricaded

G. TRAFFIC CONTROL

All cooperative employees and work areas along roads shall be in compliance with S.C. Department of Transportation regulations

Reference: SC Department of Transportation Construction and Maintenance Operations Supplement to the Manual on Uniform Traffic Control Devices (*MUTCD*)

H. VEHICLE OPERATION

- a. Motor Vehicle Safety Operation
(*Motor Vehicle and Other Mobile Equipment*)

Drivers of cooperative-owned vehicles shall comply with all South Carolina and federal motor vehicle laws and any other laws that affect the safe operation of the vehicle.

General

- 1. Only those employees specifically authorized and who possess valid licenses or permits shall operate cooperative-owned vehicles on cooperative business.
- 2. Drivers shall know and obey all federal, state and local motor vehicle laws that apply to them.
- 3. Vehicles shall be operated within the legal speed limit and at lower speeds where conditions warrant.
- 4. A driver shall not permit unauthorized persons to drive, operate or ride in or on a cooperative vehicle, except in cases of emergency.

5. Seat belts shall be used in compliance with all federal, state and local motor vehicle laws.
 6. Employees shall not ride on the running boards, fenders or any part of any motorized equipment.
 7. Employees shall not stand in moving vehicles, unless required by the nature of the operation, such as roadside spraying or stringing wire.
 8. Employees shall not ride on trailers.
 9. Employees shall not mount or dismount vehicles in motion.
 10. Employees shall immediately report loss of or restriction of drivers licenses to their supervisor.
 11. COL license holders must report any traffic citations other than parking tickets regardless of vehicle driven at time of citation.
 12. Employees shall not drive or pass under any overhead door that is being opened or closed.
 13. All loose material in the driver compartment area shall be secured.
 14. Drivers of cooperative-owned vehicles shall comply with all State and Federal motor vehicle laws.
- b. Vehicle Inspection
1. All vehicles in use shall be inspected by the driver before the beginning of each shift to assure that the vehicles, equipment and accessories are in safe operating condition. The operation of the lower controls should be checked for proper operation prior use of the bucket.
 2. A thorough inspection of each company vehicle shall be performed at least monthly.
 3. All unsafe conditions shall be corrected before use.
- c. Trailer Inspection
1. All trailers in use shall be inspected by the driver at the beginning of each shift to assure that the trailer equipment and accessories are in safe operating condition.
 2. All unsafe conditions shall be corrected before use.
- d. Operation
1. Drivers shall stay alert for children, especially in school zones or where they are playing, and be prepared for an immediate stop.
 2. Drivers shall be especially alert for slow moving machinery on or near the vicinity of the road right-of-way.
 3. All vehicles parked on or along road right-of-way shall be protected in accordance with MUTCD.
 4. Vehicles shall not be parked on bridges or culverts, except when necessary for work, and shall be protected in accordance with MUTCD.

5. A complete stop shall be made and the driver shall proceed with caution when entering or leaving any building or enclosure, an alley, or street where vision is obstructed.
 6. Before radio-equipped cars or trucks are driven adjacent to, or beneath, energized equipment such as substations, a check shall be made to ensure that proper clearance will be maintained.
 7. Ignition systems shall be turned off, and no smoking permitted while refueling.
 8. When proceeding down grade, the clutch shall not be disengaged. Trucks, particularly if heavily loaded, shall be in low or second gear on steep grades.
 9. When parking a vehicle the driver shall use all means available to secure the vehicle from unintended movement. This could include, chocking the wheels, setting the parking brake or placing the vehicle in gear.
 10. Vehicle should never be left running when unattended.
 11. Vehicle keys should be removed when unattended.
- e. Backing
1. When possible, vehicles shall be positioned to avoid the necessity of backing.
 2. Extreme caution shall be exercised when backing a vehicle to avoid injury to persons and to prevent property damage.
 3. During all backing operations the vehicle operator shall:
 - Keep a constant lookout during the entire time.
 - Carefully check any blind areas.
 - Back slowly.
 - Watch both sides. Do not depend entirely on mirrors.
 - If possible, enlist the aid of another person to act as a guide when the rear view is obstructed. Whenever possible, backing operations shall proceed to the driver's side of vehicle.
 - All mechanical equipment (aerial lift and derrick) that have an obstructed view to the rear shall have a reverse signal alarm or a designated employee to inform the operator when it is safe to do so.
- I. REPORTING HAZARDOUS CONDITIONS
(NESC SECTION 42, 420)C**
- a. When any employee observes a hazardous condition that may cause injury, property damage or interfere with service, it shall be reported promptly to the proper authority and when necessary guarded.

- b. An employee who receives a report of any hazardous emergency condition shall obtain the name of the informant, the exact location and the nature of the trouble. He shall immediately refer this information to the person having responsibility for such matters and assign a priority. A follow-up written hazard report shall be made.

J. EQUIPMENT GUARDS (1910.212)

- a. No guard shall be removed from any machine or piece of equipment except to perform required maintenance.
- b. Guards removed to perform maintenance operations shall be replaced immediately and the machine shall not be operated while the guards are removed (except for maintenance certification).
- c. Equipment guards less than 7 feet above the working surface must provide total enclosure to prevent exposure to the hazard. Opening on guards must not have an opening over 1/4 inch.

K. TAGGING ELECTRIC SUPPLY CIRCUITS ASSOCIATED WITH POWER GENERATION WORK ACTIVITIES

- a. Application. The provisions of this section apply to the use of lockout/tagout procedures for the control of energy sources in installations for the purpose of electric power generation, including related equipment for communication or metering. (1910.269 (d))

NOTE: Installations in electric power generation facilities that are not an integral part of, or inextricably commingled with, power generation processes or equipment are covered under OSHA 1910.147 and Subpart S.

- b. The employer shall establish a program consisting of energy control procedures, employee training, and periodic inspections to ensure that, before any employee performs any servicing or maintenance on a machine or equipment where the unexpected energizing, start up, or release of stored energy could occur and cause injury, the machine or equipment is isolated from the energy source and rendered inoperative.
- c. If clearance logs or sheets are not used for this purpose a properly filled-out hold tag may be used. At the end of the 12-month period all records of clearances must be reviewed to find problems and ways to improve the system.
- d. A record of all clearances must be maintained for one year.
- e. The hazardous energy control program shall meet the following requirements:
 - 1. If an energy isolating device is not capable of being locked out, the employer's program shall use a tagout system.

2. If an energy isolating device is capable of being locked out, the employer's program shall use lockout, unless the employer can demonstrate that the use of a tagout system will provide full employee protection as follows:
 - f. When a tag out device is used on an energy isolating device which is capable of being locked out, the tagout device shall be attached at the same location that the lockout device would have been attached, and the employer shall demonstrate that the tagout program will provide a level of safety equivalent to that obtained by the use of a lockout program.
 - g. In demonstrating that a level of safety is achieved in the tagout program equivalent to the level of safety obtained by the use of a lockout program, the employer shall demonstrate full compliance with all tagout-related provisions of OSHA together with such additional elements as are necessary to provide the equivalent safety available from the use of a lockout device. Additional means to be considered as part of the demonstration of full employee protection shall include the implementation of additional safety measures such as the removal of an isolating circuit element, blocking of a controlling switch, opening of an extra disconnecting device, or the removal of a valve handle to reduce the likelihood of inadvertent energizing.
 - h. Whenever replacement or major repair, renovation, or modification of a machine or equipment is performed, and whenever new machines or equipment are installed, energy isolating devices for such machines or equipment shall be designed to accept a lockout device.
 - i. Procedures shall be developed, documented, and used for the control of potentially hazardous energy covered by this section.
 - j. Equipment or circuits that are to be treated as de-energized shall have a suitable tag attached to all points where such equipment or circuits can be energized.
 - k. Controls that are to be de-activated during the course of work on energized or de-energized equipment or circuits shall also be tagged:
 1. The required tags shall be placed to identify plainly the equipment or circuits on which work is being performed
 2. When controls upon which tags have been placed open automatically, they shall be left open until reclosing has been authorized.
 3. Attachment methods of hold tags have minimum breaking strength of 50 lbs. where possible.
 - l. Before starting work on any circuit, machine, equipment or other apparatus which is out of service, employees shall assure themselves that a standard Hold Card, tag or lockout device is properly attached to the apparatus control.

- m. No switch, governor, valve, throttle, or other device used to put a circuit or equipment into service shall be operated while a Hold Card or similar device is attached to it.
- n. A Hold Card, or similar device, that has been placed for protection of workers shall be removed only by authorization of the person in whose name it was placed and then only after the work has been completed, all workmen have been notified and are in the clear. (Follow Cooperative operating instructions pertaining to the equipment involved).
- o. Each person in charge of work on any equipment shall have his Hold Card or similar device secured to the apparatus control.

L. TAGGING ELECTRICAL CIRCUITS ASSOCIATED WITH TRANSMISSION AND DISTRIBUTION ACTIVITIES (1910.269(M) and (N))

- a. Hold Tags/Lockout-Tagout
 - 1. Hold tags shall be weatherproof and if possible have a means of attachment that will withstand 50 foot lbs. of force.
 - 2. Installed anytime a line is de-energized or when a circuit is placed in the non-reclose position without SCADA assistance.
 - 3. Have the designated person's name on the tag with date, time, clearance number, and circuit or device number recorded on the hold tag.
 - 4. Hold tags shall be attached to the control panel, control handle, or within visibility of the connection between source and load connections.
 - 5. Hold tags should not be removed other than by the designated person on the Hold tag.
 - 6. An annual review is required of the lock out tag out procedure to look for potential problems and to find ways to improve the program.
 - b. All oral communications about dispatching and clearances shall be recorded by the person receiving them and read back to the person giving them.
 - c. Under no circumstances shall clearances be granted or released on a predetermined time basis.
 - d. When two or more independent crews are working on the same line or equipment and are not under the supervision of the same general foreman or other supervisor, each crew foreman shall request and release his own clearance independently in accordance with these rules.
- A Hold tag shall be attached to each switch that is providing clearance on a cleared line or apparatus.

- f. The handles of switches providing clearances for working on lines or apparatus shall be locked or blocked, open or closed, in addition to the application of the hold tags, a visible air gap shall be provided.
- g. Under no circumstances shall Hold tags be removed or the line or apparatus put in service until so ordered by the dispatcher.
- h. Before primary grounds are removed and line or equipment returned to service, the load dispatcher or designated person shall require that the same person who received the clearance shall report that the line or equipment may be re-energized.
Exception: If the person who received the clearance shall leave the work before it is completed, he shall so inform the dispatcher or designated person giving him the name of the man who will take his place. In such cases, the dispatcher shall communicate with both men, releasing the one who is leaving and accepting the other as authorized to report for him. Clear entries of all such authorized changes shall be made on dispatcher's records and Hold tags.
- i. When it is necessary to obtain a working clearance on any line or apparatus not under the jurisdiction of a dispatcher, the request shall be made directly to the person having jurisdiction.
- j. After de-energizing the line or equipment and attaching Hold tags to each switch providing clearance on the line or equipment, the employee shall report back to the person making the request that the line or equipment is out of service. Work may begin after testing for the absence of nominal voltage and installing adequate grounds that have the ampacity for the anticipated fault current.
- k. A line or equipment shall not be put back in service, nor the Hold tags removed until the person to whom the clearance was given releases his clearance.
- l. After the work is completed, the grounds removed and all employees are in the clear, the employee who received the clearance, or his properly authorized substitute, shall report to the person having jurisdiction that the line or equipment is ready for service.
- m. Lockout/Tagout programs for buildings not directly related to electrical distribution shall comply with OSHA 1910 subpart S.
- n. Employees should receive annual training on the clearance program.

M. OFFICE SAFETY (1910.22)

- a. Chairs, wastebaskets, extension cords and other articles shall not be left in aisles where they constitute a tripping hazard.
Desk and file cabinet doors shall not be left open when not in use.
- c. Only staples, clips or other approved fasteners shall be used for fastening paper together.
- d. Broken glass or other sharp edged objects shall not be placed in wastebaskets unless properly protected.
- e. Approved ladders or stools shall be used to reach material on high shelves or at other similar location. Boxes, crates, chairs, etc. shall not be used in place of a stool or ladder.
- f. Employees shall walk cautiously around blind corners and should use hand rail on stairs.
- g. Employees shall not attempt to clean, oil, or adjust any machine that is running.
- h. Do not sit on the edge of a chair. Do not tilt back when sitting in a straight chair. Heaters with visibly exposed heating elements shall not be used.
- j. All lighting panel doors shall be closed at all times.
- k. Exits and fire extinguishers shall not be blocked at any time.
- l. Annual fire/evacuation drills shall be performed and documented.
- m. Do not store combustible material in front of electrical panels.
- n. Use care when operating paper shears and other office equipment.
- o. Elevated heels should not be worn when ice is present or on an unstable walking surface.
- p. Office desk equipment should be ergonomically sound and properly adjusted.
- q. Always watch for loose tile or rough places in flooring, as this may cause a tripping incident.
- r. Swivel chairs: Never lean back in one without testing it first. Check for sticking casters, loose joints and adjustments.
- s. File cabinets: Always close a file cabinet when you are through with it so as to prevent you or someone else from running into it.
 - Be careful when closing a file cabinet, as your fingers or someone else's fingers could be in the way.
 - Never overload the top drawers of a file cabinet. This will make the cabinet top-heavy. File cabinets should be secured to prevent tipping.
 - Never open more than one drawer of a file cabinet at a time.
- t. Be cautious when approaching a door that can be pushed toward you. Be equally cautious when pushing a door open.
Never lick an envelope. It can cut your tongue. Use a wet sponge or some other wetting device.
- v. Use a rubber finger guard when working with stacks of paper.

- w. Never store any sharp objects loose in your desk. Keep them in boxes.
- x. Never remove guards from any machine. Never try to clear any jammed machine without first shutting off the power.
- y. Never indulge in horseplay in the office.
- z. When lifting or moving heavy objects: Always ask for some help. When lifting, lift in the proper manner. The safe way to lift is to bend your knees and let your legs do the lifting—not your back. Keep your back as straight as possible. Put the load down the same way—using your legs. Move your feet to turn with the load—don't twist, and keep the load close to your body.
- aa. When carrying a load, be sure you can see where you are going. Check footing on stairs, and keep the load as close to your body as you can.
- bb. Always be alert and remember that incidents can happen in offices. Report all hazards immediately.
- cc. With long hair, loose jewelry, loose clothing, neck wear—extreme caution should be used when any of these conditions exist around moving machinery or equipment.
- dd. Office equipment should be turned off after working hours with the exception of equipment designed to be left on continuously.
- ee. Drop cords shall be used only for temporary operations.
- ff. Designated employees shall be trained on their duties in an emergency procedures.

N. FIRST AID/CPR (1910.269(8) & 1910.151)

1. General

- a. All employees should be trained in First Aid and CPR.
- b. Employees rendering first aid shall exercise universal precautions when exposed to blood or body fluids of another. This would include the use of latex or nitrile gloves to avoid exposure to hand contact. Other personal protective equipment such as a breathing barrier, face mask, and eye protectors are to be used when performing mouth to mouth resuscitation and when there is possibility of splashing of blood. Immediately wash your hands with soap and water after rendering first aid.
- c. All incidents where there is potential risk of exposure to blood or body fluids shall be reported immediately so that proper follow-up procedures can be performed.
- d. Vaccinations for Hepatitis B shall be offered within 24 hours where there has been a job related exposure to blood or body fluids during first aid procedures.
- e. All employees should be aware of the emergency medical services available and how to obtain them.

- f. At least two persons trained in CRP and First Aid shall be present when two or more employees are performing work on circuit lines or equipment energized at 50 volts or more.
 - g. Employees shall be familiar with the location, the contents and the proper use of first aid kits.
 - h. The contents of the first aid kits shall be inspected each week and expended items replaced.
 - i. Material Safety Data Sheet information for all chemicals used at the cooperative, shall be readily available to all employees.
 - j. Rescue equipment and annual training is required for enclosed spaces.
- 2. Wounds and Control of Bleeding**
- a. A person can bleed to death in less than one minute. In the event of an injury that results in significant bleeding immediate steps must be taken to prevent the loss of blood.
 - b. Serious bleeding may be controlled by Direct Pressure, Elevation, and Pressure Points:
 - 1. Direct Pressure. Apply firm direct pressure directly on top of the wound. Use of a sterile dressing is preferred. In an emergency use any dressing or even the bare hand.
- 3. Shock**
- a. Attention must be given to the prompt treatment for shock. Shock usually occurs following a severe loss of blood or some type of serious injury. It can occur from a minor injury or even from anxiety or emotional stress. Regardless of the cause, the symptoms are the same and similar treatment is required.
 - b. Symptoms of shock are:
 - Chalk-like appearance
 - Dull or anxious expressions
 - Shallow breathing
 - Weak, rapid pulse
 - Cold, moist skin
 - Disorientation
 - c. Recommended treatment for shock is:
 - 1. The victim should be kept warm and comfortable but not too hot. In many cases the only first aid measure necessary and possible is to cover the victim with a blanket to prevent the loss of body heat. It may be necessary during cold weather to place a blanket underneath the victim as well.
 - 2. Keep the victim's body horizontal and position his body so that his feet are at least 6 inches higher than his head. The single exception to this positioning is the case of a victim who obviously has an injury to the chest, and who has difficulty breathing. This victim should be kept horizontal with upper body slightly raised to make breathing easier.

3. Clear the victim's mouth of all foreign bodies and make sure they are breathing properly.
 4. Loosen tight clothing at the neck, the chest and the waist.
 5. Proper transportation to a medical facility is important in the case of a person who may develop shock and lose consciousness. Use an ambulance, do not use a car or truck where there is a risk of the victim becoming unconscious when en-route to a medical facility.
- 4. Eye Injuries**
- a. Foreign Bodies
 1. When a small foreign body such as dust has entered the eye, moderate efforts may be made to remove it. The edge of a clean handkerchief or similar item may be used. Never use a matchstick, knife or other such instrument that might cause damage to the eye. Grasp the upper eye lid and pull out and down over the lower lid and release. Try this method several times.
 2. Objects imbedded in the eye must not be removed except by a physician. Place the victim on their back and call for an ambulance immediately. Both eyes of the injured should be bandaged loosely. The injured employee should be told to relax and asked not to move his eyes.
 - b. Chemical Burns, Acid or Caustic
 1. Immediate irrigation of the eye with large quantities of clean water is mandatory whenever a chemical substance enters the eye.
 2. Flushing of the eye with running water should continue for at least 15 minutes.
 - c. Regardless of first aid measures taken, potentially serious eye injury cases should be seen by a physician as soon as possible.
- 5. Burns**
- a. Electrical or thermal burns
 1. Electrical burns may be caused by electrical contact from the heat of an electrical arc or a combination of both.
 2. Cool the injured area with clean or sterile water as soon as possible.
 3. Continue to cool the burned area until professional help arrives.
 4. Treat for shock.
 5. Electrical contact injuries may cause severe internal injuries. All electrical contact injuries should be treated at a burn center.

b. Chemical burns

1. Flush the chemical from the skin for at least 5 minutes. Remove any contaminated clothing.

O. POLE TOP/BUCKET RESCUE

Electric contacts may occur at elevated locations. When such a contact does happen, immediate rescue efforts are necessary. Rescue operations will vary, depending upon the situation. The information in this section is intended to serve only as a guide.

Pre-planning for an emergency is important. Prompt action by fellow employees is essential in rescue operations. Personnel engaged in overhead line work must be trained in pole top and bucket rescue. Pole top and bucket rescue shall be practiced and documented at least annually for affected employees.

EXERCISE UNIVERSAL PRECAUTIONS AND BEGIN RESUSCITATION AS SOON AS POSSIBLE, CONTROL BLEEDING, AND TREAT FOR SHOCK.

- a. In electric shock cases, do not rush in and become a casualty yourself. (Remove or disconnect source from victim before starting rescue procedures.)
- b. Attempt to stop any serious flow of blood.
- c. Change of rescuers during CPR shall be done as smoothly as possible without breaking the rhythm. If it is necessary briefly interrupt CPR to move the victim, resuscitation shall be continued. Treat the victim for shock.

INITIATE EMERGENCY PROCEDURES TO SUMMON MEDICAL ASSISTANCE

- a. **CHECK – CALL – CARE**
Size up the situation. The rescue effort will be far more effective if a few seconds are devoted to full identification of the situation.
 1. **CHECK** - the scene to be sure area is safe to enter.
 2. **CALL** - call for MAYDAY Clearance, give location and request medical assistance.
 3. **CARE** - care for the victim in a manner not to endanger yourself or create further injury to the victim.
- b. Prepare the equipment you will need.
Protect yourself. Apply necessary protective equipment. Use the necessary PPE. Then clear the victim from the hazards.
- d. Position yourself for rescue.

- e. Proceed with pole top or bucket rescue and resuscitation as dictated by the conditions.
1. If the victim is conscious:
 - Reassure the injured
 - Be watchful for shock
 - Help injured descend the pole
 - Administer first aid
 2. If victim is unconscious and breathing:
 - Watch breathing closely
 - Lower injured to ground
 - Give first aid
 3. If victim is unconscious and not breathing:
 - Begin rescue breathing
 - Lower the victim to the ground as soon as possible
 - Place the victim in a level position on their back
 - If no pulse is detected, begin CPR immediately and continue until help arrives

SECTION II Buildings and Facilities

A. HOUSEKEEPING (1910.22)

- .. Work areas, vehicles, and facilities shall be kept clean and orderly at all times.
- b. Floors and platforms shall be kept free of dangerous projections or obstructions and shall be maintained free from oil, grease, or water. Where the type of operation produces slippery conditions, mats, grates, cleats or other methods shall be used to reduce the hazard of slipping.
- c. Stairways, aisles, permanent roadways, walkways and material storage areas in yards shall be kept free from obstructions, depressions and debris.
- d. Materials and supplies shall be stored in an orderly manner to eliminate tripping hazards.
- e. Personal lockers shall be kept clean and orderly.
- f. Paper and other combustible materials shall not be allowed to accumulate. Weeds and other undesirable vegetation shall not be permitted to grow in substations, pole yards, around buildings, oil tanks or other structures.

B. PLANS AND PROGRAMS

OSHA 1910.37, 1910.38, 1926.24, 1926.150--155

The employer shall develop and ensure the training of:

- Emergency Action Plans
- Fire protection program
- Fire prevention program

C. FIRE PREVENTION

OSHA 1926 Subpart F and 1910 Subpart E and L

- a. No more than 25 gallons of a Class 1A flammable liquid (such as gasoline) can be stored in a room outside a flammable liquid storage cabinet.
- b. All solvents shall be kept in approved, properly labeled containers.
- c. Flammable liquids shall be stored and dispensed only in U.L. approved and properly labeled safety cans. Not more than one gallon of safety solvent shall be used in any open container. The container shall be provided with a proper cover and be securely covered except when in actual use.

- e. When pouring or pumping gasoline or other flammable liquids from one container to another container, electrical bonding shall be maintained between the containers. No more than 5 gallons should be transferred at one time. (1926.151 (e)(1))
- f. Strict adherence shall be paid to "No Smoking" "No Open Flames" and "Shut off Motor" signs.
- g. If open flames are used in enclosed spaces, a test for flammable gases and vapors shall be made before the open flame device is used and shall be conducted continuously in the enclosed space.
- h. The storage of flammable liquids is not permitted in an office building. Material shall not be stored within 3 feet of electrical distribution panels.
- j. Combustible materials, such as oil-soaked rags, waste and shavings, shall be kept in approved metal containers with metal lids. Containers shall be emptied daily.
- k. Flammable liquids shall be used only for their designed purposes. Gasoline, benzene, denatured alcohol, naphtha, lacquer thinner, etc., shall not be used for cleaning purposes or for starting fires.
- l. In any building, except one provided for their storage, flammable liquids such as gasoline, benzene, naphtha, lacquer thinner, etc., shall be limited to five gallons, in U.L.-approved, properly labeled safety cans with a 60 gallon maximum limit

D. FIRE PROTECTION

OSHA 1926 Subpart F and 1910 Subpart E and L

- a. Fire protection equipment shall be properly located at all times. Except for actual use, employees shall not move or remove such equipment without proper authority.
- b. Except for wheel-type extinguishers, all portable fire extinguishers located in permanent structures shall be mounted at readily accessible locations and shall comply with current regulations.
- c. All employees shall know the classes of fire, their burning characteristics and the proper extinguishing agent to be used. The classes are:
 - Class "A" fires involve ordinary combustibles such as wood and paper. Extinguishing agents include water, multipurpose dry chemical.
 - Class "B" fires involve oils and flammable liquids. Extinguishing agents include CO2 and dry chemical.
 - Class "C" fires involve electrical equipment. Extinguishing agents include CO2 and dry chemical.

- d. Each company vehicle shall carry a fire extinguisher with a minimum rating of 5 BC, unless that vehicle is over 26,000lbs. (aerial lifts and derrick trucks), in which case no less than two 10 BC fire extinguishers will be required.
- e. Each service or fueling area shall be provided with at least one fire extinguisher having a rating of not less than 20 BC and located no closer than 25 feet nor more than 75 feet of each pump, dispenser, underground fill pipe opening, lubrication or service area.
Only approved safety solvents shall be used for cleaning equipment and parts.

E. FLAMMABLE AND COMBUSTIBLE LIQUIDS STORAGE

OSHA 1926.152

- a. Flammable or combustible materials shall not be stored in areas used for exits, stairways or passageways normally used by people.
- b. Indoor storage quantities of flammable and combustible liquids in excess of 25 gallons shall be stored in an approved cabinet.
- c. All flammable cabinets shall be labeled in conspicuous lettering "Flammable -Keep Fire Away."
- d. Not more than 60 gallons of flammable or 120 gallons of combustible liquid shall be stored in anyone building.
- e. Inside storage rooms of flammable or combustible liquids shall be constructed to meet the required fire-resistive rating for their use. Construction of inside storage rooms shall comply with the specifications set forth in Standard Methods of Fire Test of Buildings Construction and Material, NFPA251-1969.
- f. At least one portable fire extinguisher, having a rating of not less than 20 BC units, shall be located outside of, but not more than 10 feet from, the door opening into any room used for storage of more than 60 gallons of flammable or combustible liquids.

F. SMOKING

- a. Smoking or open flames shall not be permitted in areas where dangerous gases might be present; for example, oil rooms, hydrogen areas, acetylene storage, or similar areas.
- b. Smoking is not permitted in storerooms, battery rooms, flammable liquid storage and in areas where flammable liquids are used, or in other areas where quantities of combustible materials are kept.
- c. Use extreme care when smoking in wooded areas.

G. STORAGE AND HANDLING MATERIALS

OSHA -1910 Subpart O and N, 1926 Subpart Hand 1926 Subpart V

1. General

- a. All materials stored in tiers shall be stacked, racked, blocked, interlocked or otherwise secured to prevent sliding, falling or collapsing.
- b. Maximum safe load limits of floors within buildings and structures, in pounds per square foot, shall be conspicuously posted in all storage areas, except for floors or slabs on grade. Maximum safe loads shall not be exceeded.
- c. Aisles and passageways shall be kept clear to provide for free and safe movement of material handling equipment or employees. Such areas shall be kept in good repair.
- d. When a difference in road or working levels exist, means such as ramps, blocking or grading shall be used to ensure the safe movement of vehicles between the two levels.
- e. Materials shall not be stored on scaffolds or runways in excess of supplies needed for immediate operations.
- f. Structural steel, poles, pipe, bar stock and other cylindrical materials, unless racked, shall be stacked and blocked so as to prevent spreading or tilting.
- g. Portable dockboards shall be secured in position, either by being anchored or equipped with devices that will prevent their slipping.
- h. No materials or equipment shall be stored under energized bus, energized lines or near energized equipment, if it is practical to store them elsewhere.
- i. When materials or equipment are stored under energized lines or near energized equipment, applicable clearances shall be maintained as stated in OSHA 1910.269 (k) (10 feet up to 50 kv plus 4 inches for every 10 kv above 50 kv); and extreme caution shall be exercised when moving materials near such energized equipment.
- j. When mechanical equipment is used to move material in warehouses, permanent aisles and passageways shall be appropriately marked.
- k. When unpacking new capacitors they shall be treated as capacitors just removed from service until externally shunted.

2. Manual Handling

- a. An employee shall obtain assistance in lifting heavy objects or shall use power equipment.
- b. When two or more persons carry a heavy object, there shall be a prearranged signal for lifting and releasing the load.

- c. The back shall be kept straight with the object being lifted held as close to the body as possible. Lift with the legs and not the back.
 - d. When two or more persons are carrying one object each employee should face the direction in which the object is being carried. Avoid strains from lifting objects by being sure of footing, bending the knees and keeping the back almost perpendicular.
 - e. Keep back straight, avoid sudden movements and use the stronger muscles of the legs.
 - f. In areas not restricted to qualified persons only, materials or equipment may not be stored closer to energized lines or exposed energized parts of equipment than the following distances plus an amount providing for the maximum sag and side swing of all conductors and providing for the height and movement of material handling equipment:
 - 1. For lines and equipment energized at 50 kV or less, the distance is 10 feet (305 cm).
 - 2. For lines and equipment energized at more than 50 kV, the distance is 10 feet (305 cm) plus 4 inches (10 cm) for every 10 kV over 50 kV.
 - 3. In areas restricted to qualified employees, material may not be stored within the working space about energized lines or equipment.
 - g. When two or more persons are carrying one object, each employee, if possible, shall face the direction in which the object is being carried.
 - Avoid strains from lifting objects by being sure of footing, bending the knees and keeping the back almost perpendicular. When ready to lift, straighten the legs slowly, thus putting the strain on the stronger muscles of the body. Loads should be kept as close to the body as possible.
- 3. Industrial Trucks -Fork Lifts (1910.178, 1926.602)**
- a. All operators of forklift trucks shall be trained and certified in the operation of the type of forklift truck they will operate. The operator must be observed and re-certified annually.
 - b. Fork lifts shall be operated only by authorized persons who are properly trained in their use.
 - c. Brakes and controls shall be tested prior to use. Equipment with faulty brakes or mechanical or electrical defects shall not be operated. Needed repairs shall be corrected before use. A documented inspection shall be performed before each shift.

- d. Fork lifts shall always be operated at a safe speed for existing conditions.
- e. Before moving the equipment, the operator shall make sure that no person or objects are in the path of the vehicle. Clearances in all directions shall always be checked, particularly overhead clearances.
- f. Fork lifts shall not be refueled while the engine is running. Smoking is not permitted while refueling.
- g. When picking up a load, forks shall be set squarely and placed under the load as far as possible. Loads should not be raised or lowered while traveling. Whether loaded or empty, forks should be carried as low as possible, but high enough to clear uneven surfaces.
- h. Loads shall not be suspended or swung over other persons. No one shall be allowed to stand or walk under elevated forks.
- i. The operator shall always face in the direction of travel.
- j. On inclines, all types of loaded fork lifts shall be driven with the load on the upgrade side of the driver, whether ascending or descending.
- k. Sudden stops that might spill the load shall be avoided.
- l. All loads shall be securely fastened or safely positioned to prevent tipping or falling.
- m. Lift bars on fork lifts that are movable or replaceable shall be held firmly in place by a proper securing pin. Jury-rigged devices, such as using a threaded bolt, shall not be permitted.
- n. Only attachments provided by or approved by the manufacturer may be used; all attachments shall be properly secured. Improvised methods shall not be used.
- o. No one other than the operator shall be allowed to ride the fork lift or other equipment, except when seats are provided for this purpose.
- p. When a fork lift is left unattended (operator is 25 feet away or the vehicle is not in his view), the load engaging means shall be fully lowered, controls shall be neutralized, power shall be shut off, key removed and brakes shall be set. Wheels shall be chocked when the vehicle or fork lift is parked on an incline.
- q. Fork lifts shall be fitted with a back-up alarm.
- r. Fork lifts with internal combustion engines shall not be operated in enclosed areas for prolonged periods of time unless suitable ventilation has been provided, so as not to exceed the allowable levels of carbon monoxide.
- s. When loading or unloading highway trucks, properly secured, approved dockboards, shall be used. The wheels of the highway truck being loaded or unloaded shall be chocked. Inspect the floor of a trailer prior to entry.

- t. All fork lifts shall be equipped with a portable fire extinguisher.
- u. Modifications and additions that affect capacity and safe operations of fork lifts shall not be performed without manufacturer's prior written approval.
- v. The operator shall see that all nameplates and markings are in place and are maintained in a legible condition.
- w. Changing and charging batteries:
 - Facilities shall be provided for flushing and neutralizing spilled electrolyte, for fire protection, for protecting charging apparatus from damage by vehicles, and for adequate ventilation for dispersal of fumes from gassing batteries.
 - When charging batteries, acid shall be poured into water; water shall not be poured into acid.
 - Vehicles shall be properly positioned and the brake applied before attempting to change or charge batteries.
 - Smoking shall be prohibited and "No Smoking" signs posted in the charging area.
- x. The driver is required to slow down and sound the horn at cross aisles, doorways and other locations where vision is obstructed.
- y. Fork lifts shall not be driven up to anyone standing in front of a bench, truck or other fixed object.
- z. Horseplay is not permitted while operating fork lifts.
- aa. Seat belts shall be used if fork lift is so equipped.
- bb. Operators shall be required to wear hard hats and safety glasses per cooperative policy.

H. GARAGE

1. Handling and Storage of Compressed Gas Cylinders (1926.350, 1910 Sub part O)

- a. Care shall be exercised in handling all gas cylinders. Cylinders shall not be dropped or jarred.
- b. Gas cylinders shall not be hoisted using a sling or electric magnet nor shall they be lifted by the valve protection cap. Hydraulic tailgates or other approved methods shall be used in lowering cylinders from trucks. When cylinders are transported by vehicles they shall be secured in the vertical position.
- c. Gas cylinders, whether full or empty, shall be tied off securely in an upright position at all times. Valve protection caps shall be kept in place, except while regulators or hoses are attached. All cylinder labels shall be in place.
- d. Gas cylinders shall be kept away from heat and welding or cutting operations where sparks could reach them.

- e. Oxygen cylinders shall not be stored near highly combustible materials, especially oil and grease. They shall be separated in storage from fuel gas cylinders or combustible materials (especially oil or grease) a minimum distance of 20 feet or by a five (5) foot high one-half hour rated fire wall.
- f. Welding or cutting of any pipeline, tank, empty container or piece of equipment shall not be performed until it is assured the object is free from highly flammable materials or an explosive mixture of gases. Before welding or cutting is begun, the hazardous materials shall be removed, and it shall be vented to the atmosphere and purged with an inert gas to prevent an explosion from expansion of trapped gases.
- g. Cylinders containing chlorine, propane or hydrogen shall not be stored in a general storeroom. They shall be stored in separate, well ventilated, fireproof areas.
- h. Cylinders shall not be allowed to come in contact with energized conductors, ground wires from electrical equipment or welding machines.
- i. A full cylinder shall be connected to a header or manifold with other cylinders only when their temperatures are approximately the same.
- j. Only those fuel gas cylinders that are in actual use and are secured in place and connected to a manifold or welding set shall be permitted in a main building. All empty and spare cylinders shall be stored elsewhere.
- k. The valves of compressed gas cylinders shall be opened slowly.
- l. Employees shall never tamper with the safety relief devices of cylinders.
- m. Employees shall never force connections that do not fit. Only properly trained employees shall be entitled to use this equipment.
- n. Oil or grease shall not be used for lubricating valves, gauge connections or any parts of a compressed oxygen system.
- o. Before a regulator is removed from a cylinder, the valve shall be closed and all pressure released from the regulator.
- p. A leaking cylinder shall not be used. Such cylinders shall be taken outdoors away from sources of ignition. The supervisor shall be notified.
- q. A flame shall never be used to detect gas leaks.
- r. The recessed top of cylinders shall not be used as a place for tools.
- s. No attempt shall be made to mix gases in a cylinder or to transfer gas from one cylinder to another.
- t. A sign "Danger-No Smoking, Matches or Open Lights" or equivalent wording shall be conspicuously posted in rooms or at entrances to areas where fuel gas is used or stored.

2. Gas Welding and Cutting

- a. Welding and cutting shall be performed only by experienced and properly instructed persons.
- b. When welding or cutting in elevated positions, precautions shall be taken to prevent sparks or hot metal from contacting people or flammable material.
- c. Suitable fire extinguishing equipment shall be immediately available at all locations where welding and cutting equipment is used.
- d. Matches or cigarette lighters shall not be carried by welders or their helpers when engaged in welding or cutting operations.
- e. A fire watch shall be maintained wherever welding or cutting is performed in locations where combustible material present a fire hazard. A fire check shall be made of the area one half hour after completion of welding.
- f. Where combustible materials such as paper clippings or wood shavings are present, the floor shall be swept clean for a radius of 35 feet before welding. Combustible floors shall be kept wet or protected by fire-resistant shields. Where floors have been wet down, personnel operating arc-welding or cutting equipment shall be protected from possible shock.
- g. Machinery, tanks, equipment shafts or pipes that could contain explosive or highly flammable materials shall be thoroughly cleaned and decontaminated prior to the application of heat.
- h. Gaseous spaces where there is a possibility of an explosion, welding or cutting equipment shall not be used until the space is adequately ventilated and tested.
- i. Adequate ventilation or approved respiratory equipment shall be used while welding, brazing, or cutting.
- j. Welding zinc, brass, bronze, stainless steel or galvanized or lead coated material present additional hazards.
- k. Cadmium bearing materials.
 1. Proper respiratory protection must be used when welding or cutting cadmium bearing metals.
 2. Indoors or in confined spaces, local exhaust ventilation or airline respirators shall be used.
 3. Outdoors, respiratory protection, such as approved fume respirators or airline respirators shall be used.
- l. Under no condition shall acetylene be used at a pressure in excess of 15 psig. The cylinder valve should not be opened more than 3/4 to 1 1/2 turns.
- l. Cylinders shall not be placed where they may become part of an electrical circuit.

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- m. Suitable eye protection, protective gloves and 100% cotton or FR clothing shall be worn during welding or cutting operations and while cleaning scale from welds. Helpers or attendants shall wear proper eye protection.
- n. Matches shall not be used to light a torch; a torch shall not be lighted on hot work. A friction lighter or stationary pilot light shall be used.
- o. Damaged welding hose shall be replaced immediately.
- p. When welding equipment is not in use, the cylinder valves shall be closed, regulators closed, and the pressure in the hose and regulators released.
- q. Flash back arresters shall be used at the cylinder regulators.
- r. Oxygen cylinders in storage must be separated from fuel gases and oil grease by a minimum distance of 20 feet or by a non-combustible barrier at least 5 feet high having a fire resistance rating of at least 1/2 hour.

3. Electric Welding

- a. No electrical welding machine, either AC or DC, shall be operated until the frame or case of the machine is electrically grounded. Grounding connections shall be checked prior to welding to insure they are adequate, both mechanically and electrically. Welding rods shall be removed from the holder (stinger) when not in use.
- b. Rules and instructions supplied by the manufacturer for the machine shall be followed.
- c. To protect the eyes, face and body during electrical welding and cutting, the welder and helper shall wear an approved welding helmet and proper protective gloves and 100% cotton or FR clothing.
- d. Proper eye protection (safety glasses or goggles) shall be worn to guard against flying particles when chipping or grinding.
- e. Welders shall not strike an arc with an electrode when there are persons nearby who might be affected by the arc. Other employees shall not observe electric welding operations unless they use approved eye protection.
- f. Welding screens shall be used when welding and grinding when necessary for the protection of employees and the public.

4. Vehicle Battery Charging Area

- a. All exits from battery room shall be marked.
- b. Battery rooms or charging areas shall be properly ventilated.
- c. Chemical goggles, face shield, apron and rubber gloves shall be used when working with or handling batteries.
- d. Eye wash facility shall be available within the immediate area of battery charging area.

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- e. When jump starting vehicles, connect the positive post of both vehicles together first. Negative post of the battery being jumped shall be connected first to the negative cable. The negative cable shall then be connected to the frame of the vehicle providing the jump start.
- f. Only approved jumper cables shall be used to jump start a vehicle.

I. BUILDING AND FACILITIES LOCKOUT/TAGOUT

OSHA 1910.147

Employee shall follow the Lockout and Tagging procedure as written by the cooperative.

Section III Overhead Distribution Construction and Maintenance

A. GENERAL (1910.269 & 1926 Sub part V)

- a. The employee in charge is responsible for conducting the "Job briefings" or ensuring that it is done before the start of each job. Documentation of the briefing is recommended. The job briefing is always required to cover at least the following five subjects:
 - HAZARDS ASSOCIATED WITH THE JOB
 - WORK PROCEDURES INVOLVED
 - SPECIAL PRECAUTIONS
 - ENERGY SOURCE CONTROLS
 - PERSONAL PROTECTIVE EQUIPMENT
 - REQUIREMENTS.
- b. A brief discussion is satisfactory if the work involved is routine and if the employee, by virtue of training and experience, can reasonably be expected to recognize and avoid the hazards involved in the job.
- c. A more extensive discussion shall be conducted: If the work is complicated or particularly hazardous, or if the employee cannot be expected to recognize and avoid the hazards involved in the job.
- d. If the work or operations to be performed during the work day or shift are repetitive and similar, at least one job briefing shall be conducted before the start of the first job of each day or shift. Additional job briefings shall be held if significant changes, which might affect the safety of the employees, occur during the course of the work.
- e. An employee working alone is not required to conduct a job briefing. However, the employer shall ensure that the tasks to be performed are planned as if a briefing were required.

- f. These job briefing procedures are acceptable when all the employees involved are qualified in all training requirements for the job to be performed.
- g. If an employee is in the capacity of on the job training the requirements for the standard job procedure or job safety analysis should be used to document the on the job training.

**INSPECTION AND TESTING OF WOOD POLES
(1910.269 APPENDIX D)**

- a. The employee performing a pole inspection must be qualified to make a determination as to whether or not it is safe to perform the work without taking additional precautions.
- b. Wood poles should be inspected by a qualified employee for the conditions listed below. The presence of any of these conditions below is an indication that the pole may not be safe to climb or to work from:
 - 1. The pole should be inspected for buckling at the ground line and for an unusual angle with respect to the ground. Buckling and odd angles may indicate that the pole has rotted or is broken.
 - 2. The pole should be inspected for cracks. Horizontal cracks perpendicular to the grain of the wood may weaken the pole. Vertical cracks can pose a hazard to the climber, and the employee should keep his or her gaffs away from them while climbing.
 - 3. Check for hollow spots and woodpecker holes that can reduce the strength of a wood pole.
 - 4. Look for rotting and decay which are cutout hazards and are indications of the age and internal condition of the pole.
 - 5. One large knot or several smaller ones at the same height on the pole may be evidence of a weak point of the pole.
 - 6. Evidence of the existence of a former ground line substantially above the existing ground level may be an indication that the pole is no longer buried to a sufficient extent. Pole birthmark may also be used as a reference mark.
 - 7. Soft, wet, or loose soil may not support any changes of stress on the pole.
 - 8. Burning from transformer failures or conductor faults could damage the pole so that it cannot withstand mechanical stress changes.

- c. Perform the test listed below in addition to the pole inspection.

1. Hammer Test

Rap the pole sharply with a hammer weighing about 3 pounds, starting near the ground line and continuing upwards circumferential around the pole to a height of approximately 6 feet. The hammer will produce a clear sound and rebound sharply when striking sound wood. Decay pockets will be indicated by a dull sound or a less pronounced hammer rebound. Also, prod the pole up to 18 inches below the ground line using a pole prod or a screwdriver with a blade at least 5 inches long. If substantial decay is encountered, the pole is considered unsafe.

2. Rocking Test

Apply a horizontal force to the pole and attempt to rock it back and forth in a direction perpendicular to the line. Caution must be exercised to avoid causing energized lines to swing together. The force may be applied either by pushing with a pike pole or pulling with a rope. If the pole cracks during the test, it shall be considered unsafe.

- d. Poles shall be thoroughly inspected before they can be climbed. If a pole is not strong enough to sustain strain in its condition or its placement (such as in soft ground), it shall be guyed or otherwise secured throughout the time any work is being performed on it. If the pole to be climbed is being replaced and the new pole is set adjacent to it, the old pole may be lashed to the new one in lieu of guying.
- e. When poles are encountered which are unsafe to climb (ice, badly chewed, wide cracks, shell rot, etc.), an alternate means of climbing shall be used (for example two belts around the pole, while climbing) or the use of an aerial basket shall be considered. The pole can be secured by a line truck boom, by ropes or guys, or by lashing a new pole alongside it. If a new one is lashed alongside the defective pole, work should be performed from the new one. Poles shall be laid at a safe distance from the highway.

C. CLIMBING AND WORKING ON POLES

OSHA 1910.269 and 1926.959

Important: Unqualified employees (including trainees) are required to use fall protection any time they are more than 4 feet above the ground.

- a. All poles and structures shall be carefully inspected before climbing to ensure that they are in a safe condition for the work to be performed and that they are capable of sustaining the additional or unbalanced stresses to which they will be subjected.

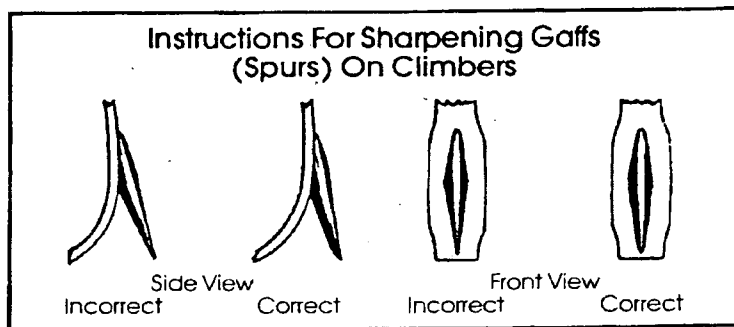
- b. Where poles or structures may be unsafe for climbing, they shall not be climbed until made safe by guying, bracing or by other adequate means.
- c. Wires shall not be attached to or removed from a pole or structure until it is certain the pole or structure will withstand the altered strain.
 All poles shall be thoroughly tested (check the birthmark for depth of pole and sound test with a hammer beginning at ground level) before they are climbed. If a pole is not strong enough to sustain a lineman's weight by reason of its condition or its placement (such as in soft ground), it shall be guyed or otherwise secured throughout the time any work is being performed on it. If the pole to be climbed is being replaced and the new pole is set adjacent to it, the old pole may be lashed to the new one in lieu of guying.
- e. When poles encountered are unsafe to climb, an alternate means of climbing shall be used (use belt around pole while climbing) or the use of an aerial lift shall be considered.
- f. Workmen shall not wear their climbers while walking, driving, riding in vehicles or when doing work on the ground or on ladders.
- g. Employees shall not work on an elevated pole or structure without first securing themselves with a safety strap.
- h. Only approved climbing belts and double-locking safety straps shall be used.
- i. The safety strap shall not be put around a pole above the uppermost pole attachment position, except where pole top or attachment is above eye level. It shall not be used on pole steps, crossarm braces, insulators, insulator pins, conductors, rotten or otherwise weak crossarms or on attachments that are being moved. When it is necessary to attach to a crossarm, the safety strap shall never be placed beyond the outside crossarm brace. It shall be so placed that it will not be cut by line equipment or twisted or fouled by material that may give way under strain.
- j. Employees shall not trust their weight to guy wires, pins, braces, conductors or other such equipment as they might prove to be unstable.
- k. When two or more employees are to work on the same pole at the same time, one shall reach the working position and attach their safety strap before the next leaves the ground. They shall ascend and descend the pole one employee at a time.
- l. A lineman shall not throw anything from the pole to the ground, nor shall he permit anything to be thrown to him while he is on the pole.
- m. There shall be at least one hand line on each pole on which linemen are working.

- n. Employees engaged in hoisting tools and materials shall stand in such a position that they will not be endangered by incidental dropping of the load. Employee should stand at least 10 feet from the pole at all possible times.
- o. Neither end of a safety strap shall be allowed to hang loose when a lineman is ascending, descending or moving about on a pole.

D. PROPER GAFF SHARPENING

ASTMF887

- a. Always use a sharp file. NEVER grind to a point on any kind of wheel as you are likely to set up heat, which will spoil the temper of the gaff and make it dangerous to use.
- b. Set climber in a vise with the gaff uppermost and the stirrup of the climber turned down so that you can file from heel to point of gaff. File toward the point and down to the edges of the underside of the gaff. Remove only sufficient material to make a good point.
- c. Do not make a needle point. File both side slopes, but not the top of gaff, to even rounded surfaces so that the final point is always in the top ridge of the gaff.
- d. The underside of the gaff should be left perfectly straight to within 1 1/16-inch of the point, then rounded slightly toward the top of the ridge of the gaff on a radius of 1/4-inch. At a distance of 1/16-inch back from the point, you should have a width of approximately 3/32-inch measured on the underside of the gaff. The remainder of the underside should be kept perfectly straight.
- e. For safety, climbers shall not be used after the gaffs are worn or filed to 1-1/4 inches on pole gaffs and 2-1/4 inches on tree gaffs, measured on the underside of the gaff. When climbers get in this condition, they shall be regaffed or a new pair obtained. By following these simple instructions, a satisfactory job can be secured and no unnecessary risks will be taken.



E. WORKING ON OR NEAR EXPOSED ENERGIZED PARTS (191 O.269(i))

- a. Electrical equipment and lines shall always be considered as energized unless they are tested for the absence of nominal voltage and properly grounded. This section applies to work on exposed live parts, or near enough to them, to expose the employee to any hazard they present.
- b. Only qualified employees may work on or with exposed energized lines or parts of equipment.
- c. Only qualified employees may work in areas containing unguarded, un-insulated energized lines or parts of equipment operating at 50 volts or more.
- d. Electric lines and equipment shall be considered and treated as energized unless they are tested for the absence of nominal voltage, tagged and grounded and worked between grounds.
- e. When work is performed within reaching distance of exposed energized parts of equipment, the employer shall ensure that each employee removes or renders nonconductive all exposed conductive articles, such as key or watch chains, rings, or wrist watches or bands, unless such articles do not increase the hazards associated with contact with the energized parts.
- f. The employer shall train each employee who is exposed to the hazards of flames or electric arcs in the hazards involved.
- g. An employee who is exposed to the hazards of flames or electric arcs shall not wear clothing that, when exposed to flames or electric arcs, could increase the extent of injury that would be sustained by the employee. (1910.269(1)(6)(iii))
- h. The employer shall ensure that no employee approaches or takes any conductive object closer to exposed energized parts than set forth in Table R-6, unless:
 - 1. The employee is insulated from the energized part (insulating gloves or insulating gloves and sleeves worn in accordance with this section are considered insulation of the employee only with regard to the energized part upon which work is being performed), or
 - 2. The energized part is insulated from the employee and from any other conductive object at a different potential, or
 - 3. The employee is insulated, isolated, or guarded from any other conductive object, as during live-line barehanded work. (1926.950(c)(1)(iii))
 - 4. Parts of electric circuits are not considered as "exposed" unless a guard is removed or an employee enters the space intended to provide isolation from the live parts.If the employee is to be insulated from energized parts by the use of insulating gloves, insulating sleeves shall also be used.

- j. However, insulating sleeves need not be used in the following conditions:
 - 1. If exposed energized parts on which work is not being performed are insulated from the employee and if such insulation is placed in a position that will not expose the employee's upper arm to contact with other energized parts.
 - 2. The energized part is insulated or guarded from the employee and all other conductive objects at a different potential.
- k. The employer shall ensure that each employee works in a position from which a slip or shock will not bring the employee's body into contact with exposed, non-insulated parts energized at a potential different from the employee. (1910.269(1)(4))
- l. The employer shall ensure that connections are made as follows:
 - 1. In connecting de-energized equipment or lines to an energized circuit by means of a conducting wire or device, an employee shall first attach the wire to the de-energized part.
 - 2. When disconnecting equipment or lines from an energized circuit by means of a conducting wire or device, an employee shall remove the source end first.
 - 3. When lines or equipment are connected to or disconnected from energized circuits, loose conductors shall be kept away from exposed energized parts. (1910.269 (1)(5)(iii))
- m. The requirements of this section which pertain to the hazards of exposed live parts also apply when work is performed in the proximity of covered (non-insulated) wires. (1910.269 (1)(8))
- n. Non-current-carrying metal parts of equipment or devices, such as transformer cases and circuit breaker housings, shall be treated as energized at the highest voltage to which they are exposed, unless the employer inspects the installation and determines that these parts are grounded before work is performed. (1910.269(1)(9))
- o. Devices used to open circuits under load conditions shall be designed to interrupt the current involved. (1910.269(1)(10))
- p. Only qualified employees may work in areas containing unguarded, un-insulated energized lines or parts of equipment at 50 volts or more. (1910.269(1)(1))
- q. No employee shall approach any exposed ungrounded line wire or apparatus over 600 volts unless he/she has a DOUBLE factor of insulation from the ungrounded wire or apparatus.
- r. Employees shall report immediately to their nearest foreman or supervisor any defective line, apparatus or tool or other condition which in their judgment may be dangerous either to persons or property or likely to interrupt or delay service. (NESC Section 42, 420, (c))

- s. Electrical equipment and lines shall always be considered as "energized" unless they are positively known to be dead and grounded. Before starting to work, a test for nominal voltage shall be made to determine what conditions exist. Extreme care shall be used when handling common neutral conductors as high voltage may be encountered. (NESC Section 42, 420 (0))

Secondary winding of current or series transformers shall be bridged before any instrument or other device connected in the circuit is removed or disconnected. (NESC 44, 443, H, 191 0.269(w)(2))

- u. Existing conditions related to the safety of the work to be performed shall be determined and discussed before work on or near electric lines or equipment is started. Such conditions include, but are not limited to, the nominal voltages of lines and equipment, the maximum switching transient voltages, the presence of hazardous induced voltages, the presence and condition of protective grounds and equipment grounding conductors, the condition of poles, environmental conditions relative to safety, and the locations of circuits and equipment, including power and communication lines and fire protective signaling circuits.

Table R-6--A-C
Live-Line Work Minimum Approach Distance

Nominal voltage in kilovolts phase to phase	Distance			
	Phase-to-ground exposure		Phase-to-phase exposure	
	m	ft-in	m	ft-in
0.051 to 0.300 \1\	Avoid Contact		Avoid Contact	
0.301 to 0.750 \1\	0.31	1-0	0.31	1-0
0.751 to 15.0	0.65	2-2	0.67	2-3
15.1 to 36.0	0.77	2-7	0.86	2-10
36.1 to 46.0	0.84	2-9	0.96	3-2
46.1 to 72.5	1.00	3-3	1.20	3-11
72.6 to 121	0.95	3-2	1.29	4-3
138 to 145	1.09	3-7	1.50	4-11
161 to 169	1.22	4-0	1.781	5-8
230 to 242	1.59	5-3	2.27	7-6
345 to 362	2.59	8-6	3.80	12-6
500 to 550	3.42	11-3	5.50	18-1
765 to 800	4.53	14-11	7.91	26-0

F. FLEXIBLE PROTECTIVE EQUIPMENT

Rubber protective equipment shall be in accordance with the provisions of the American Standards and Testing Materials (ASTM)

Item	ASTM Standard
Rubber insulating gloves	F-496
Rubber matting for use around electric apparatus	D-178
Rubber insulating blankets	F-479
Rubber insulating hoods	F-478
Rubber insulating line hose	F-478
Rubber insulating sleeves	F-496

(1910.269)

- a. Employee shall not touch or work on any exposed energized lines or apparatus above 50 volts, except when using protective equipment approved for that voltage.
- b. When work is to be done on or near energized lines or equipment, all energized and grounded conductors, guy wires or equipment within reach of any part of the body shall be covered with protective equipment, except that part of the conductor on which the employee is working.
- c. When working on energized lines or apparatus, including the installation of protective devices, work should be done from below when possible to lessen exposure to heat rise due to an arc.
- d. In applying flexible protective equipment, an employee shall always protect the nearest and lowest wires first, protecting himself as he progresses. In removing rubber protective equipment, the reverse order shall be maintained.
- e. Flexible rubber blankets shall not be used on the ground without protecting them from physical damage and moisture by means of a tarpaulin canvas, or protective mat.
- f. Personal protective equipment shall be put on before entering the working area within which energized lines or apparatus may be reached, and the protective equipment shall not be removed until the employee is completely out of reach of this area.
- g. To avoid corona and ozone damage, rubber protective equipment shall not be allowed to remain in place on energized lines or apparatus overnight, unless approved by the supervisor in charge.
- h. Line hose, hoods, blankets, line guards, etc., shall be visually inspected before each use.
- i. Flexible protective devices shall be stored in special compartments on trucks and elsewhere where they will not be subjected to damage from tools, or contamination.
- j. Bare communication conductors shall be treated as energized lines and shall be protected accordingly.

- k. Line hose shall be periodically inspected or tested according to ASTM F-478 and the cooperative's policy.

G. PROPERLY RATED RUBBER GLOVES (OSHA Approved)

SHA 1910.137, 1926.950 and .951, ASTM Standards on "Electrical Protective Equipment for Workers"

a. Care

Approved rubber gloves shall be tested periodically and in accordance with the American Society for Testing and Materials Standard for Electric Protective Equipment.

1. Before each use, approved rubber gloves shall be visually inspected for the following defects:
 - Holes, tears, punctures or cuts.
 - Ozone cutting or ozone checking.
 - Imbedded foreign objects.
 - Sunlight cutting.
 - Texture changes, swelling, softening, hardening, becoming sticky or inelastic.
2. Approved rubber gloves shall also be inspected immediately following an incident that can reasonably be suspected of having caused damage.
3. Approved rubber gloves shall be given an air test before each use.
4. Approved rubber gloves when not in use shall be kept in canvas bags or other approved containers and stored where they will not become damaged from sharp objects or exposed to direct sunlight. They shall never be folded while stored nor shall other objects be placed upon them. Approved rubber gloves shall not be stored in bins or compartments containing petroleum products.
5. Approved rubber gloves shall be stored in the glove bag with the cuffs down to permit drainage, better ventilation and reduce the possibility of damage.
6. Approved rubber gloves shall never be worn inside-out or without leather protectors. They shall be exchanged at any time they become damaged or the employee to whom they are assigned becomes suspicious of them.

7. Leather protectors shall not be worn except when in use over rubber gloves. Their use shall conform to the following table:

(ASTM F496-Table 4):

Minimum distances between protector gauntlet and cuff of rubber glove.

Class of Rubber Glove	Minimum Distance
0	1/2"
1	1"
2	2"
3	3"
4	4"

8. Rubber gloves shall be assigned and properly fitted to each affected employee. Leather protectors shall be worn over rubber gloves and properly fitted.
9. Below are classes of rubber gloves, proof-test voltages and maximum use voltages as specified by OSHA 1910.137 (b):

**Table 1 -5. Rubber Insulating Equipment
Voltage Requirements**

Class of Equipment 00	Maximum use of voltage a-c 500	Retest voltage a-c 2500	Retest voltage d-c 10000
0	1,000	5,000	20,000
1	7,500	10,000	45,000
2	17,000	20,000	50,000
3	26,500	30,000	60,000
4	36,000	40,000	70,000
<i>fn 1 The maximum use voltage is the a-c voltage (rms) classification of the protective equipment that designates the maximum nominal design voltage of the energized system that may be safely worked. The nominal design voltage is equal to the phase-to-phase voltage on multiphase circuits. However, the phase-to-phase ground potential is considered to be the nominal design voltage:</i>			
<i>fn (1) If there is no multiphase exposure in a system area and if the voltage exposure is limited to the phase-to-ground potential, or</i>			
<i>fn (2) If the electrical equipment and devices are insulated or isolated or both so that the multiphase exposure on a grounded wye circuit is removed.</i>			

10. To prevent damage to rubber gloves and comply with OSHA, employees shall remove all conductive articles (watches, rings, jewelry, etc.) while working within reaching distance of exposed energized parts.
11. Dispensing of and control of extra rubber gloves shall be done by a designated person.

b. Use Properly rated (approved) rubber gloves shall be worn:

1. When approaching or taking any conductive object within the minimum approach distance of an exposed energized part as set forth in Table R-6, the employees shall wear approved rubber gloves and rubber sleeves. (See definition of "exposed," page viii.)
2. Approved rubber gloves shall be worn from ground to ground on any energized pole or structure. This includes pole climbing and bucket work.
3. Approved rubber gloves shall be worn when working on properly grounded line, if an energized line is located (above or below) between the grounded points.
4. Approved rubber gloves shall be worn when operating manually-controlled air break switches.
5. Approved rubber gloves shall be worn when opening and closing manually-operated oil circuit reclosers.
6. Approved rubber gloves shall be worn when opening, closing, removing or replacing hot clamps, fuses or fuse doors on cutouts when using an approved switch stick or hot line tool on energized lines.
7. Approved rubber gloves shall be worn when pulling in wires or handling other conducting materials near circuits, apparatus or equipment that is, or may become, energized.
8. Approved rubber gloves shall be worn while working on or near telephone lines, foreign circuits, or any other equipment that is subject to induced voltages.
9. Approved rubber gloves shall be worn by each member of pole setting crew while a pole or other conductive structure is being set or removed from proximity of energized primary lines. They shall be put on before pole is raised and worn until pole is set and secured. Although not to be considered as primary protection dielectric rubber overshoes may be used as supplemental protection against step potential.
10. Employees shall wear rubber gloves while repairing fallen conductor.
11. Approved rubber gloves shall be worn when work is performed on energized secondaries and services.

c. Visual Test For Rubber Gloves

(Shall be performed prior to each use.)

1. Examine inside of cuff for tears, punctures and cracking.
2. Stretching cuff may make defect more visible.
3. Inspect between each finger for cracks, punctures and tears.
4. Turn glove inside out and repeat procedures 1-3.
5. Make sure this test is performed on both gloves.

d. Air Test For Rubber Gloves

(Shall be performed prior to each use.)

1. An air test is done by first closing glove to trap air.
2. Next, roll end of glove toward fingers.
3. Squeeze glove while checking for air escaping through tears or punctures. If escaping air is noticed, mark glove as defective and return to proper person.
4. Make sure this test is performed on both gloves.

H. PROPERLY RATED RUBBER SLEEVES (OSHA Approved)

OSHA 1910.137, 1926.951 and ASTM Standards

a. Care

Approved rubber sleeves shall be tested periodically and in accordance with the American Society for Testing and Materials Standard for Electric Protective Equipment.

Approved rubber sleeves shall carry a test date per cooperative policy.

1. Before each use, approved rubber sleeves shall be visually inspected for the following defects:
 - Holes, tears, punctures or cuts.
 - Ozone cutting or ozone checking.
 - Imbedded foreign objects.
 - Sunlight cutting.
 - Texture changes, swelling, softening, hardening, becoming sticky or inelastic.
2. Approved rubber sleeves shall also be inspected immediately following an incident that can be reasonably suspected of having caused damage.
3. Approved rubber sleeves when not in use shall be kept in canvas bags or other approved containers and stored where they will not become damaged from sharp objects or exposed to direct sunlight. They shall never be folded while stored nor shall other objects be placed upon them. Approved rubber sleeves shall not be stored in bins or compartments containing petroleum products.
4. Dispensing of and the control of extra rubber sleeves shall be done by a designated person.

b. Use

Important: Rubber sleeve straps shall not be worn in such a manner (both straps behind the head) that exposes the employee's shoulders. Also, rubber sleeves shall not be worn with one strap.

1. Properly rated (approved) rubber sleeves shall be worn when entering the approach distance while climbing poles.

2. Approved rubber gloves and rubber sleeves shall be worn when work is performed on energized secondaries and services if the employees upper arms are exposed to contact with unguarded energized conductors.
3. Rubber sleeves shall be worn while performing work within energized pad mounts or switching cabinets.

APPROVED RUBBER GOODS AND COVER-UP (OSHA Approved)

OSHA 1910.137 and 1926.951 and ASTM Standards on "Electrical Protective Equipment for Workers"

a. Care

Approved rubber goods and cover-up shall be tested in accordance with the American Society for Testing and Materials Standard for Electric Protective Equipment and cooperative policy.

Approved rubber sleeves shall carry a test date per cooperative policy.

1. All approved rubber goods and cover-up shall be stored in special compartments or containers on trucks where they will not be subjected to damage from tools or other equipment.
2. Approved rubber goods and cover-up shall be visually inspected before each use for the following defects:
 - Holes, tears, punctures or cuts.
 - Ozone cutting or ozone checking .
 - Imbedded foreign objects.
 - Sunlight cutting.
 - Texture changes, swelling, softening, hardening, becoming sticky or inelastic.
3. To avoid corona and ozone damage, protective equipment should not be allowed to remain in place on energized lines or apparatus overnight, or for more than one eight-hour period.

b. Use

1. When working in an aerial lift all differences of potential and lines not being worked within reach or extended reach of energized lines or equipment shall be covered.
2. In applying protective equipment, an employee shall always protect the nearest and lowest wires first, protecting himself as he progresses. In removing protective equipment, the reverse order shall be maintained.
3. Bare communications conductors shall be treated as energized lines and shall be protected accordingly.

4. When installing or removing poles or equipment on energized lines, the poles, the exposed energized lines and the equipment shall be properly covered when there is the possibility of coming into contact with an energized conductor. If it is impractical to properly cover the equipment, then at a minimum, the exposed energized conductor shall be covered

J. GENERAL TRANSMISSION AND DISTRIBUTION RULES

1. General

- a. Only ANSI/OSHA approved linemen belts and safety straps shall be used. Inspect prior to use.
- b. Metal hooks, chains, etc., for holding tools or tape shall not be attached to body belts. Leather or other non-conducting material shall be used for this purpose.
- c. The safety strap shall not be put around pole above the uppermost pole attachment position, except where pole top or attachment is above eye level. It shall not be used on pole steps, crossarm braces, insulators, insulator pins, conductors, rotten or otherwise weak crossarms or on attachments that are being moved. When it is necessary to attach to a crossarm, the safety strap shall never be placed beyond the outside crossarm attachment. It shall be so placed that it will not be cut by line equipment or twisted or fouled by material that may give way under strain.
- d. Employees shall not trust their weight to guy wires, pins, braces, conductors, or other such equipment that might prove unstable.
- e. When two or more employees are to work on the same pole at the same time, one shall reach the working position before the next leaves the ground. They shall descend the pole one at a time. Last person up brings handline and first person down removes handline.
- f. When climbers are stored in the truck or tool room, gaff guards shall be placed where the sharp points will not damage other equipment or cause personal injury.
- g. Never store or place any material on the pole strap.
- h. Pole straps shall have locking snaphooks.
- i. Fall protection (for example hitch hiking using two safety straps) shall be used by qualified climbers any time conditions such as ice, weather or unusual conditions make it unsafe to climb the pole.
- j. employees standing on the ground shall avoid touching the truck, pole or equipment while work is being performed in an energized area. Although not to be considered as primary protection dielectric rubber overshoes may be used as supplemental protection against step potential.

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K. WORKING ON ENERGIZED LINES WITH LIVE-LINE TOOLS (1910.269 u))

- a. Non-reclose or "R" switch should be used for equipment protection on all circuits.
- b. Lines of #6 copper, #6 ACSR, and #8A copper weld or smaller, shall not be worked energized with live-line tools except in specific instances where continuity of service is vital and then only upon special authorization.
- c. Planned work with live-line tools shall not be started during unfavorable weather.
- d. Before work with live-line maintenance tools is begun, the dispatcher or person having jurisdiction shall be notified. If during live-line tool work, an interruption of service occurs, the dispatcher or other person having jurisdiction shall be notified.
- e. Only hotline tools meeting OSHA requirements and ASTM standards approved by the cooperative shall be used in live-line maintenance work.
- f. A careful check shall be made to see that the condition of the structure and lines at the point of the work is such that the job may be performed safely. In addition, the adjacent spans and structures shall be carefully checked for defects in conductors, tie wires, insulators and other equipment.
- g. Under no circumstances shall a lineman depend on another workman to hold a live conductor clear of him.
- h. Positive control shall be maintained during the movement of any conductor.
- i. While live-line work is in progress, no other work of any nature shall be performed on the same pole or structure.
- j. A designated supervisor shall be on site during all hot-stick work.
- k. Live-line tools shall never be laid directly on the ground or against sharp objects such as barb wire fences. Special tool holders or tarpaulins shall be used for this purpose.
- l. Each live-line tool shall be wiped clean and visually inspected for defects before use each day. Tools shall be kept clean and properly stored.
- m. If any defect or contamination that could adversely affect the insulating qualities or mechanical integrity of the live-line tool is present after wiping, the tool shall be immediately removed from service, examined, and tested before being returned to service or replaced.
- n. Live-line tools used for primary employee protection shall be removed from service at least once every 2 years and whenever required by a before-use inspection for examination, cleaning, repair, and testing as follows:
 1. Each tool shall be thoroughly examined for defects.

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2. If a defect or contamination that could adversely affect the insulating qualities or mechanical integrity of the live line tool is found, the tool shall be repaired and refinished or shall be permanently removed from service. If no such defect or contamination is found, the tool shall be cleaned and waxed.
 3. The tool shall be electrically tested per ASTM and returned to service if it passes the test.
- New live line tools shall be tested prior to being placed in service.

L. WORKING ON DE-ENERGIZED LINES AND EQUIPMENT
IF IT ISN'T GROUNDED· IT ISN'T DE-ENERGIZED
(1910.269(m)(n)).

a. PROCEDURE TO DE-ENERGIZE A LINE OR EQUIPMENT

1. Obtain a clearance.
 2. Create a visible opening in the circuit between source and load.
 3. Make a voltage check to determine the absence of nominal voltage.
 4. Place a hold tag on circuit, switch, and/or opened point.
 5. Each vehicle and trailer in the work area should be bonded together with a minimum of # 2 copper ground cable and the vehicle grounded to the system neutral. If more than one vehicle is in the work area, the vehicles should be bonded together with a ground cable if they are close enough for someone to touch both vehicles at the same time. (1910.269(p)(4)(iii)(c))
 6. Place personal protective grounds in a manner to prevent each employee from being exposed to hazardous difference in potential.
- b. New lines or equipment under construction may be considered de-energized and worked as such where:
1. he lines or equipment are grounded, or
 2. The hazard of induced voltages is not present and adequate clearances or other means to avoid contact with energized lines or equipment are implemented to prevent equipment and the new lines from being energized. (1926.954(b)(2))
- c. Communication conductors. Bare wire communication conductors on power poles or structures shall be treated as energized lines, unless protected by insulating materials or grounded. (1926.954(c))

- d. At least two qualified employees are required to work energized lines, installation removal or repair of transformers, regulators and capacitors, work involving technical equipment and on de-energized lines that exposes the employee to contact with parts energized at 600V or more. (191 O.269(1)(i))

NOTE: Does not apply to:

1. Routine switching of circuits that can be done safely.
2. Work performed with live line tools if the employee is not within reach or exposed to contact with energized parts.
3. Emergency repairs to safeguard the general public.

M. INITIAL INSPECTIONS, TESTS, OR DETERMINATIONS.

- a. Existing conditions shall be determined before starting work, by an inspection or a test. Such conditions shall include, but not be limited to nominal voltage of lines and equipment, induced voltage, presence and condition of grounds, maximum switching transient voltages, energized lines and equipment, conditions of poles, and the location of circuits and equipment, including power and communication lines, CATV and fire alarm circuits.
- b. Electric equipment and lines shall be considered energized until determined to be de-energized by tests or other appropriate methods or means and grounded. (1910.269(1))

N. APPROACH DISTANCES (1910.269(1)(2))

- a. No employee shall be permitted to approach or take any conductive object closer to exposed energized parts than shown in Table R-6, unless:
 1. The employee is insulated or guarded from the energized part (gloves or gloves with sleeves rated for the voltage involved shall be considered insulation of the employee from the energized part), or
 2. The energized part is insulated or guarded from the employee and any other conductive object at a different potential, or
 3. The employee is isolated, insulated, or guarded from any other conductive objects, such as during live-line bare-hand work.
- b. The minimum working distance and minimum clear live-line tool distances stated in Table R-6 shall not be violated. The minimum clear live-line tool distance is that for the use of live-line tools held by linemen when performing live-line work.
- c. Conductor support tools, such as link sticks, strain carriers, and insulator cradles, may be used: Provided, the clear live line tools distance shall equal or exceed the values for the voltage ranges in Table R-6 for the operating voltage

O. DISPATCHING AND CLEARANCES (1910.269(m))

- a. If a system operator is in charge of the lines or equipment and their means of disconnection, all of the requirements of this section shall be observed, in the order given.
If no system operator is in charge of the lines or equipment and their means of disconnection, one employee in the crew shall be designated as being in charge of the clearance. The employee in charge of the clearance shall take the place of the system operator, as necessary.
- c. Any disconnecting means that are accessible to persons outside the employer's control (for example, the general public) shall be rendered inoperable while they are open for the purpose of protecting employees.
- d. A designated employee shall make a request of the system operator to have the particular section of line or equipment de-energized. The designated employee becomes the employee in charge.
- e. All switches, disconnects, jumpers, taps, and other means through which known sources of electric energy may be supplied to the particular lines and equipment to be de-energized shall be opened. Such means shall be rendered inoperable, unless its design does not so permit, and tagged to indicate that employees are at work.
- f. Automatically and remotely controlled switches that could cause the opened disconnecting means to close shall also be tagged at the point of control. The automatic or remote control feature shall be rendered inoperable, unless its design does not so permit.
- g. Hold tags shall prohibit operation of the disconnecting means and shall indicate that employees are at work.
- h. After the applicable requirements in of this section have been followed and the employee in charge of the work has been given a clearance by the system operator, the lines and equipment to be worked shall be tested for the absence of nominal voltage to ensure that they are de-energized.
- i. Protective grounds shall be installed.
- j. Equipotential zone. Temporary protective grounds shall be placed at such locations and arranged in such a manner as to prevent each employee from being exposed to hazardous differences in electrical potential.
- k. After the applicable requirements of this section and the cooperative have been followed , the lines and equipment involved may be worked as de-energized.
- l. If two or more independent crews will be working on the same lines or equipment, each crew shall independently comply with the requirements of this section.

- m. To transfer the clearance, the employee in charge (or, if the employee in charge is forced to leave the worksite due to illness or other emergency, the employee or his/her supervisor) shall inform the system operator; employees in the crew shall be informed of the transfer; and the new employee in charge shall be responsible for the clearance.
- n. To release a clearance, the employee in charge shall:
 - 1. Notify employees under his or her direction that the clearance is to be released;
 - 2. Determine that all protective grounds installed by the crew have been removed; and
 - 3. Report this information to the system operator and release the clearance.
- o. If only one crew will be working on the lines or equipment and if the means of disconnection is accessible, visible to, and under the sole control of the employee in charge at the clearance, tags are not necessary.

P. SERIES STREET LIGHTING CIRCUITS (1910.269(w(3))

- a. A street lighting circuit exceeding 600 volts is to be worked in the manner as an overhead or underground energized conductor.
 - 1. Circuit shall be visibly disconnected from the source of supply by opening disconnecting switches, and hold tags shall be placed in time switches or other automatic devices.
 - 2. Circuit shall be properly jumpered to avoid an open circuit condition.
- b. A series loop may only be opened after the street lighting transformer has been de-energized and isolated from the supply source or after the loop has been bridged to avoid an open circuit condition.
- c. All series street lighting circuits shall be considered as energized and worked accordingly.

Q. WORKING ON TRANSFORMERS

- a. The primary leads of a distribution transformer shall be considered energized at full voltage until both the primary and the secondary leads have been disconnected or it has been determined that the secondary circuit to which it is attached is not energized from other sources.
- b. The cases of all transformers connected to a source of supply shall be considered as being energized at the full primary voltage, until they are tested and inspected to ensure they are adequately grounded. (1910.29(1)(9))

- c. Employees shall not stand on or otherwise contact transformer cases while working on or near energized circuits.
- d. The primary leads of large power transformers shall remain grounded until reconnected to the transformer.
- e. The tripping mechanism of a CSP transformer shall not be used as an opening point while work is performed on secondary wires or the transformers. A visual opening shall be required (air gap) unless worked as energized. Lifting equipment of adequate strength shall be used when installing or removing transformers.
- f. When installing and connecting transformers, the ground and neutral connections shall be made first, then the secondary connections, and the primary last. The reverse order shall be followed in removing a transformer.
- h. When transformers are being raised or lowered, all employees shall stand in the clear.
- i. Employees shall avoid touching the case of any energized transformer with any unprotected portion of their bodies. Employees shall ensure that proper transformer ground connections exist.
- j. Adequate and clear climbing space must be maintained on all transformer poles.
- k. Only qualified employees shall open or close fuses on the high voltage side of a transformer.
- l. Insulating sticks shall be used at all times when connecting or disconnecting primary side of transformer to line. Clamps shall not be taken off or put on with hands.
- m. Employees shall always safety-off before opening or closing a fuse on a pole or structure.
- n. Tap changes shall never be made on any energized transformer.
- o. When changing out a defective transformer in a bank or when constructing a three-phase bank, the name plates shall be checked for voltage, polarity and percentage impedance so that the transformers will bank properly.
- p. All transformers shall be carefully inspected before being installed.
- q. When used transformers are removed from service, all wire shall be removed from all primary, secondary and ground lugs.

R. CONDUCTIVE HOIST CABLES

- a. Wire rope or other conductive material shall not be used to raise transformers, poles, or any other equipment or materials near energized lines, except:
 - 1. When the wire rope is rigged a sufficient distance from all energized wires to prevent the possibility of electrical contact between the energized wires and the wire or conductive material being raised; or

2. When the wire rope and any conductive material being raised are adequately protected; or
 3. When energized lines and equipment are DOUBLE insulated.
- b. Use of wire rope as a hoist line shall be discontinued when it becomes worn, deteriorated or damaged to a degree that is unsafe.
 - c. Metallic slings (chain or cable) shall not be used near energized equipment.
 - d. Chain slings shall not be used for hoisting purposes except for UD transformer and with proper rigging attachment.
 - e. Positive control of wire rope shall be maintained at all times.
 - f. Synthetic hoisting or pulling lines and ropes shall be considered as conductive unless properly maintained to preserve their insulating qualities and treated as live-line tools. Link sticks are recommended.
 - g. Tag lines shall be of the non-conductive type when used near energized lines.

S. WORKING ON CAPACITORS

- a. Line capacitors shall be considered at full voltage until they have been disconnected from the line, and the terminals short-circuited and discharged to ground by an approved method. The terminals shall not be short circuited until the capacitors have been de-energized for at least five minutes. Once shorted, they should remain shorted until next use.
- b. Employees shall wear all required PPE.
- c. Employees shall not come in contact with an ungrounded capacitor case until the capacitor has been disconnected from the circuit and the terminals shorted.
- d. The exposed terminals of line capacitors in storage shall remain shorted.

T. STRINGING OR REMOVING DE-ENERGIZED CONDUCTORS (1926.955 (e)) 1910.269 (q))

- a. Prior to stringing operations, a detailed job briefing shall be held setting forth the plan of operation and specifying the type of equipment to be used, grounding devices and procedures to be followed, crossover methods to be employed, and the clearance authorization required.
- b. Refer to NESC manual for all clearance requirements when stringing wire.
- c. Load ratings of stringing lines, pulling lines, conductor grips, load-bearing hardware and accessories, rigging and hoists shall not be exceeded.

- d. Conductor grips shall not be used on wire rope, unless the grip is specifically designed for this application.
- e. Reliable communications, through two-way radios or other equivalent means, shall be maintained between the reel tender and the pulling rig operator.
- f. The pulling rig may only be operated when it is safe to do so.
While the conductor or pulling line is being pulled (in motion) with a power-driven device, employees are not permitted directly under overhead operations or on the cross area, except as necessary to guide the stringing sock or board over or through the stringing sheave.
- h. When stringing conductors or crossing under non-cooperative power lines, it shall be done in sections short enough so that the entire section is under observation and control.
- i. Where there is a possibility of the conductor incidentally contacting an energized circuit or receiving a dangerous induced voltage buildup, to further protect the employee from the hazards of the conductor, the conductor being installed or removed shall be grounded or provisions made to insulate or isolate the employee.
- j. If an existing line is de-energized, proper clearance authorization shall be secured and the line grounded on both sides of the crossover, or the line being strung or removed shall be considered and worked as energized.
- k. When crossing over energized conductors in excess of 600 volts, rope nets or guard structures shall be installed, unless provision is made to isolate or insulate the workmen or the energized conductor. In addition, the line being strung shall be grounded on either side of the crossover or considered and worked as energized.
- l. Conductors being strung in or removed shall be kept under positive control by the use of adequate tension reels, guard structures, tie-lines, or other means to prevent incidental contact with energized circuits.
- m. Guard structure members shall be sound and of adequate dimension and strength, and adequately supported.
- n. Catch-off anchors, rigging, and hoists shall be of ample capacity to prevent loss of the lines.
- o. Pulling lines and accessories shall be inspected regularly and replaced or repaired when damaged or when dependability is doubtful. The provisions of §1926.251 (c)(4)(ii) (concerning splices) shall not apply.
- p. When working on bare conductors, tying crews shall work between grounds at all times.
- q. Except during emergencies, work from structures shall be discontinued when adverse weather (such as high wind or ice on structures) makes the work hazardous.

- r. Stringing and tying operations shall be discontinued if an electrical storm is in the immediate vicinity.
- s. Reel handling equipment, including pulling and braking machines, shall have ample capacity, operate smoothly, and be leveled and aligned in accordance with the manufacturer's operating instructions. Reel handling equipment shall be properly grounded.
- t. Each pull shall be snubbed or dead ended at both ends before subsequent pulls.

U. STRINGING ADJACENT TO ENERGIZED LINES (1926.955(d))

- a. Prior to stringing parallel to an existing energized line, a competent determination shall be made to ascertain whether dangerous induced voltage buildups will occur, particularly during switching and ground fault conditions. When there is a possibility that dangerous induced voltage may exist, the provisions below shall apply unless the line is worked as energized.
 - 1. When stringing adjacent to energized lines, the tension stringing method or other methods that preclude unintentional contact between the lines being pulled and an employee shall be used.
 - 2. All pulling and tensioning equipment shall be isolated, insulated or effectively grounded.
 - 3. A ground shall be installed between the tensioning reel setup and the first structure in order to ground each bare conductor and overhead ground conductor during stringing operations.
 - 4. During stringing operations, each bare conductor and overhead ground conductor shall be grounded at the first pole adjacent to both the tensioning and pulling setup and in increments so that no point is more than two (2) miles from a ground.
 - 5. The grounds shall be left in place until conductor installation is completed.
 - 6. Grounds shall be removed at the last phase of aerial cleanup.

V. REPAIRING FALLEN CONDUCTORS

OSHA 1910.269 (L) (N)

- a. No fallen primary conductor shall be touched until: the conductor is properly identified; a visible open break (air gap) is provided; a voltage test is made; the cable is properly grounded; and a hold tag is installed.
- b. When repairing an open neutral they shall be treated as energized until grounded or properly repaired.

- c. When a fallen primary conductor is or may become a safety hazard, it shall be guarded until it can be safely removed or repaired.
- d. When an overhead circuit is opened, the route of the circuit shall be patrolled for obvious hazards before the circuit is reclosed.
Rubber gloves shall be worn until the fallen primary conductor is de-energized and properly grounded.

W. GROUNDING AND BONDING (1910.269(n))

This section applies to the grounding of transmission and distribution lines and equipment for the purpose of protecting employees.

- a. General. For the employee to work lines or equipment as de-energized, the lines or equipment shall be de-energized tested for absence of nominal voltage and grounded. However, if the employer can demonstrate that installation of a ground is impracticable or that the conditions resulting from the installation of a ground would present greater hazards than working without grounds, the lines and equipment may be treated as de-energized provided all of the following conditions are met:
 - 1. The lines and equipment have been de-energized using a clearance system.
 - 2. There is no possibility of contact with another energized source.
 - 3. The hazard of induced voltage is not present.
 - 4. The lines or equipment has been tested for absence of nominal voltage.
- b. Equipotential protective grounds shall be placed at such locations and arranged in such a manner as to prevent each employee from being exposed to hazardous differences in electrical potential.
- c. Protective grounding equipment shall be capable of conducting the maximum fault current that could flow at the point of grounding for the time necessary to clear the fault. This equipment shall have an ampacity greater than or equal to that of No. 2 AWG copper. Guidelines for protective grounding equipment are contained in American Society for Testing and Materials Standard Specifications for Temporary Grounding Systems to be Used on De-Energized Electric Power Lines and Equipment. (ASTM F855)
- d. Protective grounds shall have an impedance low enough to cause immediate operation of protective devices in case of incidental energizing of the lines or equipment.
- e. Before any ground is installed, lines and equipment shall be tested and found absent of nominal voltage, unless a previously installed ground is present.

- f. Order of connection. Inspect grounds prior to use. When a ground is to be attached to a line or to equipment, the grounds shall first be attached to the system neutral and then to the furthest outside phase not being worked. The phases are then jumpered together using shorter jumpers. Grounds shall be attached/removed by means of a live-line tool. If using a cluster bar, the grounds shall first be attached to the cluster bar and then to the system neutral. A second ground shall be attached to the cluster bar and then to the furthest outside phase not being worked. The phases are then jumpered together using shorter jumpers. Grounds shall be attached/removed by means of a live-line tool.
- g. Grounds shall be removed in reverse of order connection.
- h. Additional precautions. When work is performed on a cable at a location remote from the cable terminal, the cable may not be grounded at the cable terminal if there is a possibility of hazardous transfer of potential should a fault occur.
- i. Removal of grounds for test. Grounds may be removed temporarily during tests. During the test procedure, the employer shall ensure that each employee uses insulating equipment and is isolated from any hazards involved, and the employer shall institute any additional measures as may be necessary to protect each exposed employee in case the previously grounded lines and equipment become energized.
- j. A visible opening shall be made separating source and load.
- k. Personal grounds shall be electrically tested annually, individually numbered, labeled with date of test (Month, Day, Year) and properly documented.
- l. Grounds shall be stored in such a manner that grounding clamps and cable maintain their integrity.
- m. Only flexible, covered cable with ferrules and appropriately-rated grounding clamps shall be used in protective ground jumpers.
- n. Protective ground jumpers shall be capable of conducting the available fault current. They shall not be smaller than No. 2 stranded copper conductor. Approved grounding clamps shall be rated for maximum fault current available on the system.
- o. A phase jumper, when disconnected to de-energize a section of line, shall not be used as a protective ground jumper.
- p. Employees shall avoid touching pole grounds, loops in ground jumpers and all other conductors or grounded objects when installing or removing protective grounds.
- q. Protective grounds do not provide 100 percent protection against lightning surges. Employees should avoid working on lines or apparatus under such conditions.

X. TRUCK GROUNDS

OSHA 1910.269, 1926.556, 1926.952 and 1926.955

Truck grounds shall be visually inspected before each use, tested annually, individually numbered, labeled with the date of test (Month, Day, Year) and properly documented.

- b. Derrick and aerial lifts shall be grounded any time work is performed on or near primary energized lines, structures or substations. (See Table R-6: Alternating Current Minimum Distances, page 42.)
- c. Approved grounding clamps shall be rated for the highest available fault current on the system.
- d. Approved grounding cable with ferrules shall be no smaller than No.2 stranded copper.
- e. All derrick and aerial lifts truck grounds shall be completely uncoiled and shall be attached to the main line neutral. If the trucks can't be grounded to the main line neutral, the following grounding points shall be used:
 - 2nd:** Pole Ground
 - 3rd:** Driven Ground
 - 4th:** Screw Ground (shall be installed a minimum 4 feet deep)
- f. All mechanical equipment (ex. trailer, chipper, etc.) shall be bonded together to minimize potential differences.
- g. All mechanical equipment in the work area shall be bonded together using a minimum # 2 copper to minimize differences in potential.

Y. GROUNDING NEW LINES OR EQUIPMENT (1926.954)

- a. All conductors and equipment shall be treated as energized until de-energized and tested for the absence of nominal voltage.
- b. New lines or equipment may be considered de-energized and worked as such where:
 - 1. The lines or equipment are grounded, or
 - 2. The hazard of induced voltage is not present and adequate clearances or other means are implemented to prevent contact with energized lines or equipment and the new lines or equipment.
- c. Bare wires communication conductors on power poles or structures shall be treated as energized lines, unless protected by insulating materials.
- d. Grounds shall be placed between work location and all sources of energy and as close as practicable to the work location, or grounds shall be placed at the work location. If work is to be performed at more than one location in a line section, the line section must be grounded and short-circuited at one location in the line section,

- and the conductor to be worked on shall be grounded at each work location. The minimum approach distance shall be maintained from ungrounded conductors at the work location.
- e. Grounding to the common neutral shall be made with a proper clamp and cable capable of conducting the maximum anticipated fault current.
 - f. Grounds shall be applied and removed using live-line tools.
 - g. When ground rods are used they shall have a resistance to ground low enough to remove the danger of harm to the employees and provide prompt operation of protective devices.

Z. WORKING OFF SYSTEM

- a. The Mutual Aid Agreement will be implemented when major outages occur.
- b. Should a conflict in safety rules occur while assisting another cooperative in emergency situations, employees shall follow their own Safety Manual pertaining to the work situation. When working off system, personal protective equipment such as rubber gloves and personal grounds shall be sufficiently rated for the system voltage and fault current available.

AA. POLE HAULING AND TEMPORARY STORAGE (1926.953)

- a. The trailing end of a load of poles shall be marked by a red flag during the day and a flashing red light at night that must be visible from the rear and both sides. As an additional precaution, warning flags or lights may be placed in the center of long loads. An escort vehicle in the rear of the pole trailer is recommended where available.
- b. If it becomes necessary to store poles at the location where they are to be set, they shall be so placed that they will not interfere with traffic or access to private property.
- c. If poles left on or near streets, highways or walkways overnight create a hazard, they shall be safeguarded by red lights or well-lighted signs.
- d. Poles shall be placed or blocked so that they will not roll.
- e. Employees shall not remain on a pole pile while poles are being hoisted or lowered.
- f. Poles loaded on a truck or trailer shall be securely fastened according to DOT regulations with a minimum of two tie downs.
- g. When poles are loaded on trailers, ratchet type load binders shall be used. At least 10% of the trailer loaded weight should be on the pental hook.
- h. Employees shall not ride on pole trailers.
- i. The wheels of the transporting vehicle shall be chocked and securely braked prior to loading/unloading.

- j. No material is permitted to be stored under energized lines or near energized equipment if it is practical to store it elsewhere. The minimum approach distances apply.
- k. Pole tongs used for lifting poles must be designed for lifting and rated for the load capacity.

7B. SETTING AND REMOVING POLES (1910.269)

- a. When poles are set, moved, or removed near exposed energized overhead conductors, the pole must not contact conductors.
- b. When a pole is set, moved, or removed near an exposed energized overhead conductor, the employer shall ensure that each employee wears electrical protective equipment and uses insulated devices when handling the pole and that no employee contacts the pole with un-insulated parts of their body. All employees handling the pole shall wear rubber gloves. Although not to be considered as primary protection rubber overshoes may be used as supplemental protection.
- c. Until a pole is positively secured from moving against an energized conductor, no one shall step on or off the truck, nor shall an employee standing on the ground touch any part of the truck without using rubber gloves.
- d. To protect employees from falling into holes into which poles are to be placed, the holes shall be attended by employees or physically guarded whenever anyone is working nearby.
- e. All persons not engaged in pole setting operations shall keep out of the work area.
- f. Employees on the ground shall be protected from step and touch potentials.
- g. If safe clearance cannot be maintained, the conductors shall be de-energized, covered with protective devices, spread apart, or pole guards shall be used, to minimize incidental contact.
- h. When pikes are used to hold poles in place while holes are being back-filled, they shall be firmly secured until the backfill is sufficient to hold. When a pole is being "canted" or "hooked" the pikes shall be held.
- i. Employees shall not stand or pass under a suspended load or adjacent to or over or under a loaded winch line.
- j. Employees engaged in handling or working on poles shall wear suitable gloves.
- k. Hoisting equipment operators shall accept signals only from the employees specifically designated. The operator shall obey an emergency stop signal given by anyone.
- l. No one shall be on a gin pole when it is being used to raise another pole.
- m. The proper tools shall be used to turn or roll poles.
- n. Pole jacks should be used to pull poles.

CC. AVERAGE WEIGHTS OF POLES (EXPRESSED IN POUNDS)

It should be understood that poles even within the same class vary in diameter weight. Also, the moisture content of a pole changes under various conditions. Therefore, the weights given in the table should be taken as average values only.

POLE WEIGHT

Southern Yellow Pine-RUS Specification

Size	Penta WT EA	CCA WT EA
7/16	171	186
7/20	253	276
4/25	550	600
5/25	473	516
6/25	413	450
7/25	352	384
2/30	979	1068
3/30	847	924
4/30	732	798
5/30	638	696
6/30	556	606
7/30	473	516
1/35	1441	1572
2/35	1254	1368
3/35	1084	1182
4/35	941	1026
5/35	814	888
6/35	704	768
7/35	611	666
1/40	1793	1956
2/40	1551	1692
3/40	1348	1470
4/40	1166	1272
5/40	1012	1104
6/40	875	954
1/45	2162	2358
2/45	1876	2046
3/45	1623	1770
4/45	1408	1536
5/45	1221	1332
1/50	2563	2796
2/50	2222	2424
3/50	1925	2100
4/50	1672	1824
1/55	2987	3258
2/55	2591	2826
3/55	2244	2448
4/55	1947	2124
2/60	2981	3252
3/60	2585	2820
2/65	3388	3696
2/70	3823	4170
3/70	3311	3612

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DD. DERRICK TRUCKS, CRANES AND OTHER LIFTING EQUIPMENT. (1910.269) (1926.954 & 1926.950(c)) (1926.952(c))

- All derrick trucks, cranes and other lifting equipment shall comply with this section.
- With the exception of equipment certified for work on the proper voltage, mechanical equipment shall not be operated closer to any energized line or equipment than the clearances set forth below unless:
 - An insulated barrier is installed between the energized part and the mechanical equipment, or
 - The mechanical equipment is grounded, or
 - The mechanical equipment is insulated, or
 - The mechanical equipment is considered as energized and is barricaded.

Alternating Current -Minimum Distances for Mechanical Equipment

Voltage range Minimum working (phase to phase) and clear hot kilovolt stick distance

2.1 to 15 2 ft. 0 in.

15.1 to 35.....	2 ft. 4 in.
35.1 to 46.....	2 ft. 6 in.
46.1 to 72.5.....	3 ft. 0 in.
72.6 to 121.....	3 ft. 4 in.
121.6 to 145.....	3 ft. 6 in.
145.6 to 169.....	3 ft. 8 in.
169.6 to 242.....	5 ft. 0 in.
242.6 to 362.....	7 ft. 0 in.
362.6 to 552.....	11 ft. 0 in.
552.6 to 765.....	15 ft. 0 in.

- c. The critical safety components of mechanical elevating and rotating equipment shall receive a thorough visual inspection before use on each shift.

NOTE: Critical safety components of mechanical elevating and rotating equipment are components whose failure would result in a free fall or free rotation of the boom.

- d. No vehicular equipment having an obstructed view to the rear may be backed, unless:
1. The vehicle has a reverse signal alarm audible above the surrounding noise level or
 2. Where a designated employee signals that it is safe to do so.

3. Trucks on which derricks or booms are erected above traveling height shall not be moved, except under the immediate direction of a designated employee, who shall give his undivided attention to the movement.
- e. The operator of an electric line truck may not leave his or her position at the controls while a load is suspended, unless the employer can demonstrate that no employee (including the operator) might be endangered. 191 O.269(p)(1)(8)(iii))
 - f. Rubber-tired, self-propelled scrapers, rubber-tired frontend loaders, rubber-tired dozers, wheel-type agricultural and industrial tractors, crawler-type tractors, crawler-type loaders, and motor graders, with or without attachments, shall have roll-over protective structures that meet the requirements of Subpart W of OSHA 1926.
 - g. If the vehicle is equipped with outriggers it shall be operated with the outriggers extended and firmly set as necessary for the stability of the specific configuration of the equipment.
 - h. Outriggers may not be extended or retracted outside of clear view of the operator unless all employees are outside the range of possible equipment motion.
 - i. If the work area or the terrain precludes the use of outriggers, the equipment may be operated only within its maximum load ratings for the particular configuration of the equipment without outriggers.
 - j. Mechanical equipment used to lift or move lines or other material shall be used within its maximum load rating and other design limitations for the conditions under which the work is being performed.
 - k. Operators of cranes, derricks, hoists and other hoisting equipment shall exercise extreme caution when in close proximity to energized lines of equipment:
 - 1. When performing power transmission, distribution, construction, or maintenance refer to Table R-6. Qualified employees operating the insulated section of an aerial lift are exempt from this requirement.
 - 2. Unqualified personnel cannot perform this work. The minimum clearances for unqualified personnel shall be:
 - Up to 50kv 10 feet
 - Over 50kv 10 feet plus 4 in. for each 10kv over 50 kv
 - l. A designated employee other than the equipment operator shall observe the approach distance to exposed lines and equipment and give timely warnings before the minimum approach distance is reached, unless the employer can demonstrate that the operator can accurately determine that the minimum approach distance is being maintained.

1. Wheel chocks shall be in place when units are parked and when in operation where designed.
 2. All equipment of this type shall be equipped with a backup alarm. When the operating rearward view is obstructed a flagger shall be used for backing where possible.
- m. If, during operation of the mechanical equipment, it could become energized, the operation shall also comply with at least one of the following:
1. The energized lines exposed to contact shall be covered with insulating protective material that will withstand the type of contact that might be made during the operation.
 2. The equipment shall be insulated for the voltage involved. The equipment shall be positioned so that its un-insulated portions cannot approach the lines or equipment any closer than the minimum approach distance in Table R-6
 3. Each employee shall be protected from hazards that might arise from equipment contact with the energized lines. The measures used shall ensure that employees will not be exposed to hazardous differences in potential. Unless the employer can demonstrate that the methods in use protect each employee from the hazards that might arise if the equipment contacts the energized line, the measures used shall include all of the following techniques: 1910.269(p)(4)(iii)(c)
 - i. Using the best available ground to minimize the time the lines remain energized,
 - ii. Bonding equipment together to minimize potential differences,
 - iii. Providing ground mats to extend areas of equipotential, and
 - iv. Employing insulating protective equipment or barricades to guard against any remaining hazardous potential differences.
- n. Although not to be considered as primary protection dielectric rubber overshoes may be used as supplemental protection against step potential. Appendix C of OSHA 1910.269 contains information on hazardous step and touch potentials and on methods of protecting employees from hazards resulting from such potentials.
- o. Only trained and qualified individuals shall be allowed to operate this equipment.
- p. No person shall be permitted to ride the hook, sling or load of any hoisting equipment.
- q. Load limits as specified by the manufacturer shall not be exceeded under any circumstances.

- r. Operating and maintenance, inspections, procedures, as specified by the manufacturer, shall be followed.
- s. The following are the minimum checks to be made daily prior to use:
 - 1. All control mechanisms checked for proper operation.
 - 2. All safety devices.
 - 3. Deterioration or leakage in air or hydraulic systems.
 - 4. Hooks, slings and load attachment devices.
 - 5. Fire extinguishers and first aid kit.
 - 6. All controls clearly labeled.
- t. For the first lift of each day, the load shall be test-lifted, and the hoist brakes checked (load lifted several inches and then checked for slippage).
- u. With every load the slings and binding shall be checked and shall be readjusted as necessary to insure safety and stability.
- v. All slings and other fittings shall be of sufficient strength, proper type and rated for their intended use. Inspect prior to use.
- w. Signals to the equipment operator shall be given by one person designated to perform this task. The operator shall, however obey a "Stop" signal given by anyone. Hand signals given to the operator shall be uniform per ASMEI ANSI.
- x. No employee shall be under a suspended load or inside the angle of a winch line. No employee shall stand or work in the path of a cable, chain or rope under tension.
- y. Winch lines, ropes, or wire cables shall not be guided by hand within 4 feet from a hoist drum. Tag lines shall be used to control loads being handled by hoist. Leather work gloves should be worn.
- z. Wire-rope loops shall be made by proper splicing or mechanical clamping of the tail section. Wire rope clips shall not be used to form eyes in wire rope bridles or slings. Knots shall not be used in wire ropes for any purpose.
- aa. When U-bolt wire rope clips are used to form eyes in winch lines, the number used and the spacing provided shall be in accordance with size of the cable. The saddle portion of the clamp shall be placed on the live part of the wire rope. A minimum of three clips are required.

Wire Rope - Safe Working Loads

Size Stranding		Improved Plow	
Size	Stranding	Tons	Steel Lbs
7/16"	6x19	8.27	3308
	8x19	7.09	2836
	6x37	7.82	3128
1/2"	6x19	10.70	4280
	8x19	9.23	3692
	6x37	10.20	4080
9/16"	6x19	13.50	5400
	8x19	11.60	4640
	6x37	12.90	5160
5/8"	6x19	16.70	6680
	8x19	14.30	5720
	6x37	15.80	6320

All permissible working loads are based on a safety factor of 5 to 1.

EE. ROPE

- a. Handline. Ropes shall have a minimum diameter of 0.5 inch. Synthetic rope shall have elasticity of not more than 7 percent.
- b. Rope shall be inspected before each use and if unsafe because of damage or defect may not be used.
- c. Rope shall be stored away from cutting edges and sharp tools. Rope contact with corrosive chemicals, gas, and oil shall be avoided.
- d. When stored, rope shall be coiled and piled, or shall be suspended, so that air can circulate through the coils.
- e. Rope ends shall be secured to prevent their unraveling.
- f. A rope that is wet, that is contaminated to the extent that its insulating capacity is impaired, or that is otherwise not considered to be insulated for the voltage involved may not be used near exposed energized lines.
- g. A rope shall not be overloaded or dragged over rough or sharp objects.
Short bends over sharp-edged surfaces should be avoided.
- i. Kinks shall be removed before any strain is put on a rope.
- j. When not in use, rope shall be dried, stored properly, and kept free from mechanical damage and excessive heat and contamination.
- k. Rope shall be examined regularly for cuts, worn spots, burns and rot. The rope shall be untwisted at various places and inspected for poor fiber and dry rot.
- l. The outward appearance of rope shall not be accepted as proof of quality or strength.

- m. The safe working loads, as specified by the manufacturer, shall not be exceeded.
- n. Eyes and splices shall be made in accordance with the instructions given by the rope manufacturer.
- o. Two or more ropes joined together with knots instead of splices shall not be used for lifting materials.

FF. FUSE (1910.269(R))

- a. When fuses must be installed or removed with one or both terminals energized at more than 300 volts or with expose parts energized at more than 50 volts, the employer shall ensure that tools and gloves rated for the voltage are used. When expulsion-type fuses are installed with one or both terminals energized at more than 300 volts, the employer shall ensure that each employee wears eye protection, uses a tool rated for the voltage, and is clear of the exhaust path of the fuse barrel.
- b. Rubber gloves, hard hats, eye protection, and approved live-line tool shall be used while opening, closing, removing or replacing hot clamps, fuses, or fuse doors on cutouts. Although not to be considered as primary protection dielectric rubber overshoes may be used as supplemental protection against step potential.

GG. AERIAL LIFTS (1910.67 & 1910.269)

- a. Only authorized persons, who are properly trained, shall operate aerial lifts.
- b. The operating and maintenance instruction manuals issued by the manufacturer shall be followed.
 - 1. Aerial lifts shall be equipped with back-up alarms.
 - 2. When the drivers' view is obstructed a signal person shall be used when backing.
- c. Wheels shall be chocked before use. Outrigger pads shall be used.
- d. Load limits of the boom and basket shall not be exceeded. Shock loading of the equipment shall be avoided.
- e. Aerial lifts shall not be "field modified" unless such modification is pre-certified in writing by the manufacturer. The insulated portions of aerial lifts shall not be altered in any manner.
- f. Prior to use, the equipment shall be given a warm up period and a pre-operational check. The hydraulic system and the lift controls (upper and lower) shall be tested daily before use to determine they are in safe working condition. Malfunctions or unsafe operations conditions shall be reported and corrected. Equipment that is not in proper operational condition shall not be used. D.O.T. post-trip inspections shall be performed at the end of each shift.

- g. Lower level controls shall not be operated unless permission has been obtained from the employee in the lift, except in an emergency.
- h. The truck shall not be moved unless the boom is lowered, the basket cradled and secured, and the outriggers retracted.
Employees shall not ride in the bucket while the truck is traveling.
When employees are in the bucket of an aerial lift, the parking brake of the vehicle shall be set and the wheels chocked.
- k. When outriggers are provided they shall be used. The truck should be approximately level when viewed from the rear.
- l. When working from an aerial lift a ANSI Class 3 safety harness and a shock absorbing lanyard with locking snaphooks shall be used. The lanyard shall be attached to the boom with a boom strap or other approved devices. Always inspect this equipment before each use and remove from service immediately if defective.
- m. Employees shall not be permitted to transfer from a bucket to a pole or structure, except for specialized jobs and then only when following specific written cooperative work procedures.
- n. Safety rules governing the use of live line tools, rubber goods, personal protective equipment and general safe practices shall also apply to work done from aerial baskets.
- o. When the boom must be maneuvered over a street or highway, necessary precautions shall be taken to avoid incidents with traffic and pedestrians.
- p. The operator shall always face in the direction in which the basket is moving, and he shall see that the path of the boom or basket is clear when it is being moved.
- q. Employees shall not stand or sit on top or edge of the basket or on ladders placed in the basket. Employee's feet shall be on the floor of the basket.
- r. When two persons are in the basket or baskets, one of them shall be designated to operate the controls. One employee shall give all signals, which shall be thoroughly understood by all persons concerned.
- s. When two persons are working from an aerial lift, extreme care shall be taken to avoid one person working at a different potential. Each person must be anchored to a separate approved anchor point.
- t. No more than one energized conductor or phases shall be worked at one time.
- u. The aerial lift, together with the person in the basket and all tools and equipment, shall maintain proper clearances from unprotected energized conductors, unless isolated or insulated.

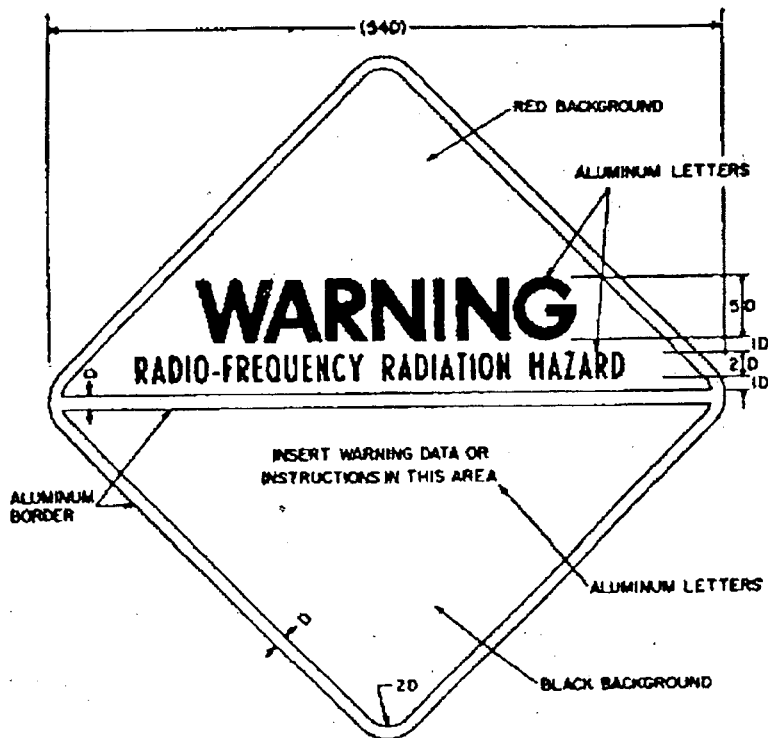
- v. When using pneumatic or hydraulic tools in a bucket, the operator shall be sure that hoses or lines do not become entangled in the operational controls.
- w. When parked, two wheel chocks shall be used.
- x. Excess material and tools shall not be stored on the bucket.
- y. Lifting equipment shall be bonded to the system neutral or it shall be considered energized and barricaded when used near equipment or lines energized at primary voltage.
- z. When vehicles are to be left unattended, use all means available to secure vehicle from unintentional movement. Such as: leaving the vehicle in gear, setting the parking brake and chocking the wheels.
- aa. All unattended vehicles should have the key removed.
- bb. When aerial devices are grounded, attached trailers shall be bonded to the vehicle with a conductor of # 2 copper or greater.

HH. HANDLING POLES AND MATERIAL (1910.269 (k))

- a. Prior to unloading steel, poles, cross arms and similar material, the load shall be thoroughly examined to ascertain if the load has shifted, binders or stakes have broken or the load is otherwise hazardous to employees.
- b. During handling operations, all poles shall be secured to prevent displacement. Precautions shall be exercised to keep all personnel out of the area.
- c. Pre-operational inspections of the pole hoist and the lifting devices are required.
- d. Poles at the pole yard shall be stored by class and length.
- e. No materials or equipment shall be stored under energized lines or near energized equipment, if it is practical to store them elsewhere.
- f. Material may not be stored within the working space about energized lines or equipment in substations.
- g. Extraordinary caution shall be exercised when moving materials near such energized equipment.
- h. Where hazards to employees exist tag lines or other suitable devices shall be used to control loads being handled by hoisting equipment.
- i. During framing operations, employees shall not work under a pole or a structure.
- j. Hoist rope shall not be wrapped around poles or an object to be lifted.

II. ELECTROMAGNETIC RADIATION (29 CFR 1910.97)

Employees must avoid all sources of electromagnetic radiation originating from radio stations, radar equipment, and other possible sources of electromagnetic radiation such as used for microwave communication, radio navigation, and industrial and scientific purposes. Do not enter an area that contains a radio frequency hazard warning sign until the hazard has been removed utilizing a lock-out tag-out program. The warning symbol for radio frequency radiation hazards consists of a red isosceles triangle above an inverted black isosceles triangle, separated and outlined by an aluminum color border. The words "Warning -Radio-Frequency Radiation Hazard" appears in the upper triangle.



1. Place handling and mounting instructions on reverse side.
2. D = Scaling unit.
3. Lettering: Ratio of letter height to thickness of letter lines.

Upper triangle :	5 to 1	Large
	6 to 1	Medium
Lower triangle	4 to 1	Small
	6 to 1	Medium
4. Symbol is square, triangles are right-angle isoseles.

Figure G-11

Radio-Frequency Radiation Hazard Warning Symbol

SECTION IV
Underground Construction And Maintenance Introduction
(1910.269 Subpart (e), (l), (m), (n), (o), (t))

Underground Residential Distribution (URD) systems have a number of apparent advantages over overhead systems; however, they also have some disadvantages such as enclosed working spaces, closer clearances between energized parts and greater exposure to all types of grounds. In most cases, if protective devices are not used, the employee will be in direct contact with the ground or grounded equipment. This ground contact completes half of an electrical circuit. If these contacts are not avoided, or protection against contact is not used, serious injury can result. Although not to be considered as primary protection dielectric rubber overshoes may be used as supplemental protection against step potential.

A. URD GENERAL

- a. Before a URD transformer enclosure is opened, all unauthorized persons including the public shall be required to leave the immediate work area, and remain clear of all hazards involved in the work. Rubber gloves, hard hat, and safety glasses are required. Although not to be considered as primary protection rubber overshoes may be used as supplemental protection.
- b. When underground faults are being located with a thumper, although not to be considered as primary protection rubber overshoes may be used as supplemental protection.
- c. A ladder or other climbing device shall be used to enter and exit a manhole or subsurface vault exceeding 4 feet in depth. No employee may climb into or out of a manhole or vault by stepping on cables or hangers. See additional entry requirements in Section C.
- d. PPE requirements to apply the same as overhead work.
- e. When underground equipment is being located, previously buried scrap cable could provide false indicators of the actual position of permanent conductors. Therefore all scrap cable regardless of length should be removed from the job site.

Note 1: One person may serve to fulfill both requirements of attendant and rescuer. However, attendants are not permitted to enter the manhole.

Note 2: Employees entering manholes containing unguarded, un-insulated energized lines or parts of electric equipment operating at 50 volts or more are required to be qualified.

- f. For the purpose of inspection, housekeeping, taking readings, or similar work, a qualified employee working alone may enter, for brief periods of time, a manhole where energized cables or equipment are in service, if the employer can demonstrate that the employee will be protected from all electrical hazards. Provided all requirements specified in Section B are met.
- g. Reliable communications, through two-way radios or other equivalent means, shall be maintained among all employees involved in the job.
- h. Duct rods. If duct rods are used, they shall be installed in the direction presenting the least hazard to employees. An employee shall be stationed at the far end of the duct line being rodged to ensure that the required minimum approach distances are maintained.
- i. Multiple cables. When multiple cables are present in a work area, the cable to be worked shall be identified by electrical means, unless its identity is obvious by reason of distinctive appearance or location or by other readily apparent means of identification. Cables other than the one being worked shall be protected from damage.
- j. Energized cables that are to be moved shall be inspected for defects.
- k. Defective cables. Where a cable in a manhole has one or more abnormalities that could lead to or be an indication of an impending fault, the defective cable shall be de-energized before any employee may work in the manhole, except when service load conditions and a lack of feasible alternatives require that the cable remain energized. In that case, employees may enter the manhole provided they are protected from the possible effects of a failure by shields or other devices that are capable of containing the adverse effects of a fault in the joint.
NOTE: Abnormalities such as hot localized surface temperatures of cables or joints, or joints that are swollen beyond normal tolerance are presumed to lead to or be an indication of an impending fault.
- l. When work is performed on buried cable or on cable in manholes, system neutral continuity shall be maintained by bonding or other equivalent means or the neutral conductors shall be disconnected on both sides of the fault.
- m. Cables shall always be spiked before cutting. This verifies the circuit is correct and de-energized.

B. OPENING AND GUARDING HOLES

- a. Barricades shall be promptly placed when covers of manholes, handholes, or vaults are removed.

- b. Before an employee removes a cover to a manhole or an unvented vault, the air shall be tested for the presence of flammable or explosive gases.
 - 1. All obstructions to traffic shall be guarded by adequate signs, barricades, lights, flares or flags. Traffic shall be warned in advance through the use of signs, high level standards, flashing lights, traffic cones or flagmen, as may be required by the situation.
 - 2. Where permissible and practicable, the truck shall be placed to guard the work area against oncoming traffic.
 - 3. A blow torch or other open flame shall never be used to melt ice around a manhole or vault cover.
 - 4. Manhole, vault and service-box covers shall always be removed and replaced by means of approved hooks or hoists.
 - 5. Continuous monitoring for oxygen is recommended during entry per enclosed space procedures.
 - 6. Provisions shall be made for an adequate continuous supply of air and continuous atmospheric monitoring.
- c. When open flames must be used, extra precautions shall be taken to provide adequate ventilation.
- d. Before using open flames in a manhole or excavation in an area where combustible gases or liquids may be present, such as near a gasoline service station, the atmosphere of the manhole or excavation shall be tested and found safe or cleared of the combustible gases or liquids.
- e. During excavation or trenching, in order to prevent the exposure of employees to the hazards created by damage to dangerous underground facilities, efforts shall be made to determine the location of such facilities and work conducted in a manner designed to avoid damage. Call before you dig.
- f. Trenching and excavation operations shall comply with OSHA 1926.650 through 1926.652.
- g. When underground facilities are exposed (electric, gas, water, telephone, etc.) they shall be protected as necessary to avoid damage.
- h. Sloping or shoring methods must be used for the protection of employees entering trenches over 5 feet in depth.

C. ENCLOSED SPACES

OSHA 1910.146, 1910.269

These requirements apply only to enclosed spaces, such as manholes, unvented vaults, tunnels, etc., that can be entered by employees. All other confined spaces are covered by 29 CFR 1910.146.

- a. The employer shall ensure that the employee uses safe work practices for entry into and work within enclosed spaces and for

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 rescue of employees from such places. Furthermore, if hazards remain after the precautions taken for enclosed space are exercised or if the escape procedures cannot be met, then entry into enclosed spaces must meet the requirements of permit-space or confined space requirements of 29 CFR 1910.146.
- b. Employees who enter enclosed spaces or serve as attendants shall be trained in the following:
 - 1. The hazards of enclosed space entry.
 - 2. Enclosed space entry procedures.
 - 3. Enclosed space rescue procedures.
- c. Employees shall be provided equipment to ensure prompt and safe rescue.
- d. Before removal of any entrance cover to an enclosed space, the employer must:
 - 1. Check for atmospheric pressure and temperature differences.
 - 2. Determine whether a hazardous atmosphere could exist in the enclosed space.
 - 3. Eliminate any conditions that make it unsafe to remove the cover.
- 4. The evaluation called for in this paragraph may take the form of a check of the conditions expected to be in the enclosed space. For example, the cover shall be checked to see if it is hot and, if it is fastened in place, shall be loosened gradually to release any residual pressure. A determination must also be made of whether conditions at the site could cause a hazardous atmosphere, such as an oxygen deficient or flammable atmosphere, to develop within the space.
- e. After the removal of a cover to an enclosed space, the opening shall be guarded by a railing or a temporary cover/barrier. Such precautions will help to prevent an employee from falling into the enclosed space, and will help to prevent objects from falling into the enclosed space and causing injury to the employee.
- f. An employee cannot enter an enclosed space that contains a hazardous atmosphere unless the entry meets requirements of 29 CFR 1910.146.
- g. If, while work is being performed in the space, there is reason to believe that a hazard may exist in the space or that traffic may cause a hazardous condition, an attendant with CPR/first aid training shall be immediately available to render emergency assistance. This attendant may perform tasks outside the enclosed space.
- h. Test equipment used to monitor atmosphere in enclosed spaces must be kept in calibration with a minimum accuracy of +/-10 percent. Before an employee enters the space, the following tests must be performed:
 - 1. The internal atmosphere shall first be tested for oxygen deficiency.

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- 2. The internal atmosphere shall then be tested for flammable gas vapors.
- 3. Each test shall use a direct-reading meter that is capable of collection and immediate analysis of data samples, thus eliminating the need for off-site evaluation.

- NOTE:** Oxygen deficiency testing is not required if continuous forced air ventilation is provided.
- j. If flammable gases or vapors are found to be present or an oxygen deficiency exists, the following action is required:
 - 1. Forced air ventilation shall be used to maintain a safe level of oxygen and to prevent the accumulation of flammable gases or vapors from reaching a hazardous concentration.
 - k. If continuous forced air ventilation is used, it must meet the following criteria:
 - 1. It must begin and be maintained long enough before workers are allowed to enter the enclosed space to ensure that a safe atmosphere exists.
 - 2. It shall be directed to the employees' immediate area.
 - 3. It shall continue until all employees have left the enclosed space.
 - 4. The supply for the continuous forced air ventilation shall be from a clean source and shall not contribute to the hazard in the enclosed space.
 - l. If open flames are used in the enclosed space, test for flammable gases or vapors shall be made immediately before the open flame device is used and at least once each hour while the device is being used in the enclosed space. More frequent tests must be conducted if there is an indication that one-hour periods are insufficient.

D. MANHOLES AND VAULTS

OSHA 1910.269 (t)

The following are additional requirements for work on underground electrical installations in manholes and/or vaults:

- a. Ladders or other climbing devices shall be used to enter or exit manholes or subsurface vaults that exceed 4 feet in depth. Employees shall not use cables or hangers as steps to climb in or out of manholes and vaults.
- b. Equipment used to lower materials and tools must be capable of supporting the weight and shall be checked for defects before use. Employees working in manholes and vaults shall stand clear of the area directly underneath openings while tools or materials are lowered or raised.

- c. While work is being performed in a manhole that contains energized electric equipment, an employee capable of rendering emergency assistance shall be on duty in the immediate vicinity of the manhole opening. CPR/first aid training of this employee shall meet the same requirements as the qualified employee.
- d. The employee attendant on duty may occasionally and briefly enter the manhole to provide assistance other than emergency.
 - .. When working in a manhole or vault with energized electrical cables or equipment, all employees must be in constant communication. This can consist of visual, voice, or signal-line communication.
- f. If duct rods are to be used, duct rods shall be installed in the direction that presents the least amount of hazard to employees. An employee shall be stationed at the far end of the duct line being rodged to ensure that required minimum approach distances are maintained to protect employees.
- g. An energized cable may be moved only under the direct supervision of a qualified employee. It must first be inspected for defects.
- h. When multiple cables are present, exact identification is required by electric means, unless identification is obvious. All other cables not being worked on must be protected against damage.
- i. When anyone of these conditions occurs, no employees are permitted in the manhole while the cable is energized. However, if de-energizing the cable is not possible, employees must be protected against effects of the failure by shields that are capable of containing the adverse effects of a fault in the joint.
- j. Sheath continuity must be maintained while work is performed on buried cable or on cables in manholes, the neutrals lifted and tagged at both ends, or the sheath must be treated as energized.

E. OPENING AND CLOSING CIRCUITS

- a. Company switching and tagging procedures shall be followed when sectionalizing URD systems.
- b. When a URD circuit has opened, the route of the circuit shall be patrolled for obvious hazards before the circuit is reclosed.
- c. An approved switching tool and rubber gloves and other required personal protective equipment shall both be used when switching, and when an energized circuit is opened or closed.
- d. Any UD primary circuit shall be de-energized by opening one or more devices. De-energizing shall be done with load break elbow connectors, load break fuse cutout at the riser pole, load break tool or other approved device.

- e. Eye protection, hard hats, rubber gloves, and other required personal protective equipment shall be worn when primary switching operations are performed. Although not to be considered as primary protection dielectric rubber overshoes may be used as supplemental protection against step potential.
- f. All URD transformers/enclosures shall be properly marked both inside and outside.

F. RUBBER GLOVES AND SLEEVES UD

- a. Rubber gloves shall be worn before any UD compartment or enclosure (including a service pedestal) is opened or closed. Rubber sleeves also shall be worn when required for protection from contact with live-front equipment, such as submersible transformer cases and pad-mount enclosures.
- b. Rubber gloves shall be worn when removing animals, vines, weeds, grass or vegetation of any kind that has grown into an energized UD installation.
- c. Rubber gloves and sleeves shall be worn when energized primary cables are moved, handled or protected by hand.
- d. Rubber gloves and sleeves shall be worn when work is performed on energized secondaries and services if upper arm is exposed to contact.
- e. Rubber gloves shall be worn when working on or contacting a neutral.
- f. Rubber gloves and sleeves shall be worn while performing work within energized pad-mounts and/or switching cabinets.

G. WATT HOUR METERS

- a. New meter bases shall be tested for continuity and voltage before installing watt hour meter.
- b. Hard hats, safety glasses, proper clothing and rubber gloves shall be worn while installing and removing meters.
- c. Broken glass shall be removed from a meter before placing the meter in storage.
- d. Meter guards shall be used, where provided, when setting and pulling meters.
- e. Check the condition of the grounding conductors.
- f. Be certain that the proper type meter is being set.
- g. Look for and immediately report signs of meter tampering.
- h. When there is any doubt about the meter base or connections do not set the meter until all issues are resolved.

H. WORK ON DE-ENERGIZED CABLES

- a. Before cutting into or removing a part of the sheath of a primary cable, the line shall be grounded at the first possible grounding point on each side of the work location.
Prior to cutting an URD cable, the cable shall be spiked with an approved spiking tool and shotgun stick utilizing all personal protective equipment. Using approved sensing tools, it shall be spiked with an approved spiking tool and cut with approved remote cable cutters. Other cables in the immediate vicinity of the one to be spiked or cut shall be protected as necessary. Although not to be considered as primary protection rubber overshoes may be used as supplemental protection.
- c. All conductors of a multi-phase primary circuit shall be de-energized and properly grounded before work is to be performed, even if only one phase requires work.
- d. System neutral shall be maintained by bonding or other equivalent means or the neutral conductors shall be disconnected on both of the fault sides.
- e. When work is done on underground equipment, precautions shall be taken to prevent backfeed.
- f. Underground secondary service cannot be considered de-energized until the bayonet fuses have been pulled and the cable has been tested for voltage, meters pulled and all possible sources of back feed have been eliminated.

I. WORK ON ENERGIZED CABLES

- a. All underground cables and apparatus carrying current at voltage above 600 volts shall be de-energized before work is done on the conductor or before the cables are cut into or spliced.
- b. Before any work is done on an energized cable, other cables and all grounded equipment with which contact can be made while working on the energized cable shall be covered with rubber blankets or approved insulating shields.
- c. Because of the characteristics of a low voltage network system, when work is performed on cables or apparatus carrying less than 600 volts, employees shall take extra precautions in the use of necessary rubber protective equipment, in observing adequate clearances and in using proper tools in order to prevent short circuits.
- d. Only one energized secondary or service cable shall be worked on at anyone time, and protective devices shall be used to insulate or isolate it from all others.
- e. Only approved and tested live line tools shall be used to remove or install primary elbows

J. WORK ON ENERGIZED EQUIPMENT

Important: Approved PPE shall be worn from the time the enclosure is opened until the job is complete and the enclosure is closed.

- a. When work is performed on cables or apparatus carrying less than 600 volts, employees shall take extra precautions in the use of necessary rubber protective equipment, in observing adequate clearances and in using proper tools in order to prevent short circuits.
- b. When energized pad-mounted transformers are unlocked and opened, they shall be directly attended by a workman. They shall be kept closed and locked at all other times.
- c. A primary or secondary system neutral on any energized circuit shall not be opened under any circumstances.
- d. Elbow connectors provide a great deal of flexibility in switching and system sectionalizing. However, only those connectors designed and approved for load break use shall be used to connect or disconnect an energized circuit.
- e. Only tools with insulated handles shall be used for making energized secondary connections or when work is performed within energized service pedestals, pad-mount compartments or submersible enclosures.
- f. When working inside any energized enclosure containing two potentials, one or more of the potentials shall be covered up and rubber gloves and rubber sleeves shall be worn.

Example: URD Transformer -while working secondary side, primary side will be covered, rubber gloves and rubber sleeves shall be worn.

K. GROUNDING

(NOTE: A capacitance charge can remain in a URD cable after it has been disconnected from the circuit and a static-type arc can occur when grounds are applied to these cables.)

- a. All URD cables and equipment that have been energized or could become energized from any source shall be considered as energized until the equipment is positively proven to be de-energized and has been grounded.
- b. Before doing work on de-energized primary cable or equipment:
 - identify the cable to be worked on.
 - a visible open break (air gap) shall be provided.
 - a voltage test shall be made.
 - the equipment shall be grounded on both sides of the work area.
 - danger tags shall be installed.

- c. When work is to be done on equipment or cables of an underground system, precautions to prevent backfeed shall be taken.
- d. De-energized cables shall be grounded and tagged on both sides of the work area, as close to the work as possible, before work is started.
All underground cables and apparatus carrying current at voltages more than 600 volts shall be identified, isolated, tested, grounded and tagged on both sides of the work area.
- f. Only flexible, covered cable and appropriately-rated grounding elbows shall be used in protective ground jumpers.
- g. Protective ground elbows shall be capable of conducting the available fault current. They shall not be smaller than No. 2 stranded copper conductor. Approved grounding elbows shall be rated 10,000 amps or greater depending on maximum fault current available on the system.

L. OPERATING BAYONET-TYPE FUSES

- a. Approved live-line tools, and rubber gloves shall be used to install or remove bayonet-type fuses from fuse holder. If the employee must enter the approach rubber sleeves shall also be worn.
- b. A bayonet-type fuse may be used to energize or de-energize a three-phase transformer with secondary load removed. A bayonet-type fuse may be used to energize a single-phase transformer with or without load.
(**NOTE:** It should be noted that when bayonet fuse is removed, only the secondary side of the transformer has been de-energized).
- c. The pressure relief valve must be operated before the bayonet-type fuses are removed.
- d. Care shall be taken when removing bayonet-type fuses as to not spill or drip oil on elbows or cables, because this oil will damage the equipment.

M. IDENTIFICATION OF URD CABLE

NESC Section 34; 341-B, 3a and Section 37; 372

- a. All URD cables, both primary and secondary, shall be properly identified and labeled before being energized.
- b. Before any work is done on a cable, it shall be identified by an approved method. If there is any doubt as to the identification, work shall not be started until it is checked and identified by the proper authority.

N. EXCAVATIONS

OSHA 1910.269 and 1926-650 - Subpart P

General

- a. All excavations must be preceded by notification to all utilities and others having underground installations in the affected location. This notice shall be 24 hours prior to starting work, unless local or state law requires a longer period.
- b. Excavations less than 5 feet deep do not require a protection system if a competent person has determined there is no cave-in potential.
- c. Excavation operations shall comply with OSHA 1910.269 and 1926 Subpart P.
- d. There shall be a competent person present at each excavation site where there is a possibility of employees entering the excavation.
- e. Before excavating in any area where any buried facilities are suspected, such facilities shall be located as accurately as possible and other utilities shall be notified of the proposed work. It is strongly recommended that you contact the local or state locating service (S.C. PUPS Call Center: 1-888-721-7877) before you dig.
- f. Mechanical excavating equipment shall be used only in areas where there is no known danger of contacting or damaging buried facilities.
- g. Whenever excavating is done in close proximity to buried facilities, it shall be done only by hand digging.
- h. When employees are required to be in excavations 4 feet deep or more, an adequate means of exit, such as a ladder or steps, shall be provided and located so as to require no more than 25 feet of lateral travel.
- i. Sides of excavations 5 feet or more in depth shall be shored, sloped or otherwise supported by means of sufficient strength to protect employees working within them.
- j. If electric cables are damaged, the following steps shall be taken:
 - If the damaged cable belongs to a power company other than the one performing the work, the other company shall be notified at once.
 - The area shall be barricaded and the public kept out until hazardous conditions can be eliminated.
- k. If gas lines are damaged, the following steps shall be taken as soon as possible:
 - The local fire and police department shall be notified immediately.

- The hole shall be left open to allow the gas to dissipate into the atmosphere. All possible sources of igniting the gas shall be removed or eliminated. Caution shall be taken in starting any equipment in the vicinity of the gas leak.
- Residents of the area shall be warned when necessary and the public kept out of the area.
- The gas company shall be notified immediately.

If communication cables are damaged, the communication company shall be notified at once. To avoid eye damage, never look at the cut end of a fiber optic cable.

- m. At the end of each day's work, as much of the excavation as practical shall be closed or protective barricades put in place.
- n. When excavations are left open, warning devices, barriers, barricades or guardrails shall be placed to adequately protect the public and employees.

SECTION V
Line Clearing and Right-of-Way Maintenance

A. TREE TRIMMING -GENERAL

OSHA 1910.269

- a. When tree trimming, tree felling, brush loading or brush disposal operations are under way on street, highway or any other areas accessible to the public, "Working" signs, cones, red flags or flares, barricades and other warning devices (or combinations thereof) shall be used to warn vehicular and pedestrian traffic.
- b. Dead or rotted limbs, regardless of size, shall not be used by employees for support. Dead or rotted limbs shall not be climbed by the employee. See OSHA 1910.269 (R) (8) Fall Protection.
- c. No work shall be done in a tree until the employee is securely tied in or belted to the tree. Refer to OSHA 1910.269 (R) (7) (i) for proper climbing rope.
- d. The climbing rope shall be crotched in such a manner as to prevent working its way out on a lateral limb.
- e. When working in a multiple-trunk tree, the climbing rope shall preferably be crotched around a main trunk other than the one on which the employee is working.
- f. Employee shall crotch the climbing rope in two places if a single crotch does not adequately protect him from falling into energized lines or falling back into trunk of the tree.
- g. The climbing rope shall not be used as a pull-rope or as a hand-line to lower limbs or branches.
- h. The ground end of a climbing rope shall not be allowed to dangle over roadways and shall be kept free from obstructions, passing vehicles, etc.
- i. The taut-line hitch shall not be released until the climber is on the ground.
- j. Branches or other material shall not be dropped unless the immediate area has been cleared so that there is no possibility of injury to persons or damage to the property. If such a possibility exists, a rope shall be used to lower branches or other materials. Trees shall be trimmed from lower level upward when possible.
- k. When lowering heavy tree members, employees shall not tie fall lines around hands or bodies.
- l. No employee shall attempt to clear limbs or brush from under the side of the tree where the climber is working.
- m. Employees shall obtain assistance or use power equipment when lifting logs or other heavy loads.

- n. When loading brush on a truck, employees shall not stand on or straddle the loaded brush.
- o. When hauling brush, care shall be taken that it doesn't extend over the sides of the truck or trailers. The brush shall also be secured by rope before hauling.
- p. Small trees and underbrush cut around poles and/or equipment shall be cut low (no more than 2 inches high) and horizontal to the ground.

B. WORKING NEAR ENERGIZED CONDUCTORS

OSHA 1910.269

Important: Only qualified employees work near energized conductors. Employees shall be trained in and familiar with the safety-related work practices, safety procedures and other safety requirements in the OSHA 1910.269 Standard.

- a. Wires in proximity to tree trimming shall be considered energized until proven dead and grounded.
- b. Parts of trees, in contact with or likely to contact energized conductors, shall be cut with insulated tools. Limbs being removed from contact with wires are to be handled with the same precaution as the wires themselves. Care shall be taken to prevent limbs being removed from coming in contact with an employee's body.
- c. Employees shall not remove tree limbs or branches from above energized conductors while other employees are working in trees below the conductors in the same span.
- d. Broken or fallen wires shall not be handled, except by properly trained employees.
- e. When working near wires the employee shall have his climbing rope secured so that in the event he slips or a limb breaks, he will swing free and clear of the wires.
- f. Tree limbs shall not be dropped on conductors.
- g. Ropes shall not be thrown over conductors or crossarms for the purpose of using the conductor or crossarm as a support or hitch.
- h. Dry ropes shall be used in trees through which energized conductors pass.
- i. When using aerial basket equipment, employee shall take care not to bring himself or the equipment within 10 feet of contact with energized lines or equipment.
- i. For additional information concerning working near energized conductors refer to *OSHA 1910.269 (R)*.

C. TREE FELLING

- a. The tree feller shall appraise the situation for dead limbs that may break or broken limbs of the tree to be cut, wind conditions, and other hazards. The tree feller shall exercise proper precautions before the cut is started.
- b. The employee felling the tree shall plan a clear retreat path before a cut is started.
- c. No one shall be allowed to work in a tree located near a tree that is being felled if there is any danger of its being struck by any part of the falling tree.
- d. All persons not engaged in the felling operation shall be kept clear of guide ropes and other rigging.
- e. Clear warning shall be given to all employees in the area when trees are to be felled or tree parts are to be dropped.
- f. Once the felling of a tree has been started, it shall be completed before leaving the job.
- g. Trees should not be worked on during high wind, or when a lightning storm is approaching or in progress.

D. CARE AND USE OF TOOLS AND ROPE

OSHA 1910.269

- a. Ropes shall be inspected daily. Damaged ropes shall be removed from service and tagged. Damaged ropes shall be replaced.
- b. Ropes shall be kept away from fire, acids, oil, chemicals and all sources of excessive heat.
- c. Dragging ropes over rough surfaces and sharp objects, such as rocks, shall be avoided. Ropes shall be stored in a dry place separately from sharp-edged cutting tools.
- d. The cutting edge of tools shall be suitably sheathed or guarded, except while in actual use.
- e. When not in actual use, the trimmer's saw shall be returned to the scabbard.
- f. Axes shall not be used in trees or carried on the shoulder.
- g. Tools shall not be thrown into or dropped from a tree; they shall be raised or lowered by a suitable rope.
- h. A pruner shall not be laid on a limb, in a crotch or hooked on a wire or rope. It shall be hooked over a limb strong enough to hold its weight.
- i. Ladders, when not in use, shall be removed from the base of a tree.

E. POWERED TRIMMING EQUIPMENT

OSHA 1910.269

Employees operating powered trimming equipment (chain saw) shall wear suitable eye, face, head, hearing, hand, leg and foot protection.

- b. When starting a chain saw, it shall be placed on or against a solid support.
- c. The operator shall grip the chain saw with both hands during the entire cutting operation.
- d. Saw bumpers shall be against a tree or limb before starting a cut.
- e. Chain saw operators shall clear the immediate area around their work to make certain that brush will not interfere with either the chain saw or operator.
- f. All chain saws shall be equipped with "dead-man" controls (control cannot lock in "on" position).
- g. The chain saw engine or motor shall be stopped:
 - When working on any part of the chain or cutting bar.
 - While the saw is being moved from one location to another.
 - While saw is unattended.
- h. Gasoline-driven chain saw engine shall be stopped when being refueled. If gas is spilled on chain saw during refueling, it shall be wiped off before the engine is started.
- i. A chain saw shall not be used above shoulder level.
- j. Employees shall not approach a chain saw operator within the reach of the saw while the saw is in operation.
- k. Powered tools shall not be left unattended if connected to a power source.
- l. Powered tools shall not be adjusted or repaired while connected to a power source.

F. CHIPPERS

OSHA 1910.269

- a. Chippers shall never be parked directly under a tree being trimmed. A chipper detached from a truck shall be chocked or otherwise secured.
- b. Employees shall not permit spectators to stand near the machine while feeding brush into chipper.
- c. Approved head, eye, face and hearing protection shall be worn by employees when feeding brush into a chipper. Employee shall never place hands or other parts of their body into brush hopper while a chipper is in operation.

- e. Tools or other metallic objects shall not be used to push brush into a chipper. Sweepings, which may contain foreign objects such as stones and nails, shall be loaded on a truck and not fed into a chipper.
- f. Ignition key shall be removed when the chipper is left unattended.
- g. Operators shall not wear loose, floppy clothing, and long sleeves are suggested.
- h. Always feed a chipper from side, and not directly behind feed table.
- i. If it becomes necessary to operate in high grass or weeds, this growth shall be cleared from around the motor and exhaust before starting engine.
- j. Only employees properly trained shall operate the chipper. An employee shall never attempt to make any repairs or adjustments to the chipper unit while it is in operation. The ignition switch must be off, the key removed, and the clutch disengaged.
- k. If the truck is grounded, chipper shall be grounded to the truck with a ground of equal or greater size.

G. BRUSH CLEARING AND MOWING

- a. Where two or more employees are cutting brush, they shall be separated by at least 10 feet.
- b. Under no circumstances shall anyone except the operator ride on a mower, or any other heavy equipment used in land clearing.
- c. Mower operators shall wear seat belts, hard hats, safety glasses and hearing protection.
- d. When emerging from right-of-way, prior to road travel, employees shall test the brakes.

H. CHEMICAL SPRAYING

OSHA 1910.269 R.

- a. Before using herbicide or any other chemical, trained and qualified employees shall read the warning label carefully and follow the directions and precautions, and use all personal protective equipment listed.
- b. When you are spraying chemicals to control growth of brush and trees, use extreme care to prevent damage to growing crops, fruits and shade trees. Don't attempt to spray when wind velocity or direction is likely to cause drift toward cultivated fields. Reducing the pressure on the spraying apparatus also reduces the extent of drift of the chemical.

- c. Employees shall avoid skin contact or breathing mist of spray material.
 - d. When working with chemicals, proper personal protective equipment, as recommended by the manufacturer, shall be worn. Consult MSDS for PPE.
 - e. When chemical is an eye hazard, a portable "eye wash" facility shall be in the immediate area.
- Employees shall familiarize themselves with MSDS, and follow the manufacturer's directions and recommended precautions.

SECTION VI
Personal Protective Equipment And Tools

A. GENERAL REQUIREMENTS

- a. Protective equipment, including personal protective equipment for eyes, face, head, and extremities, protective clothing, respiratory devices, and protective shields and barriers, shall be provided, used, and maintained in a sanitary and reliable condition wherever it is necessary by reason of hazards of processes or environment, chemical hazards, radiological hazards, or mechanical irritants encountered in a manner capable of causing injury or impairment in the function of any part of the body through absorption, inhalation or physical contact.
 - 1. All personal protective equipment shall be inspected prior to use. Any PPE found to be defective will be immediately removed from service and replaced or repaired.
 - 2. All personal protective equipment shall meet ANSI , ASTM, OSHA or NIOSH standards.
- b. Hazard assessment and equipment selection.
 - 1. The employer shall assess the workplace to determine if hazards are present or are likely to be present which necessitate the use of personal protective equipment (PPE). If such hazards are present, or likely to be present, the employer shall:
 - i. Select, and have each affected employee use, the types of PPE that will protect the affected employee from the hazards identified in the hazard assessment.
 - ii. Communicate selection decisions to each affected employee.
 - iii. Select PPE that properly fits each affected employee.
- c. The employer shall verify that the required workplace hazard assessment has been performed through a written certification that identifies the workplace evaluated; the person certifying that the evaluation has been performed; the date(s) of the hazard assessment; and, which identifies the document as a certification of hazard assessment.
- d. Defective and damaged personal protective equipment shall be removed from service immediately, it shall not be used, and shall be replaced or repaired.
- e. PPE Training
 - 1. The employer shall provide training to each employee who is required to use PPE. Each employee shall be trained to know the following:
 - i. When PPE is necessary

- ii. What PPE is necessary
- iii. How to properly put-on, take-off, adjust, and wear PPE
- iv. The limitations of the PPE
- v. The proper care, maintenance, useful life and disposal of the PPE

Each affected employee shall demonstrate an understanding of the training specified above, and the ability to use PPE properly, before being allowed to perform work requiring the use of PPE.

- g. When the employer has reason to believe that any affected employee who has already been trained does not have the understanding and skill required, the employer shall retrain that employee. Circumstances where retraining is required include, but are not limited to, situations where:
 - 1. Changes in the workplace render previous training obsolete; or
 - 2. Changes in the types of PPE to be used render previous training obsolete; or
 - 3. Inadequacies in an affected employee's knowledge or use of assigned PPE indicate that the employee has not retained the required understanding or skill.
- h. The employer shall verify that each affected employee has received and understood the required training through a written certification that contains the name of each employee trained, the date(s) of training, and that identifies the subject of the certification.

B. HEARING CONSERVATION (1910.95 & 1926.52, 1926.101)

- a. Specific areas or jobs where the noise level is above 85 DBA shall be identified. Employees and visitors shall wear ANSI approved protective devices when exposed to noise above 85 DBA.
- b. Equipment shall be tested to determine if hearing protection is required. If it is determined that noise levels exceed OSHA standards, a hearing conservation program shall be implemented.
- c. Hearing protection shall be maintained in excellent condition and properly stored when not in use.
- d. Proper hearing protection may consist of any of the following: ear muffs, molded ear protectors, molded foam, or wax-type ear plugs. Plain cotton is not acceptable. Hearing protection devices shall be worn properly to provide the required protection. Hearing protection shall be maintained in a sanitary condition.
- e. Employees shall wear ear muffs with a NRR of 30 when operating KLEARWAY, KERSHAW, Or other heavy equipment when clearing ROW.

C. FOOT PROTECTION (OSHA Approved)

OSHA 1910.136, ANSI Z41

Employees shall wear protective footwear when working in areas where there is a danger of foot injuries due to falling or rolling objects, or objects piercing the sole, and where employees' feet are exposed to electrical hazards. This foot protection shall comply with ANSI Z41-1986.

D. HAND PROTECTION (OSHA Approved)

OSHA 1910.138

Employees shall use appropriate hand protection when employees' hands are exposed to hazards such as those from skin absorption of harmful substances, severe cuts or lacerations, severe abrasions, punctures, chemical burns, thermal burns and harmful temperature extremes. Hand protection shall be inspected before each use.

E. EYE PROTECTION (1910.133 and 1926.102)

(Based on the hazard assessment, eye protection shall be selected from ANSI Z 87.1-2003.) Inspect prior to use, discard if defective. (Eyeglasses, even with hardened lenses, are not a substitute for goggles.) Full cover goggles or safety glasses and face shields shall be worn when an employee is engaged in or is close to work involving:

- a. Drilling or chipping stone, brick, concrete, paint, pipe coatings or metal and the breaking of frozen ground.
- b. Power grinding, buffing or wire brushing whether there is built-in eye shield or not.
- c. Dust or flying particles (compressed air used for cleaning purposes must be less than 30 p.s.i. and then effective chip guard and personal protection must be used).
- d. Flame welding, cutting or burning. (Approved colored lenses shall be used.)
- e. Hand drilling or sawing of overhead objects.
- f. Use of powered tools such as drills, saws, sanders, etc.
- g. Handling of acids, caustics, chlorine, ammonia, or other similar liquids or gases except when approved complete head coverings are worn (chemical goggles and face shield).
- h. Gunniting, pouring hot lead, hot compounds, or the use of other hot injurious substances.
- i. Use of brush chippers.
- j. Cleaning or scaling pipe.

- k. Flying particles caused by others, if employee is within the range of such particles. (A suitable screen around the work area may be used instead.)
- l. Use of Thermitite (Cadweld) type welders.
 - n. Any other danger of injury to the eyes, or at the direction of a foreman or supervisor.
- m. Approved safety glasses shall be worn when working with electrical conductors.
- o. Approved eye protection should be worn anytime a hard hat is required.

F. LIFE JACKETS, LIFE LINES AND SIMILAR EQUIPMENT

- a. When working where there is a danger of drowning, employees shall wear a USCG approved personal floatation device (PFD). If a safety belt and lanyard or safety net will prevent exposure to the hazard of drowning the PFD is not required.
- b. Prior to working on limited access areas where there is likelihood of fire, escaping gas, toxic fumes, or deficiency of oxygen (as inside tanks or tunnels), an employee shall wear an approved safety harness with life line attached. Employees shall not enter such a confined space or enclosed space unless properly trained in the OSHA requirements

G. HEAD PROTECTION (1910.135)

- a. Approved safety head gear Type I Class E (ANSI Z89.1) shall be worn by all employees when in areas where falling objects, electrical contact, or other hazards may cause a head injury.
- b. Safety head gear or head band assembly shall not be defaced or altered in any manner.
- c. Only Co-op approved stickers or decals shall be placed on the hardhat.
- d. Inspect prior to use, discard immediately if defective.
- e. Hard hats shall be worn per manufactures specifications.

H. HAND TOOLS (1910.269)

- a. Employers shall not allow the use of unsafe or defective hand tools.
- b. Supervision management shall inspect personal tools at least on an annual basis.

I. PERSONAL TOOLS (Body Belt, Safety Belt, Body Harness, Lanyard, Pole and Tree Hooks)

OSHA 1926.300, 1926.951 and 1926.959, and ASTM F887

- a. Wire hooks shall not be placed on body or safety belts. Metal chains, keepers or other metal parts shall not be attached to the tools or body belts.
- b. There shall be no center tool loop and a maximum of 4 tool loops on any body belt. No more holes than necessary shall be made in a body or safety belt. If additional holes are required, they shall be punched rather than cut. There shall be no rivets on the inside of the body belt.
- c. Body belts, safeties, body harnesses and lanyards shall be inspected before each use to see that they are in safe working condition.
- d. Pole gaffs shall not be used after the gaffs are worn to less than 1-114 inches, measured on the underside of the gaff.
- e. Tree gaffs shall not be used after the gaffs are worn to less than 2-114 inches, measured on the underside of the gaff.
- f. Climbing hooks shall not be worn except when climbing and working on poles or trees. They shall be put on at the base of the pole and removed at the base of the pole. Climbing hooks shall not be worn in aerial lifts.
- g. Gaff guards shall be on climbers when not in use.
- h. All tools, regardless of ownership, shall be approved by the Cooperative and maintained in good condition. (Tools are subject to inspection at any time. Supervisors have the authority and responsibility to condemn unserviceable tools, regardless of ownership.)
- i. Personal tools that are condemned shall be tagged "Danger, Do Not Use" and removed from the work area.

J. APPAREL (OSHA Approved)

OSHA 1910.269 and ASTM 1506

Employees exposed to the hazards of flame or electric arcs shall wear clothing that has been approved by the cooperative and meets the requirements of OSHA standard 1910.269.

K. FALL PROTECTION (OSHA Approved)

OSHA 1910.269, 1926.505 and 1926.503

Fall arrest equipment shall be properly used by employees working at elevated locations more than four (4) feet above the ground on poles, towers or similar structures if other fall protection has not been provided. (Exception: Qualified climbers while climbing on wooden poles.)

(NOTE: A body belt is a positioning device and cannot be used as fall arrest equipment.)

- b. Fall arrest equipment shall be properly fitted to the individual and shall be stored free from sharp objects in a clean and dry environment when not in use. Fall protection equipment shall be inspected before each use.

L. PORTABLE ELECTRIC TOOLS

- a. The non-current carrying metal parts of portable electric tools such as drills, saws, and grinders shall be effectively grounded when connected to a power source unless:
 - 1. The tool is approved double-insulated type, or
 - 2. The tool is connected to the power supply by means of an isolating transformer or other isolated power supply, such as a 24 V DC system. All powered tools shall be examined prior to use to ensure general serviceability and the presence of all applicable safety devices.
- b. Powered tools shall be used only within their design capability and shall be operated in accordance with the instructions of the manufacturer.
- c. All tools shall be kept in good repair and shall be disconnected from the power source while repairs are being made.
- d. Electrical tools shall not be used where there is a hazard of flammable vapors, gases or dusts.
- e. Ground fault circuit interrupters shall be used in outdoor or wet locations.
- f. Any cord and plug connected equipment supplied by other than premises wiring shall comply with one of the following:
 - 1. It shall be equipped with a cord containing an equipment grounding conductor connected to the tool frame and to a means for grounding the other end (however, this option may not be used where the introduction of the ground into the work environment increases the hazard to an employee); or
 - 2. It shall be of the double-insulated type or,

3. It shall be connected to the power supply through an isolating transformer with an ungrounded secondary.
- g. Portable and vehicle mounted generators used to supply cord and plug connected equipment shall meet the following requirements:
 1. The generator may only supply equipment located on the generator or the vehicle and cord and plug connected equipment through receptacles mounted on the generator or the vehicle.
 2. The non-current-carrying metal parts of equipment and the equipment grounding conductor terminals of the receptacles shall be bonded to the generator frame.
 3. In the case of vehicle-mounted generators, the frame of the generator shall be bonded to the vehicle frame.
 4. Any neutral conductor shall be bonded to the generator frame.
- h. A documented tool inspection program is required.

M. AIR AND HYDRAULIC TOOLS

- a. AIR POWER TOOLS (1926 Sub Part I)
 1. Compressed air and compressed air tools shall be used with care.
 2. Pneumatic tools shall never be pointed at another person.
 3. Pneumatic power tools shall be secured to the hose by some positive means to prevent the tools from becoming incidentally disconnected.
 4. Safety clips or retainers shall be securely installed and maintained on pneumatic impact (percussion) tools to prevent attachments from being incidentally expelled.
 5. Compressed air shall not be used for cleaning purposes, except where reduced to less than 30 p.s.i. and then only with effective chip guarding and personal protective equipment.
 6. Compressed air shall not be used to blow dust or dirt from clothing.
 7. The manufacturer's stated safe operating pressure for hoses, pipes, valves, filters, and other fittings shall not be exceeded.
 8. The use of hoses for hoisting or lowering tools shall not be permitted.
 9. All compressed air hoses exceeding one-half inch inside diameter shall have a safety device at the source of supply or branch line to reduce pressure in event of hose failure.
 10. Before making adjustments or changing air tools, unless equipped with quick-change connectors, the air shall be shut off at the air supply valve ahead of the hose. The hose shall be bled off at the tool before breaking the connection.
 11. Eye and hearing protection shall be worn.

12. Powered tools shall be operated only by competent persons who have been trained in their use.
13. Conductive hose shall not be used near energized equipment.
14. All pneumatically driven nailers, staplers, and other similar equipment provided with automatic fastener feed, which operate at more than 100 p.s.i. pressure at the tool shall have a safety device on the muzzle to prevent the tool from ejecting fasteners, unless the muzzle is in contact with the work surface.
15. Airless spray guns of the type which atomize paints and fluids at high pressures (1,000 pounds or more per square inch) shall be equipped with automatic or visible manual safety devices which will prevent pulling of the trigger to prevent release of the paint or fluid until the safety device is manually released.
16. In lieu of the above, a diffuser nut which will prevent high pressure, high velocity release, while the nozzle tip is removed, plus a nozzle tip guard which will prevent the tip from coming into contact with the operator, or other equivalent protection, shall be provided.
17. Abrasive blast cleaning nozzles shall be equipped with an operating valve which must be held open manually. A support shall be provided on which the nozzle may be mounted when it is not in use.
18. A documented monthly tool inspection program is required for high speed air tools.

b. **HYDRAULIC TOOLS**

1. Safe operating pressures for hydraulic and pneumatic tools, hoses, valves, pipes, filters, and fittings may not be exceeded.

NOTE: If any hazardous defects are present, no operating pressure would be safe, and the hydraulic or pneumatic equipment involved may not be used. In the absence of defects, the maximum rated operating pressure is the maximum safe pressure.

2. The hydraulic system supplying a hydraulic tool used where it may contact exposed live parts shall provide protection against loss of insulating value for the voltage involved due to the formation of a partial vacuum in the hydraulic line.

NOTE: Hydraulic lines without check valves having a separation of more than 35 feet (10.7 m) between the oil reservoir and the upper end of the hydraulic system promote the formation of a partial vacuum.

3. A pneumatic tool used on energized electric lines or equipment or used where it may contact exposed live parts shall provide protection against the accumulation of moisture in the air supply.
4. Pressure shall be released before connections are broken, unless quick acting, self-closing connectors are used. Hoses may not be kinked.
5. Employees may not use any part of their bodies to locate or attempt to stop a hydraulic leak.

N. POWDER ACTUATED TOOLS

- a. Only those employees who have been trained in their use shall operate these tools.
- b. Explosive charges shall be carried and transported in approved containers.
- c. Operators and assistants using these tools shall be safeguarded by means of eye protection devices (safety eye goggles and/or face shields) and a safety hat.
- d. Tools shall be maintained in good condition and serviced regularly by qualified persons. The material upon which these tools is to be used shall be examined before work is started to determine its suitability and to eliminate the possibility of hazard to the operator and others.
- e. Prior to use, the operator shall insure that the protective shield is properly attached to the tool.
- f. Prior to use, the operator shall inspect the tool to be sure that it is clean, moving parts operate freely and the barrel is free from obstructions.
- g. A defective tool shall be tagged and immediately removed from service.
- h. Powder actuated tools shall not be used in an explosive or flammable atmosphere.
- i. Tools shall not be loaded until just prior to the intended firing.
- j. Only cartridges with an explosive charge adequate for the job with proper penetration shall be used.
- k. Tools and cartridges shall never be left unattended.
- l. Tools shall never be pointed at any person.
- m. In case of a misfire, the operator shall hold the tool in place for 30 seconds. Then try to operate the tool a second time and if unsuccessful shall wait another 30 seconds. Misfired cartridges shall be disposed of properly. (Place in metal container and return to supervisor.)

O. POWER LAWN MOWERS, EDGERS, BLOWERS, TRIMMERS, ETC. (1910.243)(e)

- a. Safety glasses and hearing protection shall be worn when operating this equipment.
- b. Employees shall insure that all applicable guards are in place prior to using power lawn mowers.
All power lawn mowers shall be equipped with adequate guards, which shall remain in place while the mower is operating.
- d. Prior to making adjustments, inspection or repairs, the employee shall turn off the mower and permit it to come to a complete stop.
- e. When operating a power mower, the operator shall:
 - 1. Remove any loose material from the area to be mowed.
 - 2. Avoid standing in front of the discharge opening.
 - 3. When mowing a slope or incline, mow across the face of the slope.
- f. Power lawnmowers - Power lawn mowers of the walk-behind, riding-rotary, and reel power lawnmowers designed for sale to the general public shall meet the design specifications in "American National Standard Safety Specifications for Power Lawnmowers" ANSI B71.1-X1968.

P. PORTABLE LADDERS (1926.1053)

a. General

- 1. Ladders shall be inspected prior to use.
- 2. Employee shall not use a ladder that has broken, loose or cracked rungs, side rails or braces. Defective ladders shall be tagged and removed from service immediately.
- 3. When ascending or descending ladders, employees shall face the ladder and grip the sides or rungs with both hands.
- 4. Boxes, crates, chairs, etc. shall not be used in place of a ladder or step ladder.
- 5. Only one employee shall work from a ladder (except hook ladders) at one time. If the work requires two employees, a second ladder shall be used.
- 6. If a ladder is to be placed where the opening of a door may displace it, the door shall be locked or otherwise guarded.
- 7. Metal ladders or ladders with metal side rails shall not be used near energized equipment or lines. (Conductive ladders may be necessary in specialized work. Conductive ladders shall be prominently marked.)
- 8. Wooden ladders shall not be painted. They shall be treated only with a transparent non-conducting material.
- 9. Only ANSI approved ladders owned by the Cooperative shall be used by employees.

10. When transferring from a ladder to an elevated position, the ladder side rails shall extend at least 36 inches above the landing.
 11. Straight and extension ladders shall not be used unless they are equipped with non-skid safety feet or other means to prevent slipping.
 12. Do not lean outside the rails of a ladder.
 13. All ladders shall be Type 1, Extra Heavy Duty Industrial class or stronger.
- b. Straight Ladders 1926.1053**
1. Straight ladders shall not be used unless equipped with non-slip bases, held in place or otherwise secured.
 2. Ladders shall be placed so the distance from the foot of the ladder to the base of the wall or other support is approximately one-fourth the working length of the ladder.
 3. An employee shall not stand on either of the top two rungs of a ladder.
 4. Ladders shall not be tied together.
 5. A ladder shall never be placed against an unstable support.
 6. Ladders shall be placed on a substantial base.
 7. Ladders shall not be used as scaffold platforms.
 8. Portable ladders in use shall be tied, blocked or otherwise secured to prevent their being displaced.
- c. Step Ladders (1926.1053)**
1. Employees shall not use the top two steps of a step ladder. (This rule does not apply to safety platform ladders.)
 2. The ladder shall be tied, blocked, secured or held in place to prevent its being displaced.
 3. Step ladder legs shall be fully spread and locked open when the ladder is in use.
 4. Step ladders shall not be used as straight ladders.
 5. Ladders and platforms shall be secured to prevent their becoming incidentally dislodged.
 6. Conductive portable ladders should not be used near exposed energized lines or equipment. Specialized ladders used for transmission work excepted.

**SECTION VII
MISCELLANEOUS**

A. LIGHTING (1910.301)

Where natural illumination is not sufficient artificial lighting shall be used.

- a. Lighting equipment used in underground should be of the dust proof type.
- b. Lighting used on coal conveyor systems should be of the dust proof type.
- c. Extension lights must be of the double insulated type or the metal guards must be grounded.

B. ASBESTOS (1910.1001 & 1926.1101)

- a. Certain precautionary measures must be taken prior to working with asbestos.
- b. Personnel must have special training and physicals before handling asbestos products or material.

**C. EXHAUST VENTILATION
(1926.57 & 1910.94 & 1926.154(A)(1))**

- a. Exhaust systems, when provided at the work location, shall be used.
- b. Where an exhaust system does not provide adequate protection, other protective means such as an approved respirator shall be used.

D. HAZARD COMMUNICATION (OSHA 1920.1000-1201)

- a. All employees shall know the location of and how to read the Material Safety Data Sheets of all chemicals that they may be exposed to.
- b. All employees shall be trained in Hazard Communication and in the safe use and handling of all dangerous chemicals they are required to use.
- c. All required PPE should be used to protect against exposure to hazardous materials.
- d. At any time an employee is unsure about the proper use of a chemical they shall consult with their supervisor before proceeding with the job.
- e. Do not eat, drink, or use tobacco products when handling chemicals.

- f. Wash hands immediately after handling any chemicals.
- g. All DOT Hazardous shipping markings must remain on the container.
- h. Any employee who uses a respirator must be included in a comprehensive respiratory protection program that includes a health history questionnaire, medical monitoring, training and a respirator physical.
- i. All containers must be labeled as to contents.

E. CONTRACTORS AND VISITORS

- a. All contractors are required to follow all applicable OSHA, DOT, NESC and EPA rules and regulations.
- b. All visitors, vendors, and contractors are required to use all required personal protective equipment such as but not limited too eye, head, face, hearing, foot and fall protection.

SECTION VIII SUBSTATIONS

- a. Sufficient access and working space shall be provided and maintained about electric equipment to permit ready and safe operation and maintenance of such equipment.
- b. The substation must conform to the edition of RUS requirements that was in effect at the time of construction.
- c. The configuration of the installation must enable employees to maintain the minimum approach distances while they are working on exposed, energized parts.
- d. Work precautions must be taken when work is performed in a substation that does not conform to ANSI C2-1987 to provide protection equivalent to the protection that would be provided by access and working space meeting ANSI C2-1987.
- e. When draw-out-type circuit breakers are removed or inserted, the breaker shall be in the open position. The control circuit shall also be rendered inoperative, if the design of the equipment permits.
- f. Conductive fences around substations shall be grounded. When a substation fence is expanded or a section is removed, fence grounding continuity shall be maintained, and bonding shall be used to ensure electrical continuity.
- g. Substations that are not occupied should have all gates closed and locked. Substation gates that are not attended when the substation is occupied shall be kept closed and secured at all times.

- h. Unqualified persons may not enter rooms or spaces while the electric supply lines or equipment that contain unguarded parts energized at more than 50 volts that are within 8 feet of the floor level. Entrances to rooms or spaces that are not under the observation of an attendant shall be kept locked. Signs shall be posted at the entrance to these rooms or spaces warning unqualified persons to keep out.
Upon entering an attended substation, each employee other than those regularly working in the station shall report his or her presence to the employee in charge in order to receive information on special system conditions affecting employee safety.
- j. Extreme caution shall be exercised in the handling of parts and material in substation. Never manually carry anything above the waist if possible.
- k. Use of vehicles and mechanized equipment in substations shall be supervised by a qualified person at all times.
- l. All stationary trucks, mobile cranes, backhoes, and other mechanized equipment shall be grounded when performing work in the vicinity of energized conductors or equipment in substations.
- m. Temporary grounds used in substations should be sized to accommodate maximum available station fault current.
- n. Battery safety equipment, chemical goggles, face shield, fire extinguisher rubber gloves, and apron shall be available when work is performed on station batteries.
- o. A source of water must be immediately available when work is performed on station batteries. If a portable emergency eyewash/shower unit is used it must provide at least a 15 minute flow of water.
- p. Substation entry shall be restricted to qualified employees. Visitors and unqualified employees may enter when accompanied by a qualified escort.
- q. Before beginning work on any equipment or structure in a substation, the employee in charge of the work shall see that all the workers in the crew are familiar with the equipment, what part if any is energized, location of grounds, what the limits of the working space are, and what open switches disconnect the equipment from the source of supply. If for any reason there is an interruption causing the workers to leave the job or a switching change is made, before work is resumed, the same formality of checking and making the workers familiar with conditions shall be followed as at the beginning of the job.
- r. Proper protective clothing, head and eye protection shall be worn by all employees, contractors and visitors working in a substation.
- s. Head and eye protection may be worn by all visitors entering a sub station for observation purpose only provided they are not exposed to the hazards of ARC and flames.

- t. If the supervisor or his representative in charge determines a job to be hazardous because of proximity to energized equipment, and decides that a checker is necessary to reduce such hazard and prevent accidents, he shall designate a qualified checker.
- u. While climbing or working on structures above 4 feet inside of substations, 100% fall protection shall be used.
- v. All substations shall be inspected monthly, dated, signed by the person performing the inspection, and properly documented.
- w. All substation fences and gates shall be locked and properly grounded. The fence and barbed wire shall not have tears or gaps in it. There shall not be washouts or gaps underneath the gates or fences of more than four (4) inches.
- x. Proper signs of wording and color shall be displayed on all outside fences, all gates and inside the stations on the steel where required.
- y. Materials and/or equipment that is stored in or around the substation shall be stored as to prevent unauthorized access or contact with overhead lines or equipment.
- z. All substation structures and devices shall be kept in excellent condition with no evidence of broken welds, loose bolts, cracked cement or oil leaks, and they shall be properly grounded.
- aa. All switching devices shall be locked and secure at all times and shall have a properly grounded mat for the employee to stand on while operating the device. Approved rubber gloves shall be worn while operating these devices.
- bb. All substation circuits should have proper identification with an identification system that is legible, and this system should be consistent system wide.
- cc. Safe working distance shall be maintained between workers and all exposed energized parts.
- dd. No employee shall approach or take any conductive object closer to exposed energized parts than specified in the following Tables R6-R10. Work inside these limits will be performed with protective equipment or approved devices.
- ee. If energized apparatus is being directly worked on, approved insulated tools or devices shall be used, and approved protective guards or barriers shall be installed between the employee and the adjacent energized parts.

References

Engineering Standards

Herman's Handbook

ANSI (American National Standards Institute)

- a) A 10.31 Digger Derricks
- b) A 92.5 Boom-Supported Elevated work platforms
- c) B 30.5 Mobile and Locomotive Cranes
- d) Z 87.1 Occupational Eye and Face Protection
- e) Z 89.1 Protective Headwear for Industrial Workers
- f) Z 41 Safety Footwear
- g) Z 133.1 Tree Care Operations

ASTM (American Society of Testing and Material Standards)

- a) 0-120-95 Rubber insulating gloves
- b) 0-178-93 Rubber matting for use around electric apparatus
- c) 0-1048-99 Rubber insulating blankets
- d) 0-1049-98 Rubber insulating hoods
- e) 0-1050-90 Rubber insulating line hose
- f) 0-1051-95 Rubber insulating sleeves

CFR (Code of Federal Regulations)

- 29 CFR Part 1910 Occupational Safety and Health Standards for General Industry
- 29 CFR Part 1926 Occupational Safety and Health Standards for Construction

IEEE (Institute of Electrical and Electronic Engineers)

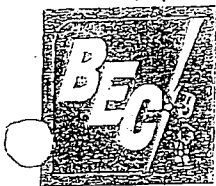
- IEEE978 Guide for In-Service Maintenance and Electrical Testing of Live Line Tools

Federal Motor Carrier Safety Regulations

NEC (National Electric Safety Code)

NESC (National Electric Safety Code)

NFPA (National Fire Protection Associates)



BERKELEY
ELECTRIC COOPERATIVE, INC.

A Touchstone Energy™ Partner



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October 30, 2001

Frank Droze
Tomberline Pole Treatment Co.
Manning SC 29102

RE: 2002-2003 POLE INSPECTION

Dear Mr. Droze:

You are invited to submit a quotation in connection with Berkeley Electric Cooperative's 2002-2003 Pole Inspection Program.

Please use the enclosed forms for submitting proposals and return no later than 1:00 P.M. on Wednesday, November 28, 2001. All quotations should be submitted in the envelope provided and addressed to:

Berkeley Electric Cooperative, Inc.
Att: Charles A. Staley
Post Office Box 1234
Moncks Corner, SC 29461-1234

If you should have any questions concerning this matter please feel free to call me.

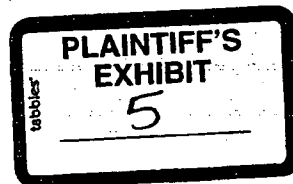
Sincerely,

C. A. Staley

Charles A. Staley
Vice President, Outside Operations.

CAS/kw

Enclosures



Post Office Box 1234
Moncks Corner, SC 29461
(843) 761-8200
Fax (843) 572-1280

Post Office Box 128
Johns Island, SC 29457
(843) 559-2458
Fax (843) 559-3876

Post Office Box 1549
Goose Creek, SC 29445
(843) 553-5020
Fax (843) 553-6761

3745 N. Highway 17
Awendaw, SC 29429
(843) 884-7525
Fax (843) 881-8558

ISK Biocides, Inc.
416 East Brooks Road
Memphis, TN 38109
PH: 901-344-5350
FAX: 901-344-5387

Emergency Telephones:
Business: 800-246-7961
Chemtrec: 800-424-9300

ISK Biocides, Inc.

MATERIAL SAFETY DATA SHEET

ISK BIOSCIENCES PRODUCT NAME: CURAP® 20

ATTENTION: SAFETY MANAGER

Product Codes: 8112, 8129, 8587, 8673, 8405, 8109, 8155, 8921, 8302, 8704

Date of Last Revision: 05/24/95

MSDS Number: 5103

EPA Registration Number: 1022-536-50534

I. PHYSICAL AND CHEMICAL CHARACTERISTICS

APPEARANCE AND ODOR: Thick blue paste with a faint amine odor.

BOILING POINT (RANGE) (Deg F): 240 - 250

VAPOR PRESSURE (mm Hg): >1

VAPOR DENSITY (Air=1): >1

pH RANGE: 10.60 - 11.60

DENSITY (Lbs/Gal) (Water @ 20C = 8.33): 10.1

EVAPORATION RATE (nBuAC=1): <1

SOLUBILITY IN WATER: Slight

SPECIFIC GRAVITY: 1.21

II. HAZARDOUS INGREDIENTS (See Section X Also)

COMMON NAME	CHEMICAL NAME	C.A.S.#	%	OSHA PEL	ACGIH TLV
Copper Naphthenate	Naphthenic Acid, Copper Salt*	1338-02-9	15-25	0.5 mg/CuM	0.5 mg/CuM
Rheological Additive	Organophillic Clay @		1-10	5.0 mg/CuM	10.0 mg/CuM
10 MOL Borax	Sodium Tetraborate, Decahydrate @	1303-96-4	35-45	10.0 mg/CuM	5.0 mg/CuM
Monoethanolamine	2-Aminoethanol	141-43-5	10-20	3.0 ppm	3.0 ppm

Ingredients marked with the sign of @ are hazardous as nuisance dusts in dry or granular products. These ingredients may not be present a hazard in liquid products. Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 (40 CFR 372) requires that certain toxic chemicals be identified. Any such chemicals contained in this product are listed in Section II and are identified by an asterisk (*). OSHA's Hazard Communication (Standard 29CFR 1910.1200) requires hazardous chemicals to be listed and the MSDS to identify the hazards associated with the product. This information must be included in all MSDS's that are copied and distributed for this product.

HMIS HAZARD RATINGS

Health Hazard: 3, Fire Hazard: 1, Reactivity: 0, Special Hazard: ---
(Based on the revised National Paint & Coatings Association HMIS Rating System) (1984)

III. HEALTH HAZARD DATA (See Section IX Also)

EMERGENCY AND FIRST AID PROCEDURES:

EYES:

IMMEDIATELY flush eyes with plenty of water for at least 15 minutes holding eyelids apart to ensure flushing of the entire eye surface. Seek medical attention IMMEDIATELY.

INGESTION:

NEVER induce vomiting or give anything by mouth to an unconscious person. Drink promptly large quantities of milk, egg white, gelatin solution, or, if these are not available, water. Avoid alcohol. DO NOT induce vomiting. If vomiting occurs spontaneously, give liquids again and keep airway clear. Seek medical attention IMMEDIATELY.

NOTE TO PHYSICIAN: Probable mucosal damage may inhibit the use of gastric lavage. Depending on the amount of product ingested, emptying the stomach should be considered. If large amounts have been ingested, treat for Borate toxicity.

ISK Biocides, Inc.
416 East Brooks Road
Memphis, TN 38109
PH: 901-344-5350
FAX: 901-344-5387

Emergency Telephones:
Business: 800-248-7961
Chemtrec: 800-424-9300

ISK Biocides, Inc.

MATERIAL SAFETY DATA SHEET

Page 3 of 4 for Product CURAP® 20

WASTE DISPOSAL METHODS: If these wastes cannot be disposed of according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste Representative at the nearest EPA Regional Office for guidance. Open dumping is prohibited. Pesticide wastes are toxic. Improper disposal of excess pesticide, pesticide formulation or rinsate is a violation of federal law. Dispose of container in a sanitary landfill or by incineration if allowed by state and local authorities. If incinerated, stay out of smoke.

VII. SPECIAL PROTECTION EQUIPMENT

VENTILATION REQUIREMENTS: Ventilate via mechanical methods (general or local exhaust) to maintain exposure below TLV(s), if applicable. Good industrial hygiene practice dictates that indoor work areas should be isolated and provided with adequate local exhaust ventilation.

RESPIRATORY: If TLV for product or any component is exceeded, use a MSHA/NIOSH-approved respirator.

EYE: Chemical worker's goggles or face shield.

GLOVES: Wear impervious gloves, such as: Nitrile Rubber, Neoprene, PVA, PVC, or NBR(Buna-N). Special precautions should be taken to ensure that material cannot get inside gloves.

OTHER PROTECTIVE EQUIPMENT: Wear long-sleeved shirts, long pants, and rubber boots or disposable coveralls when handling this product. The clothing should be changed daily. Impervious boots (nitrile rubber), aprons, or chemical suits should be worn when necessary to prevent skin contact. Safety showers and eyewash stations should be provided in all areas in which this product is stored and/or handled. Persons exposed routinely to this material should shower prior to leaving work each day. Work clothing should be changed daily.

VIII. OTHER SPECIAL PRECAUTIONS

HANDLING AND STORAGE PRECAUTIONS: Store away from food or feed in a secure, well ventilated area protected from extreme temperatures. Do not transfer to an unmarked container. Keep container closed when not in use. Observe good personal hygiene practices. Change protective gloves/clothing when signs of contamination appear. Keep out of reach of children.

OTHER PRECAUTIONS: Wash thoroughly after skin contact and before eating, drinking, use of tobacco products, or using restrooms.

IX. ADDITIONAL INFORMATION

No additional information.

OSHA's Hazard Communication Standard, 29 CFR 1910, 1200 requires that a MSDS be kept on file and distributed to employees and/or customers. If this product is used at other locations, it is your responsibility to promptly distribute this information to that location. Additional copies of the Material Safety Data Sheets are available upon request.

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Notice and Instructions to Bidders

Instructions for Certification (Disbarment and
Suspension) - Attachment "A1-A2"

Lobbying Certification - Attachment "B"

Specifications for the Inspection, Evaluation,
and Necessary Treatment of Standing Poles

Hold Harmless Agreement - Attachment "C"

Bid Form - Attachment "D"

Evaluation Sheet - Attachment "E"

Contractor's Proposal and Owner's Acceptance
Agreements - Attachment "F"

NOTICE AND INSTRUCTIONS TO BIDDERS

1. Sealed proposals for the inspection, evaluation, and necessary treatment of standing poles, of a rural electric project of BERKELEY ELECTRIC COOPERATIVE, INC. (hereinafter called the "Owner") to be known as Project 2002-2003 POLE INSPECTION will be received by the Owner on or before 1 o'clock P.M., November 28, 2001, at its office at MONCK'S CORNER, SOUTH CAROLINA. This will be a private bid opening. Any proposal received subsequent to the time specified will be promptly returned to the Bidder unopened.
2. Description of Project
The Project will consist of units P1 through P9 as described in the following specifications.

The term of the contract is TWO (2) YEARS, for inspection of approximately 15,000 poles or a maximum contract price of \$80,000 per year.

The Project is located in the Berkeley Electric Cooperative service area in Berkeley, Charleston and Dorchester Counties. The owner reserves the right to change location of inspection crew as deemed necessary.
3. Balanced Bid
The attention of Bidders is called to the desirability of a proper balance between unit prices for respective pole units. Lack of such balance may be considered as a reason for rejecting a proposal.
4. Manner of Submitting Proposals
Proposals and all supporting instruments must be submitted on the forms furnished by the Owner and must be delivered in a sealed envelope addressed to the Owner. The name and address of the Bidder, its license number if a license is required by the State, and the project's name must appear on the envelope in which the Proposal is submitted. Proposals must be completed in ink or typewritten. No alterations or interlineation will be permitted unless made before submission, and initialed and dated.
5. Bidder's Experience
In estimating the least cost to the Owner as one of the factors in deciding the acceptance of the Proposal, the Owner will consider, in addition to the bid prices of the various pole units, the experience and responsibility of the Bidder.
6. Hold Harmless Agreement
This agreement must be signed and included with proposal. (See attachment "C").
7. Contract is Entire Agreement
The Contract to be effected by the acceptance of the Proposal shall be deemed to include the entire agreement between the parties thereto, and the Bidder shall not claim any modification thereof resulting from any representation or promise made at any time by any officer, agent or employee of the Owner or by any other person.

8. Evaluation of Proposal
Inasmuch as actual quantities of units are not being bid, an "Evaluation Section " is included at the rear of the Contract book. The bid will be evaluated based on the units in this section. The units in this section are intended to be representative of the work to be performed, but are not to be interpreted as guaranteed. That is, the actual quantities may be more or less than shown and some units included may not be used at all.
9. Rejection of Bids
The Owner reserves the right to reject any or all bids.
10. Debarment and Suspension
Certification regarding debarment, suspension, ineligibility and voluntary exclusion - lower tier covered transaction must be signed and included with proposal. (See attachment "A1-A2").
11. Lobbying Certification
Standard form - LLL, "Disclosure Form to Report Lobbying" must be signed and completed with proposal. (See attachment "B").
12. Completion of Contract by Contractor
The following sections must be completed by the Contractor: Bid Form (see Attachment "D"), Bid Evaluation form (see Attachment "E"), and Contractor's Proposal (see Attachment "F").
13. THE ATTENTION OF THE BIDDER IS DIRECTED TO THE SPECIAL CONDITIONS CONTAINED IN AND MADE A PART OF THIS PROPOSAL.

Berkeley Electric Cooperative, Inc.
(Authorized Representative)

By Charles A. Staley *AKS*

10-30, 2001

INSTRUCTIONS FOR CERTIFICATION
ATTACHMENT "A1"

1. By signing and submitting this form, the prospective lower tier participant is providing the certification set out on the reverse side in accordance with these instructions.
2. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.
3. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
4. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance obtaining a copy of those regulations.
5. The prospective lower tier participant agrees by submitting this form that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.
6. The prospective lower tier participant further agrees by submitting this form that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions," "without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.
7. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.
8. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
9. Except for transactions authorized under paragraph 5 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

ATTACHMENT "A2"

CERTIFICATION REGARDING DEBARMENT, SUSPENSION,
INELIGIBILITY AND VOLUNTARY EXCLUSION - LOWER TIER COVERED
TRANSACTIONS

This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 7 CFR Part 3017, Section 3017.510, Participants' responsibilities. The regulations were published as Part IV of the January 30, 1989, Federal Register (pages 4722 - 4733).

(BEFORE COMPLETING CERTIFICATION, READ INSTRUCTIONS ON REVERSE)

- (1.) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals if presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participant in this transaction by any Federal Department of agency.
- (2.) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participants shall attach an explanation to this proposal.

Tomberlin Pole Treatment Co LLC
Organization Name PR/Award Number or Project Name

Richard F. Drose Jr. Partner
Name and Title of Authorized Representative

Richard F. Drose Jr. 11-5-01
Signature Date

Attachment "B"

Certification for Contracts, Grants, Loans, and Cooperative Agreements

The undersigned certifies, to the best of his or her knowledge and belief, that:

- (1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of Federal loan, the entering into of any cooperative agreement and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
- (2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal Contract, grant, loan or cooperative agreement, the undersigned shall complete and submit standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
- (3) The undersigned shall require that the language of the certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

The certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than 10,000 and not more than 100,000 for each such failure.

Tomberlin Pole Treatment Co LLC
Organization Name

Richard F. Drose Jr.
Name of Authorized Official

Richard F. Drose Jr.
Signature

Date

11-05-01

SPECIFICATION FOR THE
INSPECTION, EVALUATION, AND NECESSARY
TREATMENT OF WOOD POLES

BERKELEY ELECTRIC COOPERATIVE, INC.
MONCK'S CORNER, SOUTH CAROLINA

REVISION DATE: OCTOBER 24, 2001

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GENERAL

SECTION A

A.1 SCOPE

This specification covers the requirements for the inspection, evaluation, groundline treatment, and internal treatment of B.E.C. wood poles.

A.2 DEFINITIONS

B.E.C. Berkeley Electric Cooperative, Inc.

Superintendent B.E.C. Superintendent of Overhead Construction and Maintenance.

Contractor Firm that has been awarded a formal contract to perform work described in this specification. The contractor shall not be considered an agent or employee of B.E.C.

A.3 CONTRACTOR REQUIREMENTS

The contractor shall furnish all supervision, labor, tools, equipment, transportation, chemicals, pesticides, and material necessary for the inspection and treatment of wood poles as required by this specification.

A.4 B.E.C. REQUIREMENTS

B.E.C. will furnish the Contractor with copies of this specification, forms for recording all pole data, and maps showing sections of line containing poles to be inspected and treated. B.E.C. will supply the Contractor with "B.E.C." tags, "REJECT" tags, and nails for marking poles. B.E.C. will supply the Contractor with the materials needed for repair of broken pole grounds.

A.5 PESTICIDE, FUMIGANT, AND PRESERVATIVE LICENSING AND REPORTING REQUIREMENTS

The Contractor's supervisor shall have, and furnish proof of, any and all licenses required to legally apply pesticides, fumigants, and preservatives as required to successfully treat poles. The Contractor shall be responsible for the accurate recording and submission of all usage forms required by the various regulatory agencies and for meeting all applicable State rules and regulations. Any spillage, which exceeds the limits, set forth by local, state, and/or federal authorities shall be reported to the required authorities and to the superintendent.

A.6

PERSONNEL QUALIFICATIONS

Contractor personnel carrying out any of the work contained in this specification must be trained and experienced in doing so. A minimum requirement of six (6) months' experience is necessary. The Contractor shall perform supervision of all work. Supervisors must have at least two years of experience in the art of wood pole inspection, evaluation, and treatment. B.E.C. reserves the right to review evidence of previous experience and training in the form of letters of reference and test results.

Copies of this specification shall be provided to all Contractor personnel. It will be the responsibility of the Contractor to insure that the personnel qualifications are met. B.E.C. reserves the right to stop all work and payments if these qualifications are not met.

A.7

PROPERTY - LIMITS, PERMISSION, AND DAMAGE COMPLAINTS

The Contractor crew shall confine all operations within the limits of the B.E.C. right-of-way subject to the following exceptions:

- a) Alternate access to a structure location has been established.
- b) To traverse the right-of-way from structure to structure would damage crops, tree plantings, or established lawns.
- c) To traverse the right-of-way from structure to structure would require crossing streams, creeks, or other water runoffs.

The Contractor shall report at once to the superintendent all claims for property damage on and off the right-of-way. The superintendent shall receive a copy of the signed claim release of each claim settled or a report on all claims denied.

A.8

COORDINATION OF WORK

The Contractor will operate under the direction of the superintendent. The superintendent will coordinate the areas in which the Contractor crew is to perform the work defined in this specification. The superintendent must be informed as to the days and hours in which the Contractor crew will be operating.

A.9

REPORTING, INVOICING, AND PAYMENTS

All work performed must be accurately and legibly recorded on the "B.E.C. REPORT FORM". When a reasonable amount of work is completed, an invoice from the Contractor shall be submitted with a copy of the corresponding report forms. The invoice must have the units listed in sequential order with the corresponding quantity of each unit, the unit cost, and the total cost for each unit. The report forms will be checked to verify presence of required information and compared with the invoice to check for billing accuracy. B.E.C. reserves the right to withhold payment on a wood pole that does not have the required information on the report form. If errors are found, the Contractor will be notified, corrections will be made, and the payment process carried out.

A.10 QUALITY CONTROL

At B.E.C.'s option, the superintendent may inspect completed work at any time. This quality control check is intended to satisfy B.E.C. of the proper performance of the work in accordance with the provisions of this specification, and is not intended to substitute for careful supervision by the Contractor's own personnel. The quality control check shall consist of randomly selecting no more than 2% of the poles inspected by the Contractor since the previous quality control check. The quality control check will be done in accordance with this same specification.

Hammer marks should be evident to show that each pole has been adequately sounded. B.E.C. reserves the right to take any action necessary to confirm that the work reported on a particular wood pole has been performed. Treatment procedures must be done as agreed upon by B.E.C. and the Contractor prior to the contract being awarded. If negligence is apparent, the Contractor must, at his own expense, repeat the inspection, evaluation, and treatment process on that pole.

Once an occasion of negligence is found B.E.C. reserves the right to inspect any poles inspected by the Contractor during the current contract. Again, the Contractor must, at his own expense, repeat the inspection, evaluation, and treatment process on any poles which do not meet the requirements of the contract.

A.11 INSURANCE

The Contractor shall procure, maintain, and enforce during the performance of the work, insurance of the type and amount indicated below:

- (1) Comprehensive general liability insurance, including premises-operations, elevators, independent contractors, completed operations, products, personal injury liability, and contractual liability, with the limits of liability being no less than \$1,000,000 for each occurrence.
 - (a) In addition, the comprehensive general liability insurance shall specifically include contractual liability insurance against the liability assumed by the Contractor under his contract.
 - (b) The comprehensive general liability insurance shall be written to eliminate the "XCU" (explosion, collapse, and underground) exclusions.
- (2) Comprehensive automobile liability insurance covering the use of all owned, on-owned, and hired automobiles used in the work performed under this contract with limits of liability not less than \$1,000,000 for each occurrence.
- (3) Workers compensation and employers liability insurance as follows:
 - (a) Workers compensation: Statutory
 - (b) Employer's liability: \$1,000,000

A. 11

INSURANCE

- (4) Builders risk insurance covering fire, extended coverage, vandalism, and malicious mischief, including the interests of all contractors and sub-contractors as their interests may appear. This builders risk insurance shall be carried by the Contractor for the duration of the construction project and shall continue in effect until the project is completed and accepted by Berkeley Electric Cooperative, Inc.

All the above described insurance coverage's are to be procured and maintained by the contractor and shall be obtained from an insurance carrier with a Best rating of no less than B+. The Contractor shall deliver to the Cooperative completed certificates of insurance, relating to the aforementioned insurance, prior to commencing any part of the work.

Such policies shall provide that the insurance is not subject to change or cancellation until thirty days after written notice of such proposed action has been given to Berkeley Electric Cooperative, Inc.

The successful contractor will be required to submit evidence of the insurance coverage outlined above.

A.12 CHEMICAL INFORMATION

The Contractor must submit for B.E.C. approval the manufacturers catalog data and recommendations for applications of all chemicals, which will be used for the treatment of wood poles. Three (3) copies of the Material Safety Data Sheets for all pole treatment chemicals must be provided to B.E.C. before the Contractor begins work. B.E.C. must be notified before any changes are made in the chemicals being used. Manufacturer recommendations and Federal, State, and Local regulations for disposal of empty pesticide, fumigant, and preservative containers shall be strictly followed. The Contractor shall not store any chemical containers, empty or otherwise, on B.E.C. premises without first consulting the superintendent. The Contractor must accept responsibility for storage and handling of all chemicals used.

Understanding the increased influence of environmental concerns, B.E.C. is open to suggestions about the use of chemicals and wood preservatives. However, B.E.C. reserves the right to reject the use of any chemical suggested by a Contractor based on the requirements of the previous paragraph or that chemical's proven poor performance as a wood preservative.

INSPECTION, EVALUATION, AND TREATMENT PROCEDURE

SECTION B

B.1. GENERAL PROCEDURE

Every wood pole inspection begins with a visual inspection that must be done with the aid of binoculars. The visual inspection includes the wood pole and any assemblies or attachments on the pole. Problems which must not be overlooked include frayed conductors, chipped or broken insulators, loose or missing hardware, split or damaged crossarms, loose or broken guy wires, broken ground wires, and leaning or damaged apparatus. The pole itself shall be examined for excessive splitting, burn damage (as from lightning, equipment failure, or brush fires), insect damage, woodpecker or animal damage, decay or shell rot, and breaks in the pole.

If the pole is less than ten (10) years old, it must be sounded as described in section B.2 of this specification. If the pole is at least ten (10) years old, it must be inspected as described in section B.3 of this specification. If a pole is less than ten (10) years old but is suspected of having internal and/or external decay that might require treatment, the Contractor crew shall inspect it as described in section B.3 of this specification.

Once the required inspection is performed, the pole shall be treated as deemed necessary by the Contractor. Sections B.4 through B.7 discuss the different treatments that must be provided by the Contractor. If the pole is determined to be a reject pole, no treatment should be performed.

The Contractor shall report any dangerous circumstances to the superintendent immediately. Also, the presence of oil on or around a pole shall be reported to the superintendent immediately.

The Contractor will be responsible for clearing all tree, brush, or vegetation growth around a pole in order to perform the inspection and treatment of that pole in accordance with this specification. When the Contractor crew is finished with a particular pole, a thorough clean-up shall be performed. All cleared material shall be removed and disposed of properly. Disposal shall be in accordance with all Federal, State, and Local regulations in regards to the environment.

Sections B.2 through B.10 describe the individual units of this specification. The Contractor is responsible for performing the work described in each of these sections as they apply to a particular B.E.C. pole.

B.2 VISUAL INSPECTION AND ABOVE GROUND SOUNDING (UNIT P1)

All poles that are less than ten (10) years old shall be visually inspected as described in section B.1 and sounded above ground. The pole shall be sounded from ground level to approximately six (6) feet above ground. A two (2) pound sledge hammer shall be used. The pole shall be struck squarely from at least four (4) different directions around the pole at each of three (3) separate levels. Hammer marks shall be evident on the pole when it is sounded adequately. If no visual defects are found and the pole sounds solid, then no further inspection shall be necessary. The Unit P1 shall be marked on the report form when no further inspection is required.

B.3

VISUAL INSPECTION, EIGHTEEN (18) INCH EXCAVATION, SOUNDING, BORING, AND
EVALUATION OF POLE STRENGTH (UNIT P2)

All poles that are at least ten (10) years old shall be visually inspected as detailed in section B.1 and then inspected as described in this section. Poles that are in positions that do not allow for excavation, including pole with underground risers, shall not be inspected as described in this section. The reason for not inspecting a particular pole as described in this section shall be noted on the report form.

The pole shall be excavated to a depth of at least eighteen (18) inches. It shall be sounded from below ground level to approximately six (6) feet above ground. A two (2) pound sledgehammer shall be used. The pole shall be struck squarely from at least four (4) different directions at each of three (3) separate levels. Hammer marks shall be evident on the pole when it is sounded properly.

If sounding the pole gives evidence of internal decay, the pole shall be bored as necessary to determine the extent of the decay. All dirt and external decay shall be removed from the pole. When the extent of the internal and external decay has been determined, the Contractor crew must evaluate the strength of the pole to insure that it meets the minimum strength requirements of the National Electrical Safety Code. R.E.A. Bulletin 161-4 has appendices that explain methods that will aid in this determination.

If the pole does not meet the N.E.S.C. minimum requirements, it must be rejected. If the pole has adequate strength, it shall be treated. When the inspection process as described in this section is performed, the Unit P2 shall be marked on the report form.

4

GROUNDLINE TREATMENT (UNIT P3)

Every pole that has been excavated to eighteen inches and not rejected must be treated as described in this section. This treatment must follow any necessary treatment for internal decay.

All dirt and external decay must be removed from the surface of the pole from eighteen (18) inches below the groundline to six (6) inches above groundline. Extreme care shall be used so that the remaining good wood fiber is not disturbed. If wood ground wire molding is present and is extended below groundline, remove the portion below groundline. All loose shavings and decayed pieces are to be removed from the hole and the surrounding ground.

Once the preparatory work has been done, a B.E.C. approved external preservative shall be liberally applied to the external pole surface. The preservative shall be applied from eighteen (18) inches below groundline to three (3) inches above groundline. Particular care shall be taken to insure that seasonal checks are well treated.

Once the preservative is applied, it shall be covered with a B.E.C. approved moisture barrier wrap. The wrap shall be held firmly in place by stapling the overlapping edge and the top. At least a four (4) inch overlap shall be used. There shall be no exposed preservative above the groundline.

If obstructions (fences, curbs, walls, ground rods, etc.) are present, the preservative shall be applied in excess amount near the obstructions and the moisture barrier wrap shall be placed as close to the obstruction as possible. Such conditions shall be noted on the report form.

- B.4 Once the moisture barrier wrap is in place, the hole shall be filled in. Extreme care must be taken to avoid damaging the wrap. The soil shall be well tamped. If necessary, extra soil must be added to insure that there will not be a puddle around the pole after the soil has settled. When groundline treatment is performed on a pole, Unit P3 shall be marked on the report form.

B.5 TREATMENT OF INTERNAL VOIDS (UNIT P4)

This method shall be used when the actual void or cavity caused by decay can be reached by boring. This unit shall include all borings, B.E.C. approved preservatives, and treated dowels used to treat a pole with internal decay. The preservative and/or method used must be known to be effective and approved by B.E.C. prior to the commencement of work.

The preservative shall be injected at an adequate pressure into the cavity of the enclosed pocket or hollow heart through holes that have been bored to determine the extent of the cavity. The amount of preservative injected into the cavity will vary depending on the soundness of the wood, size of the cavity, moisture content of the wood, and other factors. However, in no case will it be necessary to inject more than 2-1/2 gallons per pole. When all voids have been filled with the preservative, the drilled holes shall be plugged with tight-fitting treated dowels.

This process must precede the groundline treatment. When the treatment described in this section is performed, Unit P4 shall be marked on the report form.

B.6 FUMIGANT TREATMENT / TREATMENT OF DIFFICULT POLES (UNIT P5)

This method of treatment shall be used when decay is evident and this decay cannot be treated as described in sections B.4 and B.5. Where excavation is not feasible or when the internal voids cannot be reached by boring, the treatment described in this section will be considered adequate.

A. APPROVED FUMIGANTS

Internal treatment for decay shall be by a B.E.C. approved fumigant, such as Vapam (sodium N-methyl dithiocarbamate). The Contractor may use an alternate fumigant that is proven to be as effective as Vapam; however, it must be approved by B.E.C. prior to commencing work.

B. PROCEDURE FOR DRILLING HOLES

Required hole depths (described in the table below) provide a void space with a volume equal to that of the quantity of fumigant that must be applied. This quantity of fumigant is the minimum amount that will kill decay organisms effectively for each size of pole. B.E.C. will not accept treatment on a pole for which the hole depths are shorter than required. Excessively deep holes will cause unnecessary pole strength reduction, and therefore should be avoided.

NUMBER OF HOLES REQUIRED IN POLES OF DIFFERENT SIZES
TO HOLD VARYING AMOUNTS OF FUMIGANT
(HOLE SIZE: 3/4" diameter, 15" deep*)

POLE SIZE	< 32"	32" - 45"	>45"
FUMIGANT VOLUME	3/4 pint	1 pint	2 pints
NUMBER OF HOLES	3	4	6

* The effective depth of the hole is actually 13" - the specified value takes into account the use of a 2" treated plug.

Starting at the groundline, adjacent to the deepest check, drill toward the center of the pole at a steep downward angle that will not go through the pole (approximately 45 degrees). If the fumigant holes cannot be drilled to the required depth for reasons beyond the Contractor's control, this must be noted on the report form and a reason given for each short bore.

While drilling, care shall be taken to avoid intersecting a seasoning check. DO NOT pour fumigant into a hole, which has intersected a check.

If a check is intersected, one additional hole may be bored in the pole; otherwise, borings shall be restricted to the number and depth specified in the preceding table.

Bored holes shall be equally spaced around the pole in an upward spiral pattern with a vertical distance of six (6) inches between holes.

Much of the fumigant placed in rot pockets will be lost through any seasoning checks, which intersect the pocket. Therefore, when pockets of rot are encountered, holes shall be drilled above and/or below them to allow the fumigant to diffuse through relatively solid wood as it volatilizes. This will provide protection of the wood around the pocket of decay.

C. APPLICATION OF FUMIGANT

The fumigant shall be dispensed into the holes via a system appropriately calibrated to control the volume applied. This system shall be approved by B.E.C. prior to the commencement of work.

The lowest hole shall be filled first with the prescribed amount of fumigant.

Insert and drive in plugs carefully to avoid squirting fumigant out of the holes. Work up and around the pole, filling and plugging the holes as work progresses.

A tag indicating the year of treatment and type of fumigant used shall be placed on the pole at a height of 5 to 6 feet above the groundline. The contractor will supply this tag.

Appropriate precautions should be taken in the handling of all fumigants. Directions on all fumigant labels should be followed closely, not only during handling and application, but also when disposing of empty containers.

D. DISPOSAL OF FUMIGANT CONTAINERS

Empty containers should be handled with care. The following special safety precautions shall be observed:

1. Empty fumigant containers shall be disposed of in accordance with State and Local regulations.
2. The empty container shall not be transported in a closed vehicle.
3. The manufacturer's instructions on the container label shall be followed.

Whenever the procedure in this section is performed, the Unit P5 shall be marked on the report form.

B.7 PESTICIDE TREATMENT (UNIT P6)

The Contractor shall be responsible for applying pesticides as deemed necessary to eliminate termites, wood boring beetles, and carpenter ants. This assumes that the contractor's treatment for these pests involves action that was not taken to treat decay.

If other treatments on a particular pole will effectively eliminate these pests, then this unit shall not be recorded on the report form. When a pesticide is administered to a pole, separate from other treatments, the Unit P6 shall be marked on the report form.

B.8 REPAIR OF BROKEN GROUND (UNIT P7)

The Contractor shall be responsible for repairing all broken ground wires or broken ground wire connections to a ground rod. B.E.C. will supply all materials required to repair the broken pole ground. The Contractor must use safe working practices when handling a broken ground wire. Unit P7 shall be marked on the report form when a ground that has not been damaged by the Contractor is repaired.

B.9 POLE TAGGING / "B.E.C." OR "REJECT" TAG / REMOVAL OF UNAUTHORIZED SIGNS (UNIT P8)

Upon completion of pole inspection, the pole shall be tagged appropriately. If the pole is rejected, a "REJECT" tag shall be placed on the pole. If the pole is not rejected, and it does not already have a "B.E.C." tag; a "B.E.C." tag shall be attached to the pole. Tags shall be placed at a level of six (6) feet from the ground, facing the nearest road or access. Remove any unauthorized signs from power poles. If a pole is tagged or signs removed, the Unit P8 shall be marked on the report form.

B.10 RECORDING OF INFORMATION (UNIT P9)

The Contractor shall record all information related to each pole on the "B.E.C. REPORT FORM", as detailed in section A.9.

10 RECORDING OF INFORMATION (UNIT P9)

The information at the top of the Report Form must be complete, as it will be used for future reference. The supervisor must sign each form; this person must meet the qualifications outlined in section A.6. The Contractor crew will be informed as to which substation and circuit they are working on.

As each pole is inspected and treated, the information for that pole must be accurately and legibly entered on the Report Form. It is the responsibility of the Contractor supervisor to insure that this is done correctly. The map location number can be determined from the B.E.C. maps, which will be provided. The length, class, manufacturer, and date of manufacture will be taken from the pole itself. Units, which apply to a pole, shall be marked with an "X" in the appropriate box on the Report Form. The chemical or solution used for the pole treatment must be clearly written in the space provided. If a pole cannot be inspected for any reason, the appropriate box should be marked and an explanation given. If a pole is rejected, the corresponding box should be marked and an explanation given. An explanation must be given when the treatment described in section B. Unit P5, is used.

10 RECORDING OF INFORMATION (UNIT P9)

The information at the top of the Report Form must be complete, as it will be used for future reference. The supervisor must sign each form; this person must meet the qualifications outlined in section A.6. The Contract crew will be informed as to which substation and circuit they are working on.

As each pole is inspected and treated, the information for that pole must be accurately and legibly entered on the Report Form. It is the responsibility of the Contractor supervisor to insure that this is done correctly. The map location number can be determined from the B.E.C. maps, which will be provided. The length, class, manufacturer, and date of manufacture will be taken from the pole itself. Units, which apply to a pole, shall be marked with an "X" in the appropriate box on the Report Form. The chemical or solution used for the pole treatment must be clearly written in the space provided. If a pole cannot be inspected for any reason, the appropriate box should be marked and an explanation given. If a pole is rejected, the corresponding box should be marked and an explanation given. An explanation must be given when the treatment described in section B. Unit P5, is used.

ATTACHMENT "D"
BID FORM

<u>UNIT</u>	<u>DESCRIPTION</u>	<u>UNIT COST</u>
P1	VISUAL INSPECTION AND ABOVE GROUND SOUNDING	<u>.60</u>
P2	VISUAL INSPECTION, EIGHTEEN (18) INCH EXCAVATION, SOUNDING, BORING, AND EVALUATION OF POLE STRENGTH	<u>7.95</u>
P3	GROUNDLINE TREATMENT	<u>4.75</u>
P4	PENTACHLOROPHENOL TREATMENT / TREATMENT OF INTERNAL VOIDS	<u>N/C</u>
P5	FUMIGANT TREATMENT / TREATMENT OF DIFFICULT POLES	<u>10.50</u>
P6	PESTICIDE TREATMENT	<u>N/A</u>
P7	REPAIR OF BROKEN GROUND	<u>3.00</u>
P8	POLE TAGGING; "B.E.C." OR "REJECT" TAGS / REMOVAL OF UNAUTHORIZED SIGNS	<u>.75</u>
P9	RECORDING OF INFORMATION	<u>.50</u>

ATTACHMENT "D"
BID FORM

<u>UNIT</u>	<u>DESCRIPTION</u>	<u>UNIT COST</u>
P1	VISUAL INSPECTION AND ABOVE GROUND SOUNDING	<u>.60</u>
P2	VISUAL INSPECTION, EIGHTEEN (18) INCH EXCAVATION, SOUNDING, BORING, AND EVALUATION OF POLE STRENGTH	<u>7.95</u>
P3	GROUNDLINE TREATMENT	<u>4.75</u>
P4	PENTACHLOROPHENOL TREATMENT / TREATMENT OF INTERNAL VOIDS	<u>N/c</u>
P5	FUMIGANT TREATMENT / TREATMENT OF DIFFICULT POLES	<u>10.50</u>
P6	PESTICIDE TREATMENT	<u>N/A</u>
P7	REPAIR OF BROKEN GROUND	<u>3.00</u>
P8	POLE TAGGING; "B.E.C." OR "REJECT" TAGS / REMOVAL OF UNAUTHORIZED SIGNS	<u>.75</u>
P9	RECORDING OF INFORMATION	<u>.50</u>

ATTACHMENT "F"

Contractor's Proposal. Each and all of the covenants and agreements contained in the Contract effected by the acceptance of the Proposal shall extend to and be binding upon the successors and assigns of the parties thereto.

Tomberlin Pole Treatment co. LLC
(Contractor)

By Richard F. Don Jr.

Partner
(Title)

Date of Proposal 11-05-01

This proposal must be signed with the full name of the Contractor. If the Contractor is a partnership, the Proposal must be signed in the partnership name by a partner. If the Contractor is a corporation, the Proposal must be signed in the corporate name by a duly authorized officer and the corporate seal affixed.

Owner's Acceptance. The undersigned hereby accepts the foregoing Proposal of, 2002-03 Pole Inspection dated 11-5-01, for the inspection, evaluation, and necessary treatment of standing poles, for 2002-2003.

Berkeley Electric Cooperative, Inc.
(Authorized Representative)

By Charles A. Staley

VP Outside Operations
(Title)

October 30, 2001
Date of Contract

6221
RECEIVED JUN 4 2008



McCall-Thomas Engineering Company, Inc.

Consulting Electrical and Communications Engineers Since 1945

May 29, 2008

Mr. Pope D. Johnson III
McCutchen Blanton Johnson & Barnette, LLP
PO Drawer 11209
Columbia, SC 29211-1209

Dear Mr. Johnson,

Subject: Attached Data

Attached herewith is the data obtained at your request concerning the characteristics and measurements of one span of electrical distribution line owned and operated by Berkeley Electric Cooperative, Inc., and located on the property of Thornhill Farm near McClellanville, SC. This data was obtained by Shawn Higbe, PE, Derek Rickenbaker and myself.

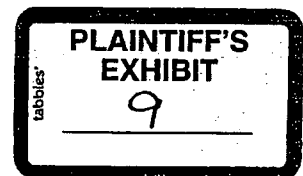
Following are several items of information related to the line but not included on the following pages:

1. This is a single span, with guys at each end, therefore, we have no "average span value" to provide.
2. There were no detectable marks on the line which would indicate the exact point of contact.
3. The site is close to the town of McClellanville. We consider it to be in the Medium Loading District.

If you have any questions, please let me know. I was at the site about two hours after the accident, so I learned about the incident and made a number of photographs.

Yours very truly,

J. L. Jones, PE
McCall-Thomas Engineering Co., Inc.



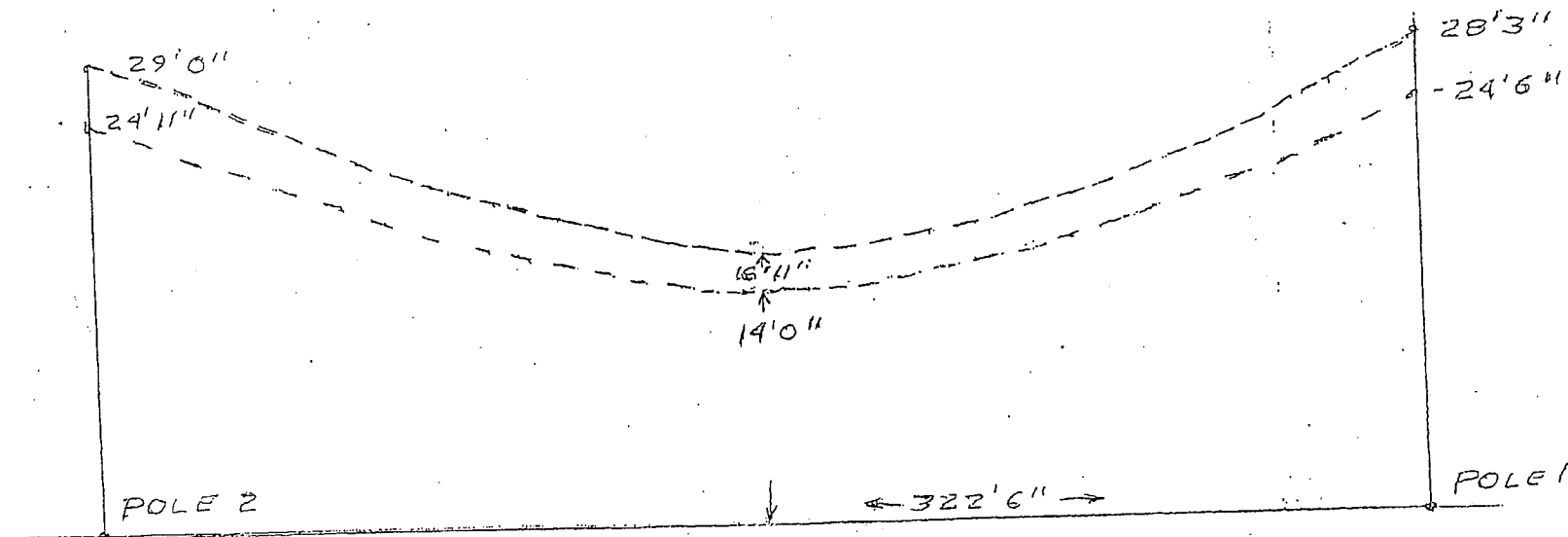


McCall-Thomas Engineering Company, Inc.

Consulting Electrical and Communications Engineers Since 1945

MEASUREMENTS AND OTHER DATA	MEASUREMENTS MADE BY MCCALL-THOMAS	DATA FROM BERKELEY E.C.I. STAKING SHEETS
Date	May 07, 2008	
Temperature	87 degrees F.	
Pole 1 primary takeoff	28' 3"	
Pole 1 neutral takeoff	24' 6"	
Separation at Pole 1	3' 9"	
Pole 2 primary takeoff	29' 0"	
Pole 2 neutral takeoff	24' 11"	
Separation at Pole 2	4' 1"	
Span Length	322' 6"	
MidSpan Primary Clearance	16' 11"	
MidSpan Neutral Clearance	14' 0"	
Date Line Staked		1/27/1993
Line construction completed		2/1/1993
Conductor size		2 ACSR
Pole sizes		35-5

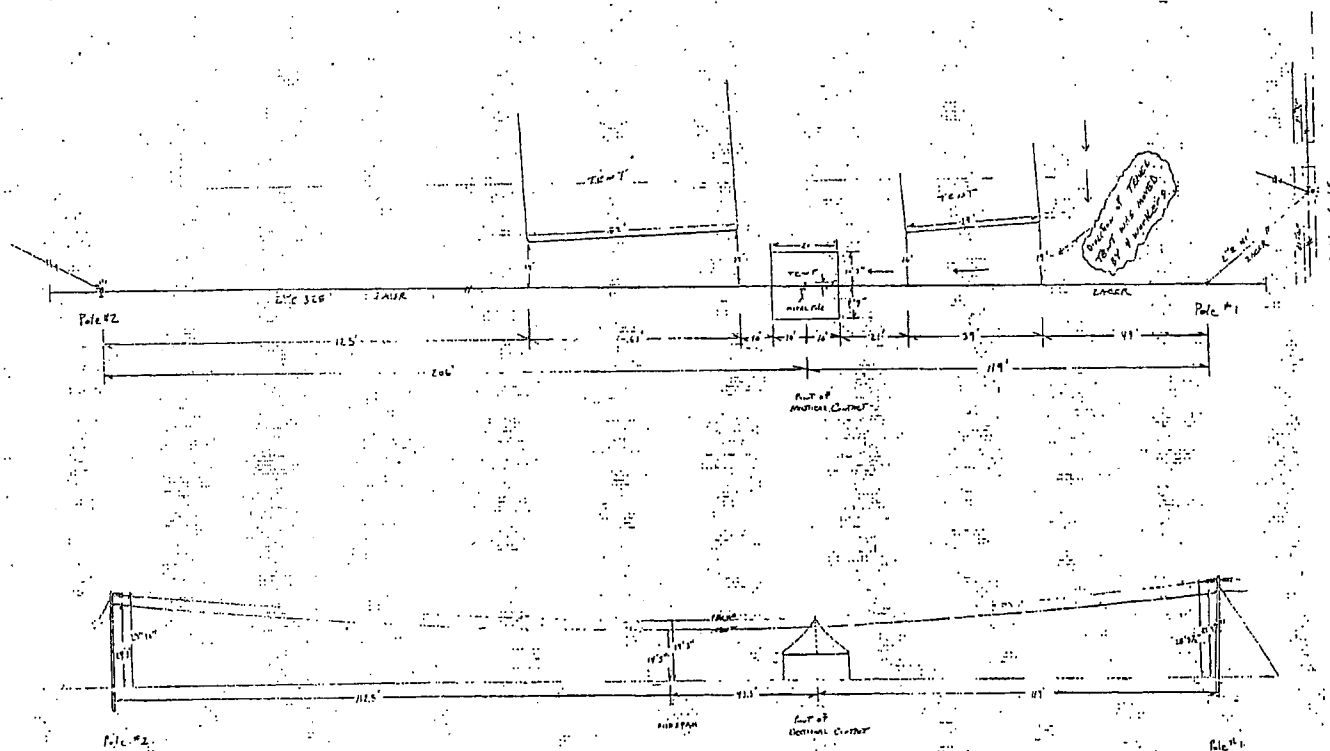
Joseph L. Jona, P.E.
MAY 29, 2008



SKETCH OF SPAN DIMENSIONS
AT THORNHILL FARM,
APRIL 24, 2008

JFJ 5/24/08

Enlargement N.T.S.
All measurements are at point
of electrical contact.



Plan SCALE - 1" = 20'

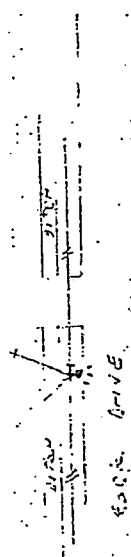
Thornhill Farm off River Road
C. V. S. 17N, North of McCallinville, S.C.

* ALL MEASUREMENTS TAKEN @ 6:30 PM on 4/3/08
OUTSIDE TEMPERATURE APPROX. 64°F by J.H.
Union 4/4/08 by J.H.

Pole #1 - 1/92
355.
149
1082
06
17-15
m2-1

File # 2: 1972 Longfellow St
345
415
460-13
51-L, 52-10
51-13
52-5-17-110
4K3
4046-7(2)

Plan File Scale $\therefore 1'' = 20'$



PLAN SCALE 1" = 20'

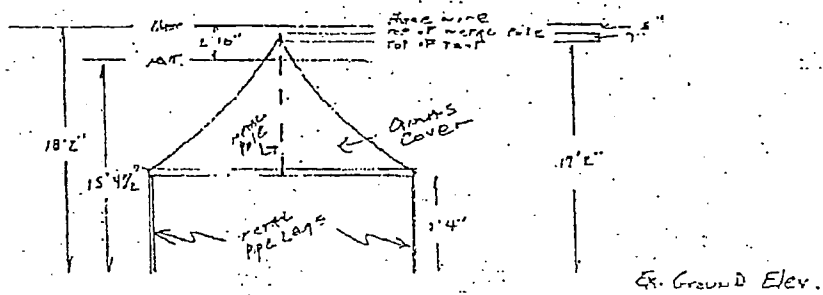
Thornhill Farm off River Road
 C. U.S. 17 N., North of McClintonville, S.C.

* ALL MEASUREMENTS TAKEN @ 6:40 PM ON 4/23/08
 OUTSIDE TEMPERATURE APPROX. 64°F by J.H.
 Union 4/24/08 by J.H.

Pole #1 - 1/92 LOCATION #
 35-5
 274
 VM5-2
 E-2
 FI-25
 MZ-1

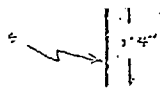
Pole #2 - 1/92 LOCATION #
 35-5
 VM5
 VM5-15
 E-2, E3-10
 FI-15
 MZ5-17/10
 UK5
 UM6-9 (2)

Profile SCALE 1" = 20'

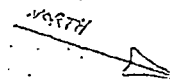


ENLARGEMENT N.T.S.

ALL MEASUREMENTS ARE AT POINT
OF ELECTRICAL CONTACT

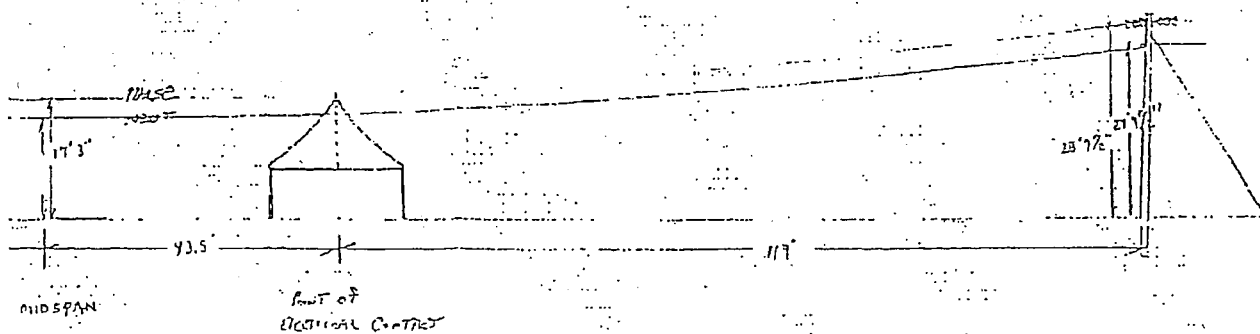
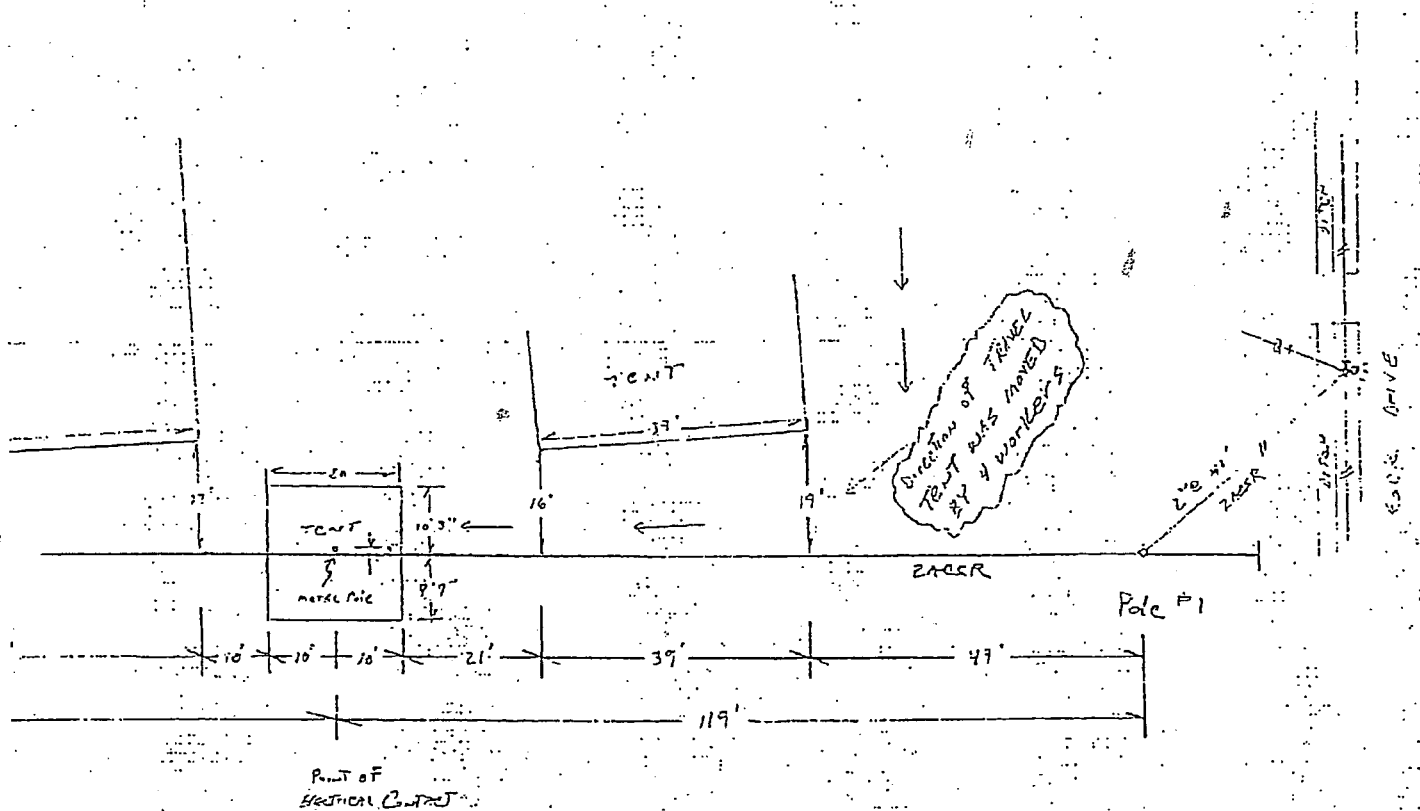


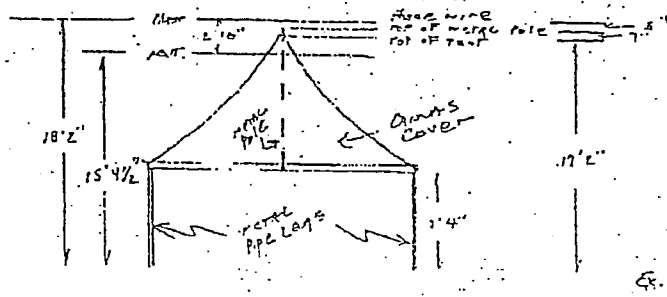
Ex. Ground Elev.



T N.T.S.

1 - ARE AT POINT
1 - CONTACT

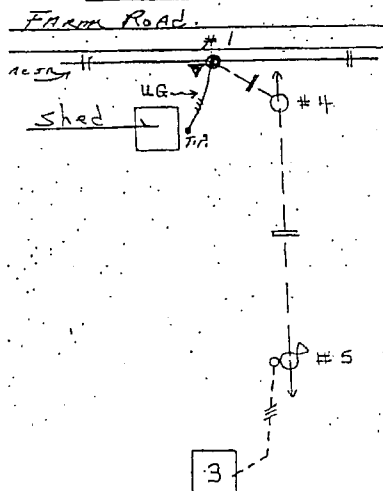




ENLARGEMENT N.T.S.

ALL MEASUREMENTS ARE AT POINT
OF ELECTRICAL CONTROL

R Indicates units to be removed
 I Indicates units to be installed



Release for R/W

R/W Secured

By:

Released Date:

For Const. By:

Const. Started:

Const. Completed: 2-1-93 71

Checked By:

Part 1-27-90

STAKING SHEET

1 OF 1

BERKELEY ELECTRIC COOPERATIVE S. C. 25

MAP 245 BLOCK 95 HOUSE 003 SUB 24 CKT 1
 W. P. #100 SECT. #2554 POLE 001 PHASE 2 KVA 0/5
 COUNTY: Charleston SCHOOL DIST. 712
 LOCATION: 0882 Hwy 171 N. W. N. C. 114-1145 YES NO. ✓

ACCT. #

W.O. # Job #

Const. 1022

10-18-93

Ret. 108.8

Staked by: (RT)

1-24-93

Verified by: SC

2-10-93

Meters Set:

1 TW

Meters Removed:

0

3rd Wire

Map No.	Block No.	House No.	Loc. No.	R or I	Pri. Back Spans	Pri. Wire Size	Pole H & C	Pri. Unit	Line Angle	Trans. 'G'	Gr. M' 2	GUY 'E'			Anchor 'F'	SECONDARY				SERVICE			Sec. or Ser. Wire Size	REMARKS
												N	Unit	Lead		Span Under-build	Sec. Only	N	J or K	Span	N	K		
245	95	003	001	R				VHS																EX-355 N/A
				I																				← MAKE 2' PLUMB LINE BACK
			004	R																				
				I																				
			005	R																				
				I																				
			006	R																				
				I																				
			007	R																				
				I																				
			008	R																				
				I																				
			009	R																				
				I																				
			010	R																				
				I																				

MISC. REMARKS: COMPRESSOR NEEDED,
 RIGHT OF WAY STIPULATIONS, ETC.

Retirement	Feet	No. of Wires	Pole Line Feet	Conductor - Feet		Construction	Feet	No. of Wires	Pole Line Feet	Conductor - Feet	
				Covered	Bare Wire					Covered	Bare Wire
Primary Line						Primary Line	372	2	372		744
Sec. - Bare						Sec. - Bare					
Sec. - Covered						Sec. - Covered					
Sec. - Underbuild						Sec. - Underbuild					
Service Drop						Service Drop (A.C.)	156	1	156	156	744
TOTAL						TOTAL				528	156
No. of Members						No. of Members				1	

SKETCH OF WORK

POSTED TO MAP BY:

DATE:

PLAINTIFF'S
 EXHIBIT

10

BERKELEY ELECTRIC COOPERATIVE, INC.

POSITION SPECIFICATIONS

FIRST CLASS LINEMAN

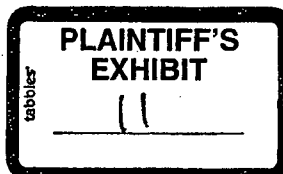
EDUCATION: High School Diploma or equivalency required. Also, any training schools offered such as live line school, transformer, regulator, bucket truck and underground.

EXPERIENCE: Must have minimum of six (6) years of progressive experience in electrical utility line work, must meet all the requirements of the Apprenticeship Program for constructions, maintenance and operation of electrical facilities. Must meet time requirements set for apprenticeship training.

JOB KNOWLEDGE: Should possess an effective working knowledge of REA Specifications and Cooperative system, its feeds, switching points and sectionalizing equipment, safety policies and procedures.

ABILITIES & SKILLS: Must have the ability to construct and maintain overhead or underground lines. To operate heavy equipment such as backhoe, line truck, bucket truck, trencher and test equipment. Install underground or overhead switches. Also, ability to teach and train employees under supervision the duties and responsibilities of their job and promote job training; to have leadership and ability to motivate people. Should have ability to climb poles. Ability to use tact and courtesy in dealing with members and general public. Must possess a S. C. CDL license with Air Brake, Combination and HAZ/MAT endorsements.

WORKING CONDITIONS: Outside work in various weather conditions with irregular and long hours during outages. Climbing, stooping, bending and lifting heavy objects weighing up to 100 pounds. Some overnight travel involved.



BERKELEY ELECTRIC COOPERATIVE, INC.

POSITION DESCRIPTION

FIRST CLASS LINEMAN

I. OBJECTIVES

- A. To construct, maintain and operate underground and overhead electrical facilities in accordance with RUS Specifications and Cooperative Procedures; to respond to member's needs and maintain continuity of service.

II. REPORTING RELATIONSHIPS

- A. Reports to: District Superintendent/Crew Leader
- B. Directs: 2nd Class Lineman
Apprentice Lineman
Lineman Helper

III. RESPONSIBILITIES AND AUTHORITIES

- A. Takes standby calls on overhead and underground lines.
- B. Assists crew leader in preparing work load and prepares daily time sheet for approval by Crew Leader. Directs and assists in loading wire and material for the daily work assignment.
- C. Takes inventory of material and equipment on trucks and in warehouse. Ensures tools are in good condition and are properly used.
- D. Keeps abreast and implements the latest safety requirements as per policy and sees that these rules are followed in the daily assignments and on trouble calls.
- E. Observes, repairs or reports all hazardous and unsafe conditions to proper authorities.
- F. Maintains proper trouble, voltage, and material reports to assure that proper accounting procedures have been followed.
- G. Assists in substation load balancing and sectionalizing.
- H. Cuts and trims right-of-way for line clearance when necessary.

- I. Operates and makes minor repairs on all equipment used on the job.
- J. Sets and disconnects meters as required or directed.
- K. UNDERGROUND - Buries primary and secondary cable, terminates all underground primary and secondary cable at transformers, junctions, riser poles and all other points. Performs HI-Pot-Tests, spots underground cable and locates trouble on all underground cable with fault finder from 100 to 100,000 volts. Assists in construction and repair of overhead lines when necessary.
- L. OVERHEAD - Performs and assists in all types of hot line work from bucket trucks and on poles. Installs and sees that all regulators, capacitors, breakers and switches are connected as required in accordance with RUS specifications. Assists in burying and repair of underground cable when necessary.
- M. Performs other duties as assigned.

III. EXTERNAL RELATIONSHIPS

- A. Members - To courteously answer member inquiries and if unable to, directs them to the appropriate persons, to make every effort to gain their increased understanding and acceptance of the Cooperative's plans, programs and policies.

REVIEWED _____ DATE: _____

APPROVED: _____ DATE: _____

(2) 69
(10)

HEALING FARM MINISTRIES									
Feeder	Phnse	PredictedDevice	OutageName	CustomerCount	CreationDate	RestorationTime	Cause	ActionTaken	Crew
AW-01	B	24594003	10882 HWY 17 NORTH	1	7/30/2003 2:36:27 PM	7/30/2003 5:50:25 PM	TRANSFORMER	REPLACE TRANSFORMER	ISIAH WARD
AW-01	B	INCIDENT	10882 HWY 17 NORTH	1	12/15/2003 10:16:55 AM	12/15/2003 12:50:09 PM	MACHINERY	RISER CONDUIT	NICK VAN ALLEN
AW-01	B	INCIDENT	10882 HWY 17 NORTH	1	8/1/2007 9:26:23 AM	8/1/2007 11:56:53 AM	CUSTOMER PROBLEM	EXPOSED WIRES NOT BEC WIRE	KENNY HOLLOWAY
AW-01	B	SERVICE	10882 HWY 17 NORTH	1	8/20/2007 1:48:51 PM	8/20/2007 3:36:36 PM	DIG IN	UG SERVICE	RICO HARRELL
AW-01	B	INCIDENT	10882 HWY 17 NORTH	1	4/23/2008 4:23:42 PM	4/23/2008 5:15:41 PM	OTHER		RICO HARRELL
								A CREW SETTING UP FOR A EVENT ON HEALING FARM CAME INTO CONTACT WITH OUR POWER LINE. CONTACTED WARD AND AWENDAW CREW TO HEAD THAT WAY. ALSO CONTACTED JUNIOR,	

OMS WAS BEGAN IN 2003. BEFORE 2003 ALL OUTAGES/
SERVICE CALLS WERE MANUALLY LOGGED ON "TROUBLE
LOG".

OMS - OUTAGE MANAGEMENT SYSTEM

Bouvia Rembert

From: Bouvia Rembert

Sent: Tuesday, September 08, 2009 3:35 PM

To: Lauren Christensen

Historical Editor 5 Historical Outages



Search Option

☒ Outages

☐ Trouble
Calls

☐ Affected
Customers

☒ Find Similar

Map Scale

400

Outage Name

10882 hw

Location

Action Taken

Creation Date

Acknowledged Time

Crew Dispatched Time

Estimated Time

Elapsed Time

Can Grow

Substation

Feeder

Phase

Switch Equipment

Type

Air Cost Count

Status

Weather

Trouble Code

Comments



Drag a column header here to group by that column

Outage	Class	Action	Report	Acknowledged	
10882 HWY 17	703-Machinery or	599-OTHER	12/15/2003	12/15/2003	12
10882 HWY 17	304-Transformer	601-REPLACE	7/30/2003 2:36:27	7/30/2003 3:01:53	7/
10882 HWY 17	799-Other (Explain)	799-OTHER	8/1/2007 9:26:23	8/1/2007 9:27:24	8/
10882 HWY 17	705-Dig In (UG	509-SERVICE	8/20/2007 1:48:51	8/20/2007 1:50:22	8/
10882 HWY 17 N	799-Other (Explain)	499-OTHER	4/23/2008 4:23:42	4/23/2008 4:24:17	4/

9/8/2009

Created by laurenc - 09/09/2009 07:51:08 AM EDT

Service Orders : CBDSN GEORGETOWN, Cust#: 8146251

Provider Level

SO WIN	SO Type	Status	SO Process	Name	Needed Date	Contact Name
1033366	SLO - Security Light Out	C - Closed	Miscellaneous Service L...	CBDSN GEORGETOWN	03/06/2009	KEVIN PARKS DIREC
25168998	SOXFER - Transfer (Read and Leave)	C - Closed	Change of Service	CBDSN GEORGETOWN	03/06/2009	KEVIN PARKS DIREC
25167607	SODM - Disconnect Meter	X - Cance...	Change of Service	CBDSN GEORGETOWN	03/06/2009	KEVIN PARKS DIREC

SO Function	Service	Serv Loc #	Name	Default Serv Desc	Owner Cust #	Account	Service Status	To
Reconnect	ELEC	21406	CBDSN GEORGETOWN	10802 HWY 17 NORTH (HOUSE)	0	8146251001	41 - Inactive n...	

Reconnect New

Initiate

Functions Available

Connect

CUSTOMER

Personal:

ADDRESS

Home:

Mobile:

Business:

Fax:

Bill Cycle: 0 Reading Cycle: 0

E-Bill E-Mail Addr:

Service Provider Current Service Status Service Status Re

Address:

Additional Name:

Service Location

Service Agreement

SETUP
METERS
GAS

GETUP
METERS
ELECTRIC

Recurring
Charge
Credits

Connect
Charges

Billing and
Payment
Options

Reassign
Primary
Location

Save

Reset

Add

Related

Print

Start Workflow

Quit Screenflow

Show Workflow

Loc # History

File Edit Tools Help

Appraisal Mapping GIS/Airports/Casualty Register Collections Control Files Credit Report Dashboard Description File

General FM Imaging Load Management Location FM Meter FM New Connect POS Device Security Light

Special Equipment Inquiry Search

Consumer Accounting CC GA

Option: Location FM Location: Submit Add

Location: 2459007116 Location Status: Active

Svc Address: 10692 HWY 17 NORTH (SHED)

Rate: 10 Class: 1 Cycle: 550

District: 17 Tax District: 21 Board District: 2

City Code: County Code: 2 State Code: 1

Air Code: 0 Heat Code: 0 Service Code: 1

Unit Switches: 0 Open Contracts: 0 Mkr Services: 1

Service Status: Active Electric

Transfer Station: 24595001 Minimum Bill Amount: .00

Read Sequence: 56070000 Landlord Agreement Nbr: 0

Pole Number: 24595001 Landlord Nbr: 0

Meter Grade: SHED

Usage Plant: Not applicable Mobile Phone Code: 0

Construction: Overhead Standard Industrial Code: 0

Subdivision Nbr: Tax Code: 0 Easement: Lot:

Yard Lights Meter Connect Eng History

Open Service Orders

SC Nbr	Description	History
8136097-02	HEALING FARM INDUSTRIES INC	
8063422-03	BELLFIELD FARMS LLC	
8044785-03	LAWRENCE JOHN L JR	
8008414-04	BISHOP JERRY S	
7002121-02	YERGIN JAMES L	

Notes Add

Mtr Sep	Name	Meter	Connect	Disconnect
07429781	07/01/05			
97429781	07/25/07			
50284490	12/28/04			
50284490	12/18/03			
50284490	04/03/09			

View Map Delete Update

Account	Job No.	Budget Master	Checks	Construction Unit	Customer	General Plan	Invoice Class
Job	Material	PO Inquiry	Pool	Pool Actions	Project	PO Redivision	Record Unit
Ship To Code	Task	Vehicle	Vehicle Parts	Vendor	Work Order Type	Vendor Plan	AP Inquiry
CA		CC					General Accounting

Options: Job Name Starting With: Search Add Display Standard List Customize

Specific Job Number

Job Name	Job No.	Location	Desired	Applied	Shaded	Notes
HEALING FARM MINISTRIES	83772	24595005	09/24/08	09/24/08	09/24/08	
HEALING FARM MINISTRIES	84146	24595003	08/04/08	08/04/08	08/04/08	
HEALING FARM MINISTRIES	83374		04/24/08	04/24/08		
HEALY JACK	23304	48451024	01/18/94	01/18/94	01/18/94	
HEALY JACK	35101	48451024	11/20/98	11/20/98	11/20/98	
HEALTH FIRST (TRANSF)	82174	30704063	01/24/08	01/24/08	01/24/08	

Select Job for Detail

Job Data: Statistical Information: Estimates: Estimates

Job Number:	03772	State:	1-SC	Staked Date:	09/24/08	Cost Estimates:
Job Name:	HEALING FARM MINISTRIES	County:	2	Staked By:	BLAKE	Labor:
Telephone:		City:		Send to Staking:		Material:
		Tax District:	712	CIA Required:	No Yes	Overhead:
Billable Job Only:	No Yes	Type:	Overhead Underground	CIA Amount:		Hours:
Work Order Type:	20	Construction Co:	0 - Utility	CIA Paid:		
Work Plan Num:	160000	Member Number:		Location:	24595005	
Application Date:	05/24/08	Service Order:		State Hwy No:		
Desired Date:	06/24/08	Project:		Encasement:		
District:	7			Circuit:	1	
Warehouse:	7			Crew:		

REPAIR OR REPLACE AND INSTALL UO PRI. AT HEALING FARM MINISTRIES

Change Delete

Created by laurenc - 09/08/2009 08:55:02 AM EDT

Service Orders : HEALING FARM MINISTRIES INC, Cust#: 8126097

Account Level Set Aside Retrieve (0)

SO WIN	SO Type	Status	SO Process	Name	Needed Date	Contact Name
879952	SEC - Security Light Out	C - Closed	Miscellaneous Service L	HEALING FARM MINISTRIE	08/21/2007	HEALING FARM M
923379	DPOLE - Disconnect Service at pole	C - Closed	Change of Service	HEALING FARM MINISTRIE...	08/21/2007	HEALING FARM M

SO Function	Service	Serv Loc #	Name	Default Serv Desc	Owner Cust #	Account	Service Status	To
Disconnect...	ELEC	21406	HEALING FARM MINISTRIE	10882 HWY 17 NORTH HOUSE	0	8126097001	41 - Inactive n...	

Disconnect

Initiate

Function: Available

Disconnect Equipment General Open Field(s) Workflow Activity Comments Close

Customer: 8126097 HEALING FARM MINISTRIES I Personal

Account: 8126097001

Home: (843) 509-9384 Mobile:

Business: Fax:

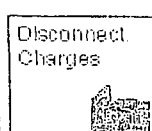
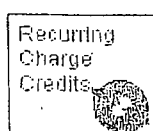
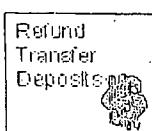
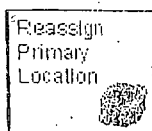
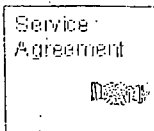
E-Bill E-Mail Addr:

Address: PO BOX 12810, CHARLESTON, SC 29422

Additional Name:

Service Provider	Current Service Status	Service S
HEALING FARM MINISTRIES INC	HEALING FARM MINISTRIES INC	HEALING FARM MINISTRIES INC

Disconnect For Nonpayment



Save

Reset

Add

Related

Print

Start Workflow

Quit Screenflow

Show Workflow

File View Help

SO Number: 079952

SECURITY LIGHT OUT

Job Number: 1714024

Requested By: HEALING FARM 林林林

Date Taken: 02/18/07 14:14

141
142
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Closed: AWSO: 02/27/07: 09:24 AM

Date Desired: 02/16/07

Date Closed: 02/16/07

details

Reference

Customer

Name: HEALING FARM MINISTRIES INC.

Business:

FAX:

 $\text{C/O}:$

Home: 843-722-0000

Pager:

Address:

Mobile:

Other

PO BOX 12810

E-mail: 1

CHARLESTON, S.C.

E-mail: 2

Zip:

29422:2810:

Owner

Location	24594001
Read Seq	56076500
Svc Addr	10882 HWY 17 NORTH HOUSTON
Police No	24594005
District	17
Officer	1034
Meter	97429705
Demand	Not Demanded
Inventory	In the Field

Yard Lights

Card	Type	Number	KWH	Amount
1	16	7		
2	26	3		

Notes: FRI FEB 16 2007 12:41 PM Created By: BOUVIAR

Taken By: J. C. L. Y. 10/15/61

Lines Printed:

Department: SCSO

Route To:

District: 17

Print To:

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Add

Discontinued - 923378		File View Functions Help																
SO Number:	923378	Requested By:	KEVIN PARKS															
Job Number:		Date Desired:	08/21/07															
Mbr. Gap:	8128097-01	Disc Non Pay:																
Customer:	Details	Date Taken:	08/21/07															
		Date Closed:	08/21/07															
		Reference:	923378															
Closed, AWSO: 08/23/07 12:22 PM																		
Details																		
Name:	HEALING FARM MINISTRIES INC	Business:																
C/O:		Home:	843-509-9394															
Address:		Mobile:																
	PO BOX 2810	E-mail 1:																
	CHARLESTON SC	E-mail 2:																
Zip:	29422-2810	SSN:																
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		Bug ID:	320029626															
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Consumer Dep:																		
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Department:		Route To:																			
District:		Print To:																			

File Edit Tools Help									
Account	Order Item To	Budget Master	Checks	Construction Unit	Customer	General Plan	Invoices		
Job	Material	PO Inquiry	Pole	Pole Actions	Project	PO Receiving	Record Unit		
Ship To Code	Task	Vendor	Vendor	Vendor	Work Order Type	Work Plan	AP Inquiry		
CA		CC					General Accounting		

Option: Job Name Starting With: Search Add Display: Standard List Customize

Specific Job Number:

Job Name	Job Nbr	Location	Desired	Applied	Start	Notes	Add
YERGIN JAMES	10957	24595001	01/27/93	01/27/93	01/27/93		
YERGIN JAMES	10999	24594005	01/29/93	01/29/93	01/29/93		
YERGIN JAMES	63657	2695800	07/02/03	07/02/03	07/02/03		
YERGIN JAMES II (400KMY/POLE	60188	26958020	08/29/04	08/05/04	08/12/04		
YERGIN JAMES II (OH) LG SERV	65877	26958018	02/03/04	11/13/03	02/03/04		
YERICH ALVIN K.	13131	23131005	11/04/91	10/31/91	11/04/91		

Select a job for detail.

Job Detail: Status: Estimate: Standing

Job Number:	10957	Status:	1-SC	Staked Date:	01/27/93	Cost Estimates
Job Name:	YERGIN JAMES	County:	2	Staked By:	RT	Location:
Telephone:		City:		Sold to Staking:		Material:
		Tax District:	712	CIA Required:	No Yes	Overhead:
Estimate job only:	No Yes	Type:	Overhead Undergirding	CIA Amount:		Hours:
Work Order Type:	10	Construction Co:	0-Utility	CIA Paid:		
Work Plan Nbr:	000100	Member Number:		Location:	24595001	
Application Date:	01/27/93	Service Order:		State Hwy Nbr:		
Desired Date:	01/27/93	Project:		Encasement:		
District:	7			Circuit:	1	
Warehouse:	7			Crew:	71	

Details: INST. OH-1-PRASE PR. & JAV LG SERV. 10982 HWY 17 NORTH

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File Edit Tools Help		1690	
Account	Budget Item ID	Budget Master	Construction Unit
Job	Material	PO Inquiry	PO
Ship To Code	Task	Vehicle	Vehicle Parts
CA		CC	
		General Accounting	

Option: Job Name Starting With: Search Add Display: Standard List Customize

Specific Job Number

Job Name	Job No.	Location	Desired	Applied	Started	Notes
YERGIN JAMES	1326	2459409	04/14/89	04/14/89	04/14/89	
YERGIN JAMES	13623	24595003	12/10/91	12/10/91	12/10/91	
YERGIN JAMES	13624	24595003	12/10/91	12/10/91	12/10/91	
YERGIN JAMES	13766	24594006	12/19/91	12/19/91	12/19/91	
YERGIN JAMES	18056	24594005	08/10/92	08/10/92	08/10/92	
YERGIN JAMES	18857	24594005	08/10/92	08/10/92	08/10/92	

Select a job for detail.

Job: 18857

Job Name: YERGIN JAMES

Telephone:

State: 1 SC

County: 2

City:

Tax District: 712

Type: Overhead

Construction Co: 0 - Utility

Member Number:

Service Order:

Project:

Started Date: 01/27/93

Started By: RT

Send to Skating:

CIA Required: No

CIA Amount:

CIA Paid:

Location: 24595001

State Hwy Num:

Encumbr:

Circuit: 1

Crew: 71

Cost Estimates:

Labor: .00

Material: 1,278.68

Overhead: .00

Holds: .00

Estimate Job Only: No Yes

Work Order Type: 10

Work Plan Num: 000100 Year: 89

Application Date: 01/27/93

Desired Date: 01/27/93

District: 7

Warehouse: 7

Description: INST. OH-1-PHASE PRI. & JAW UG SERV. NORTH

10992 HWY 17

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Service Order Notes

862811

Wed 12/20/2006 10:43 AM T YVONNER
THIS IS RELEASED BY CHAS COUNTY-3W 60 AMPS--PERMIT E152473
HATCHER ELECTRIC

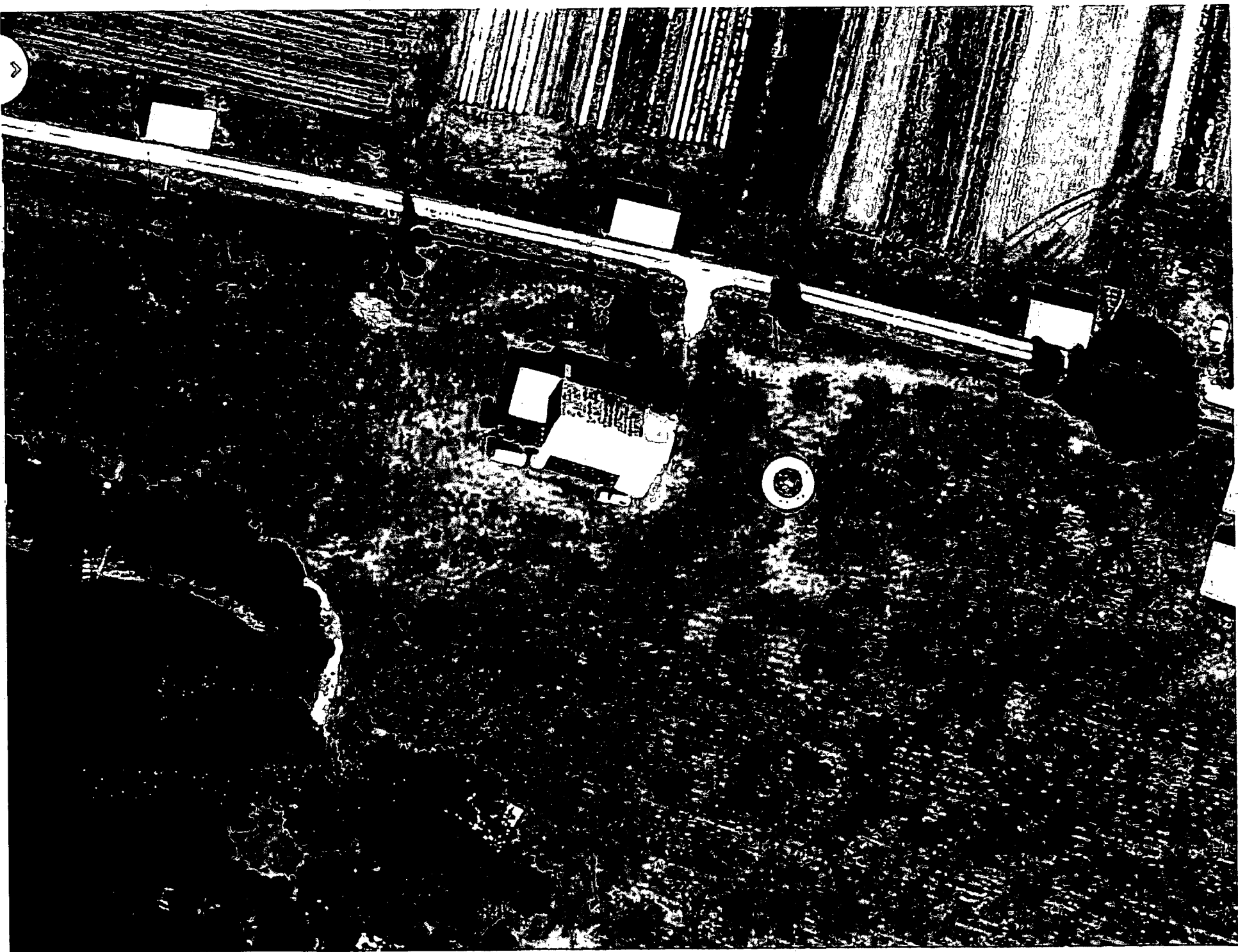
Mon 12/4/2006 4:25 PM T YAJAIRAT
GARY WANTS A SEPERATE METER INSTALL FOR HIS SIGN @ HIS FARM@ 10882
hwy17n(thornhill farm)PLS CALL HIM @224-2301 TO MEET U OUT THERE

Mon 12/4/2006 4:21 PM T YAJAIRAT
GARY WANTS A SEPERATE METER INSTALL FOR HIS SIGN @ HIS FARM.ROBERT
PLEASE CALL HIM @224-2301 TO MEET U OUT THERE

1691







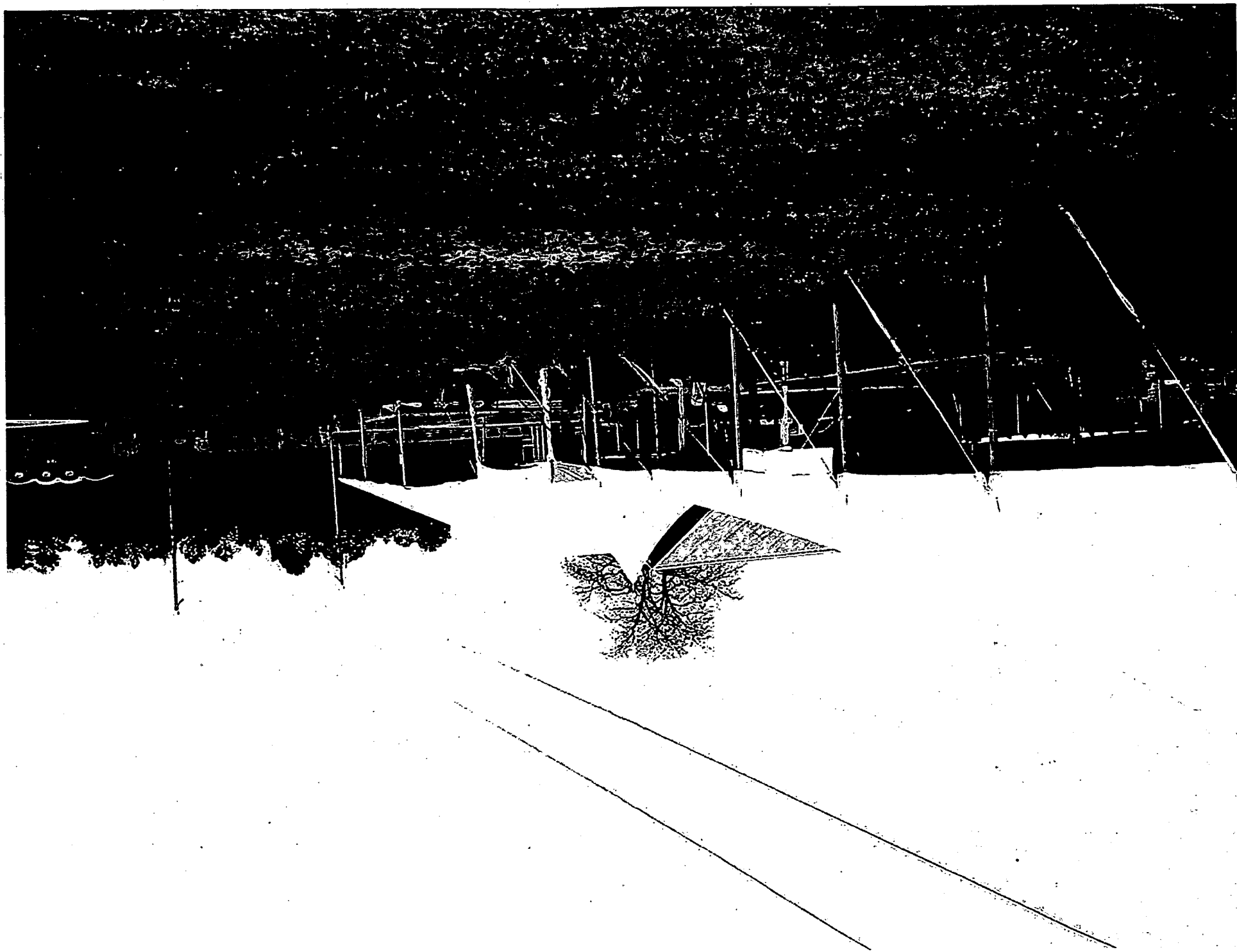
Showdeo Promotional Plan

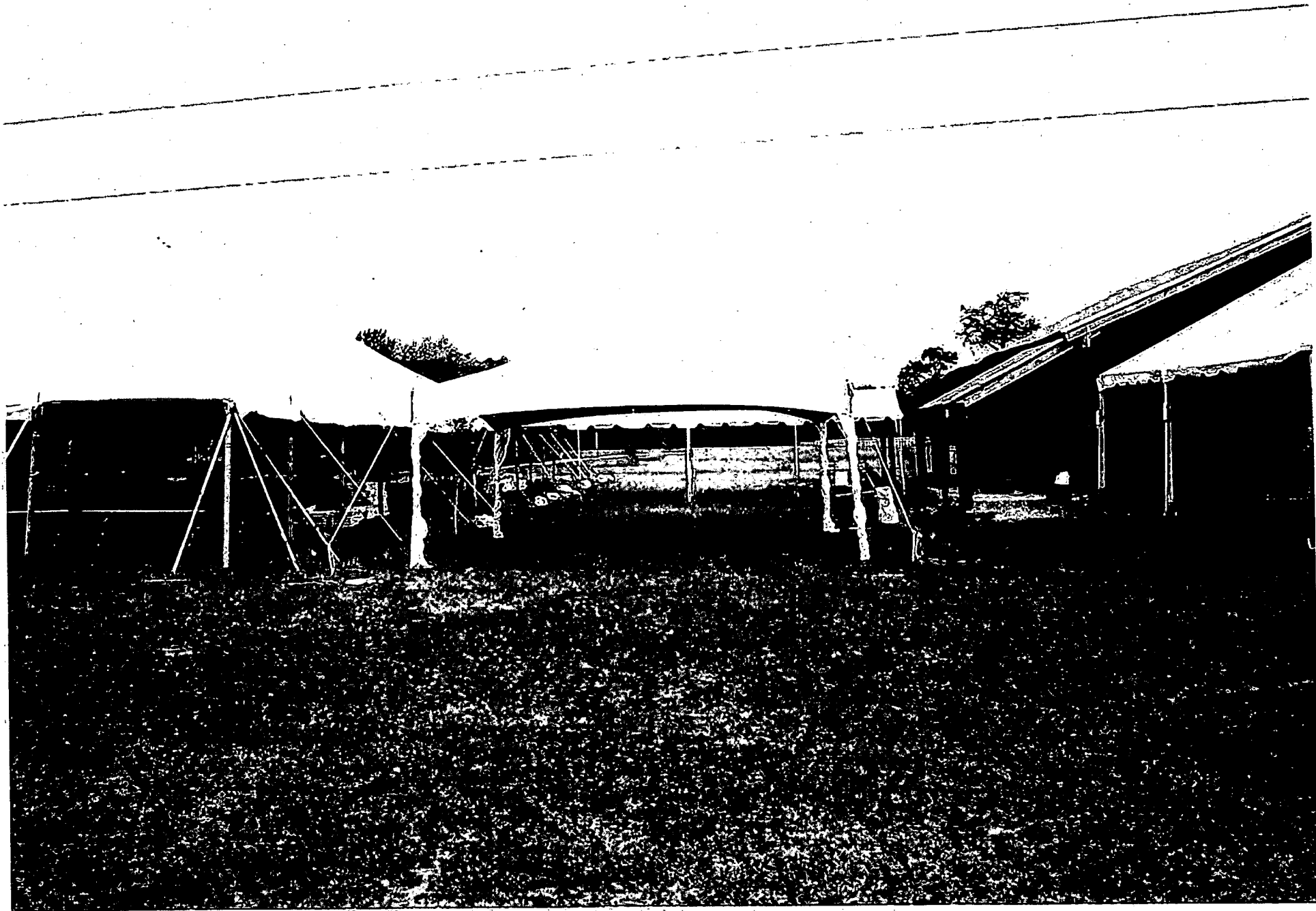
Revised: 2/28/08

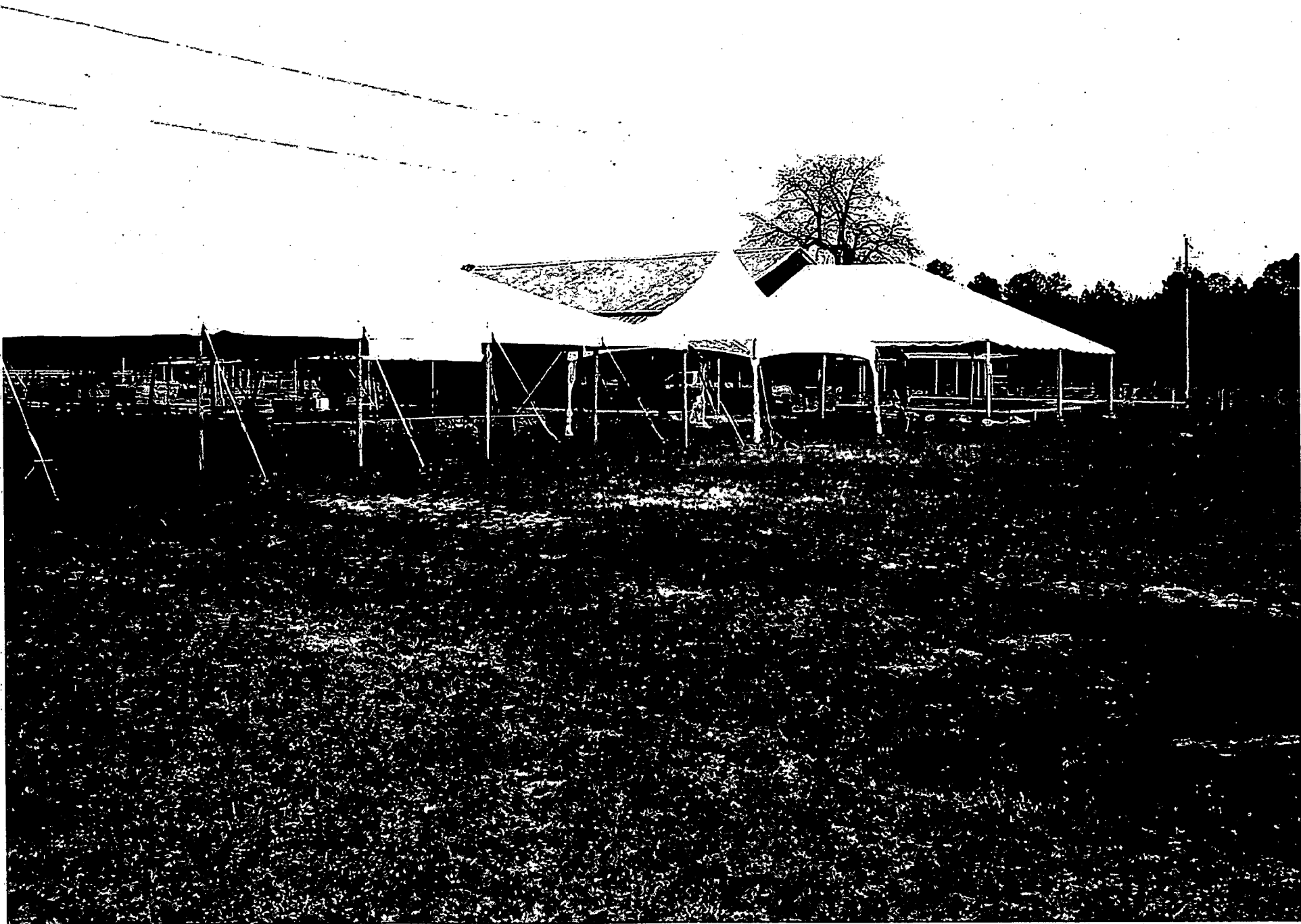
Medium	Vendor	Plan	Cost	Timing/Dates
Radio	WEZL	1. WEZL will visit the farm for a pre-promotion event. They may come and observe a work day, take pictures, shoot video. This will be the framework for radio discussions and promos. 2. We will get 21 radio mentions starting two weeks out. This will include radio banter during talk segments. The experience in item #1 above will be used as a basis for the talk pieces. This will be primarily on the morning show with TJ. 3. A 30 second radio PSA will be made at the station for use as a voice over for the TV PSA below.	Free with sponsorship recognition	1. TBD 2. April 14
TV	CBS Channel 5 Amanda Childs	1. Possible appearance of HFM rep on Live 5 at noon or other programs.	TBD	1. TBD 2. TBD
Internet		1. Banner on HFM web page. Will have revised poster, link to Acteva for ticket purchases, directions, etc. 2. Link to all sponsor web pages from HFM Showdeo web page. 3. Link on all sponsor web pages to HFM Showdeo page.	Small amount of John's time	1. ASAP
Print	Post & Courier	1. We purchase a communications package for \$2,000, and P&C will match it. 2. Inclusion in the Charleston Area Calendar of Community Events. 3. Possible Myrtle Beach/Pawleys/Georgetown outlets 4. Press releases to all media outlets, churches, missions groups and disabilities groups.	\$2,000	1. TBD 2. 3/10
Signage		1. Marquee on HWY 17 at Farm entrance with all sponsor names. 2. Posters to be distributed to all sponsor locations, churches, HFM "friends", and other public locations. 3. Tent signage for on-location tents	1. TBD 2. TBD 3. TBD	1. 3/15 2. 3/15 3. 4/18
Other	Various	1. Mail out to HFM database 2. Mail out to HFM newsletter with announcement 3. T-Shirts with sponsor names for all volunteers 4. Event brochure with sponsors featured	1. \$300 2. \$300 3. TBD 4. TBD	1. 4/1 2. 4/15 3. 4/18 4. 4/18

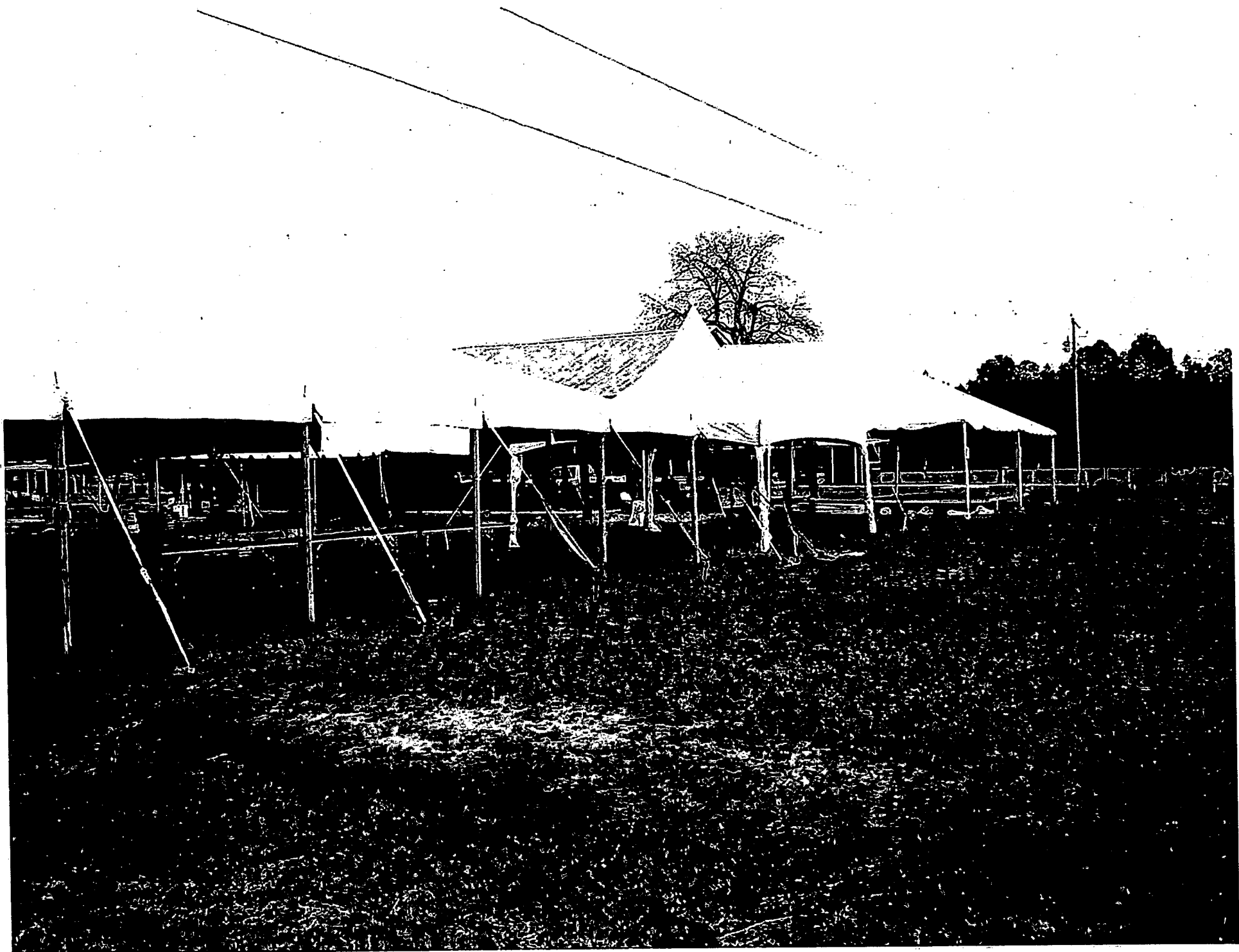
PLAINTIFF'S
EXHIBIT

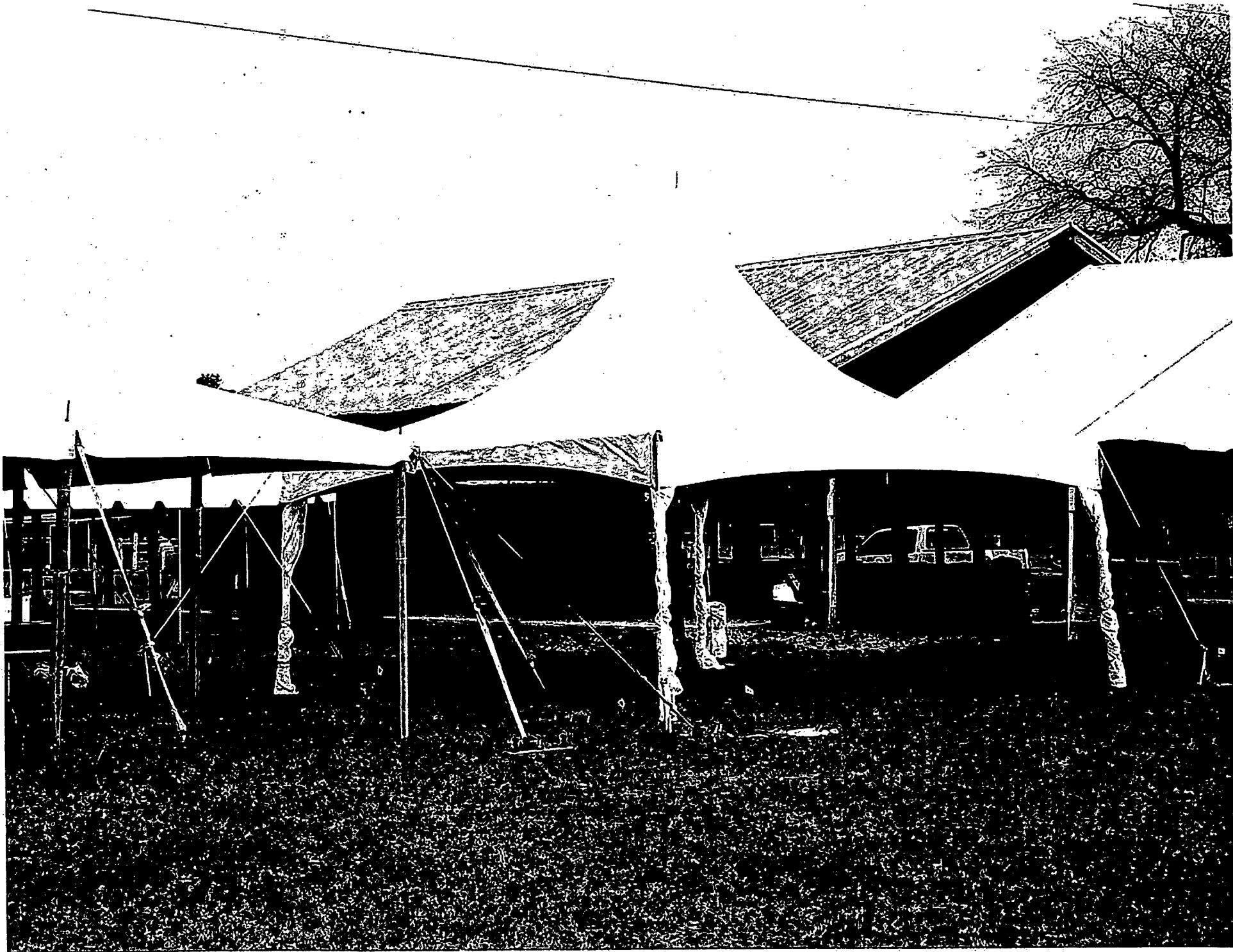
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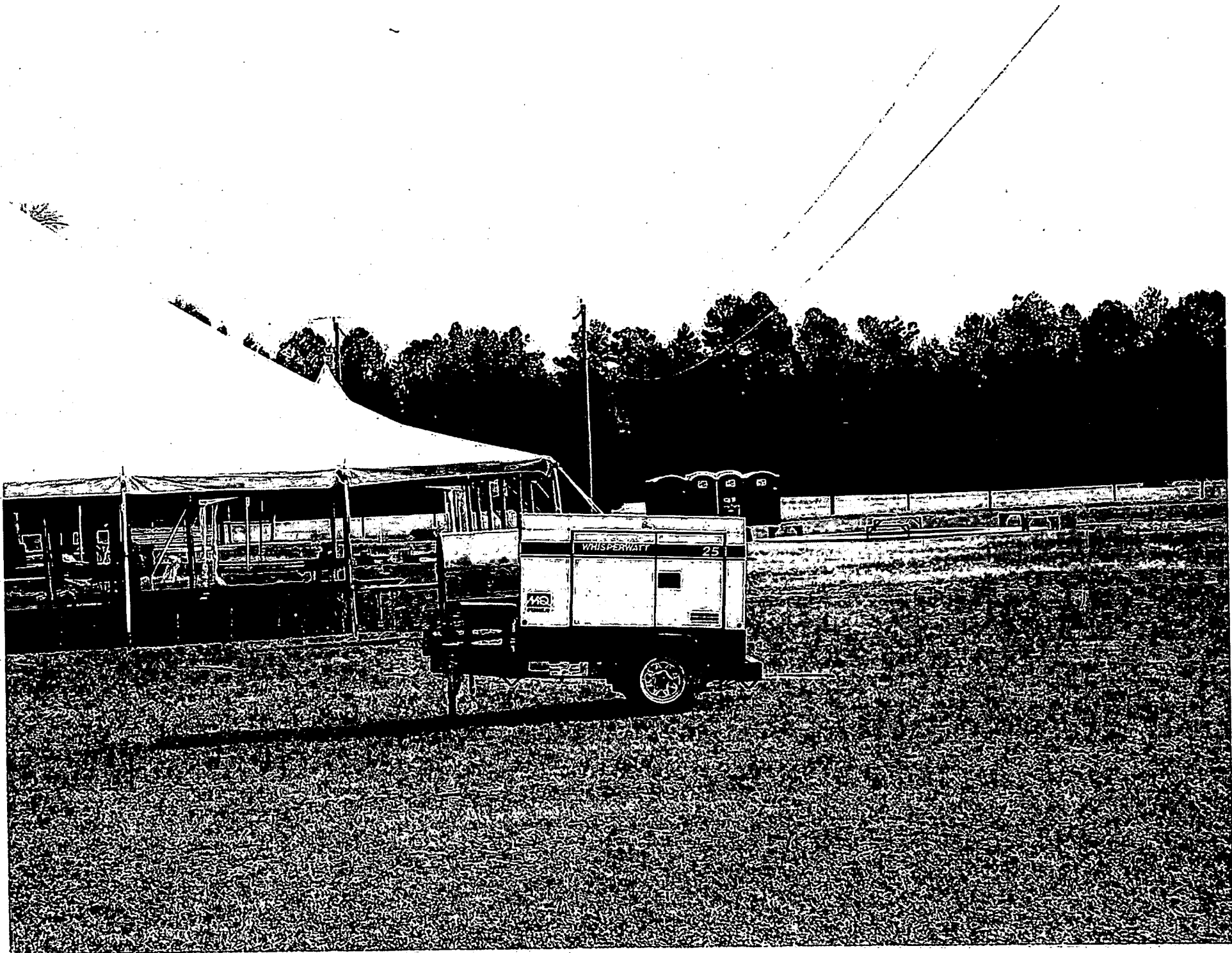


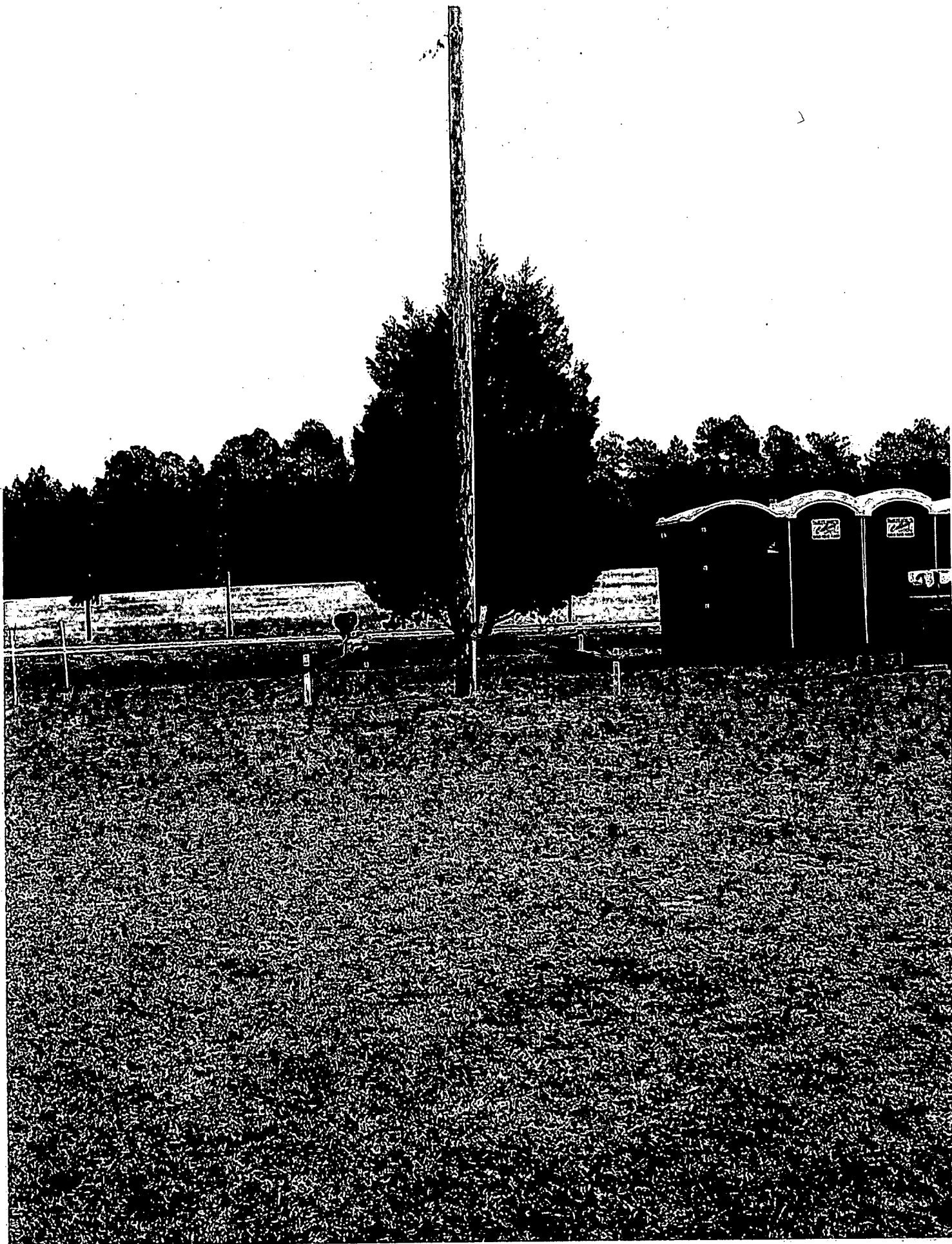












Cathleen M. Moore

Curriculum Vita

January 2014

11 Seashore Hall E, Dept of Psychology, University of Iowa, Iowa City, IA, 52242
Phone: (319) 335-2427 FAX: (319) 335-0191 Email: cathleen-moore@uiowa.edu
Website: www.psychology.uiowa.edu/labs/iapl

Present Position

2007-present Professor, Department of Psychology, University of Iowa

Previous Positions

2013 Visiting Faculty
 Dept. of Psych, University of Washington
2001 - 2007 Associate Professor
 Dept. of Psych, Pennsylvania State University
2003 Visiting Research Faculty
 Dept. of Psych, University of British Columbia
1996 - 2001 Assistant Professor
 Dept. of Psych, Pennsylvania State University
1994 - 1996 Postdoctoral Fellow
 Dept. of Psych, Johns Hopkins University
1989 - 1994 Graduate Student
 Dept. of Psych, University of California, San Diego
1989 Psychology Technician (summer)
 Lab. of Socio-Environmental Studies, NIH
1988 - 1989 Research Assistant/Lab Coordinator
 Dept. of Psych, Hamilton College

Education

1989 - 1994 University of California, San Diego; La Jolla, CA
 Ph.D. in Psychology; September, 1994
1986 - 1987 Malungs Folkhögskola; Dalarna, Sweden
 Scandinavian Seminar — University of Massachusetts, Amherst
1984 - 1988 Hamilton College; Clinton, NY
 B.A. in Psychology and Philosophy; May, 1988

Honors & Awards

APA Fellow (Division 3)	2005
Elected Member of Sigma Xi	2005
Distinguished Alumnus Medal (Hamilton College)	2005
APA Division 3 Young Investigator Award (<i>JEP:HPP</i> , 24)	1999
APA Division 3 Young Investigator Award – Hon. Ment. (<i>JEP:HPP</i> , 23)	1998
B. F. Skinner Senior Research Award in Psychology (Hamilton College)	1988
Babcock Senior Award in Philosophy (Hamilton College)	1988
Phi Beta Kappa	1988

**PLAINTIFF'S
EXHIBIT**

19

Grants and Fellowships

External

- 2013-2015 NIH (R21 1EY023750) – *Multisensory perception: Audiovisual interactions under dynamic conditions*, direct costs: \$275,000
- 2008-2012 NSF (BCS-0818536) – *The role of perceptual organization in dynamic representational updating* (PI), \$233,996
- 2003-2009 NIH (R01 MH067793) – *Attention and oculomotor control: Attentional resolution*, (PI), \$1,375,000
- 1998-2002 NSF (SBR-9728628) – *Visual attention and perception: Locations, objects, and organization*, (PI), \$198,000

Internal

- 2010-2011 Iowa Injury Prevention Research Center – Development of a validated video library for developing evidence-based surveillance training for lifeguards, (PI), \$15000.
- 2008-2009 Iowa Center for Research by Undergraduates Scholar Award, (sponsor; D. Anderson undergraduate recipient), \$2500.
- 2002-2003 Penn State RGSO faculty research grant – *The control of eye movements and attentional resolution*, (PI), \$5000.

Fellowships

- 1996-1997 NSF-NATO Postdoctoral Fellowship (declined)
- 1994-1996 NIH Postdoctoral Traineeship (Johns Hopkins University)
- 1993-1994 NIH Individual National Research Service Award
- 1990-1993 NSF Graduate Fellowship

Professional Memberships

American Psychological Association
American Psychological Society
Psychonomic Society
Sigma Xi
Vision Sciences Society

Professional Service

Editorial Service

- Editor-in-Chief
Psychonomic Bulletin & Review (2010-2013)
- Associate Editor
Psychonomic Bulletin & Review (2002-2005)
- Advisory Editor
Psychological Science (2009)
- Consulting Editor:
Journal of Experimental Psychology: HPP (1998-present)
Perception & Psychophysics (1997-present)
Visual Cognition (2005-present)

- Ad hoc reviewer for the following additional journals: *Acta Psychologica*, *American Journal of Psychology*, *Cognition*, *Cognitive Psychology*, *Consciousness & Cognition*, *Journal of Cognitive Neuroscience*, *Journal of Experimental Psychology: General*, *Journal of Vision*, *Journal of Experimental Child Psychology*, *Perception*, *Proceedings of the National Academy of Sciences*, *Psychonomic Bulletin & Review*, *Psychological Science*, *Spatial Vision*, and *Vision Research*

Other National and International Service

- Governing Board, Psychonomic Society (2011-present)
- Advisory Council, International Association for the Study of Attention and Performance (2011-present)
- Review Committee for the Vision Sciences Society meeting (2007-present)
- Cognition & Perception Study Section (2006-2010)
- Chair, APA Division 3 Fellows Committee (2007-2008)
- APA Division 3 awards committee (2004)
- Ad hoc Member, NIMH BBBP-4/Perc & Cog Study Section (2002-2005)
- National Review Panel for NSF-REU sites (1998)
- Ad hoc reviewer, National Science Foundation
- Ad hoc reviewer, National Science & Engineering Council (NSERC), Canada
- Ad hoc reviewer, Binational Science Foundation, Israel and United States
- panel on dual careers at 2003 meeting of the Psychonomic Society

Legal Consulting and Testimony

- Regarding visual perception and lifeguarding: Ephrata, WA (2005); Laurens, SC (2008-09); Santa Barbara, CA (2009); Austin, TX (2009-2010), Wisconsin Dells, WI (2010-11), Mantua, OH (2011-present)
- Regarding visual perception in a medical setting: Greenville, SC (2009)
- Regarding visual perception in airplane piloting: Salt Lake City, UT (2011-present)

Institutional Service (University of Iowa)

- Director of Graduate Studies (2008-present)
- Graduate Council (2013-present)
- Member of NSF ADVANCE Committee, CLAS (2013-present)
- Faculty Search Committee, Dev. Science and Cognition & Perception (2011-2012)
- Panel member (topic: securing funding) for New Faculty Orientation for CLAS (2011)
- Faculty Search Committee, Health (2010-11)
- Member of Department Review Committee, English and Iowa Writer's Workshop (2011)
- Member of University Task Force "Graduate and Professional Education: Selective Excellence" (2009-2010)
- Departmental Self-Study Committee (2009-2010)
- CLAS Student Computing Fees Committee, member (2008-2010)
- Faculty Search Committee, Clinical Psychology (2009-2010)

- Faculty Search Committee, Personality and Social Psychology (2008-2009)
- Faculty Search Committee for Developmental Science (2007-2008)
- Committee for Undergraduate Studies, member (2007-2008)

Institutional Service (Penn State University)

- Director of Graduate Studies (2006-2007)
- Department Planning and Advisory Committee to the Head, member (2002-2007)
- Tenure and Promotion Committee, member (2002-2007)
- Cognitive Area Coordinator (2001-2003)
- Subject Pool Coordinator (1996-1999)
- Undergraduate Honors Advisor (1997-1999)
- Faculty Search Committee (clinical), member (1998-1999)
- Faculty Search Committee (cognitive development), member (1996-1997)
- Department Head Search Committee, member (2006-2007)
- College Faculty Advisory Committee to the Dean, member (2006-2007)
- University Graduate Council, member (2006-2007)
- University Graduate Council Subcommittee on Academic Standards, member (2006-2007)
- Department of Psychology Faculty Representative on University NSF project for recruiting, mentoring and retaining underrepresented minority graduate students (2006-2007)

Journal Articles

- Hein, E. & Moore, C. M. (in press). Evidence for scene-based motion correspondence. *Attention, Perception, & Psychophysics*.
- Attarha, M., Moore, C. M., Scharff, A., & Palmer, J. (in press). Evidence of unlimited-capacity surface completion. *Journal of Experimental Psychology: Human Perception and Performance*.
- Scharff, A., Palmer, J., Moore, C. M. (2013). Divided attention limits perception of 3D object shapes. *Journal of Vision*, 13(2):18, 1–24, doi:10.1167/13.2.18.
- Hein, E. & Moore, C. M. (2012). Spatiotemporal priority revisited: The role of feature identity and similarity for object correspondence in apparent motion. *Journal of Experimental Psychology: Human Perception and Performance*, 38, 975-988. doi: 10.1037/a0028197
- Hirsch, H. L., & Moore, C. M. (2012). Simulating light source motion in single images for enhanced perceptual object detection. *Journal of Defense Modeling and Simulation*, 9, 269-278 DOI: 10.1177/1548512911431814
- Scharff, A., Palmer, J., & Moore, C. M. (2011). Object perception under divided attention: fixed capacity categorization of multiple animal images. *Psychonomic Bulletin & Review*, 18, 713-721. DOI: 10.3758/s13423-011-0101-1
- Yigit, S., Palmer, J., & Moore, C. M. (2011). Distinguishing blocking and attenuation in selective attention. *Psychological Science*, 22, 771-780. DOI: 10.1177/0956797611407927
- Scharff, A., Palmer, J., & Moore, C. M. (2011). Distinguishing parallel and serial processes using variations of the simultaneous-sequential paradigm. *Journal of Experimental Psychology: Human Perception and Performance*, 37, 813-833. DOI: 10.1037/a0021440

- Hein, E. & Moore, C. M. (2010). Lateral masking in cycling displays: The relative importance of separation, flanker duration and inter-stimulus interval for object-mediated updating. *Perception*, 39, 1330-1340.
- Moore, C. M., Stephens, T., & Hein, E. (2010). Features, as well as space and time, guide object persistence. *Psychonomic Bulletin & Review*, 17, 731-736.
- Lanagan-Leitzel, L. K., & Moore, C. M. (2010). Do lifeguards monitor the events that they should? *International Journal of Aquatic Research and Education*, 4, 241-256.
- Hein, E., & Moore, C. M. (2010). Investigating temporal properties of covert shifts of visual attention using the attentional walk task. *Psychonomic Bulletin & Review*, 17, 41-46.
- Attarha, M., & Moore, C. M. (2010). Testing capacity limitations of surface completion using the simultaneous-sequential method. (Paper published as part of Object Perception and Memory conference report) *Visual Cognition*, 18, 1487-1491.
- Hein, E., & Moore, C. M. (2009). Unmasking the standing wave of invisibility. *Attention, Perception & Psychophysics*, 71, 971-983.
- Hein, E. & Moore, C. M. (2009). Explicit eye movements failed to facilitate the precision of attentional localization. *Experimental Brain Research*, 197, 387-393.
- Moore, C. M., Hein, E., Grosjean, M., Rinkenauer, G. (2009). Limited influence of perceptual organization on the precision of attentional localization. *Attention, Perception & Psychophysics*, 71, 971-983.
- Palmer, J. & Moore, C. M. (2009). Using a filtering task to measure the spatial extent of attention. *Vision Research*, 49, 1045-1064.
- Moore, C. M. & Lanagan-Leitzel, L. K. & Fine, E. M. (2008). Distinguishing between the precision of attentional localization and attentional resolution. *Perception & Psychophysics*, 70, 573-582.
- Chen, P., Moore, C. M., Mordkoff, J. T. (2008). On the Spatial Metric of Short-SOA Costs of Exogenous Cuing. *American Journal of Psychology*, 121, 229-240.
- Moore, C. M., Mordkoff, J. T., & Enns, J. T. (2007). The path of least persistence: Evidence of object-mediated visual updating. *Vision Research*, 47, 1624-1630. DOI: 10.1016/j.visres.2007.01.030
- Moore, C. M., Lanagan-Leitzel, L. K., Chen, P., Halterman, R., & Fine, E. F. (2007). Nonspatial attributes of stimuli can influence spatial limitations of attentional control. *Perception & Psychophysics*, 69, 363-371.
- Lleras, A., & Moore, C. M. (2006). What you see is what you get: Functional equivalence of a perceptually filled-in surface and a physically presented stimulus. *Psychological Science*, 17, 876-881.
- Moore, C. M., & Fulton, C. (2005). The spread of attention to hidden portions of occluded surfaces. *Psychonomic Bulletin & Review*, 12, 301-306.
- Moore, C. M., & Lleras, A. (2005). On the role of object representations in substitution. *Journal of Experimental Psychology: Human Perception and Psychology*, 31, 1171-1180.
- Lleras, A., Moore, C. M., & Mordkoff, J. T. (2004). Looking for the source of the Simon effect: Evidence for multiple codes. *American Journal of Psychology*, 117, 531-542.
- Moore, C. M. & Enns, J. T. (2004). Substitution masking and the flash-lag effect. *Psychological Science*, 15, 866-871.

- Moore, C. M., Lleras, A., Grosjean, M., & Marrara, M. T. (2004). Using inattention blindness as an operational definition of unattended: A response-end effect. *Visual Cognition*, 11, 705-719.
- Osman, A., Moore, C. M., Ulrich, R. (2003). Temporal organization of covert motor processes during response selection and preparation. *Biological Psychology*, 64, 47-75.
- Marrara, M. T., & Moore, C. M. (2003). The role of the directional cue in the two-rectangles method of assessing object-based selection. *Perception & Psychophysics*, 65, 1103-1109.
- Lleras, A., & Moore, C. M. (2003). When the target becomes a mask: Using apparent motion to isolate the object component of object-substitution masking. *Journal of Experimental Psychology: Human Perception and Performance*, 29, 106-120.
- Moore, C. M., Grosjean, M., & Lleras, A. (2003). Using inattention blindness as an operational definition of unattended: The case of perceptual completion. *Visual Cognition*, 10, 299-318.
- Brown, L. E., Moore, C. M., & Rosenbaum, D. A. (2002). Differential Processing of color and depth for recognition and action. *Journal of Experimental Psychology: Human Perception and Performance*, 29, 106-120.
- Moore, C. M., Elsinger, C. E., & Lleras, A. (2001). Spatial attention and the apprehension of spatial relations: The case of depth. *Perception & Psychophysics*, 63, 595-606.
- Moore, C. M. (2001). Inattention Blindness: Perception or memory and what does it matter? *Psyche: An Interdisciplinary Journal of Research on Consciousness*, 7.
- Moore, C. M., & Brown, L. E. (2001). Preconstancy information can influence visual search: The case of lightness constancy. *Journal of Experimental Psychology: Human Perception and Performance*, 27, 178-194.
- Marrara, M. T., & Moore, C. M. (2000). Role of perceptual organization while attending in depth. *Perception & Psychophysics*, 62, 786-799.
- Moore, C. M. (1999). Cognitive impenetrability of early vision does not imply cognitive impenetrability of perception. *Behavioral and Brain Sciences*, 2, 385-386.
- Moore, C. M. & Egeth, H. (1998). How does feature-based attention affect visual processing? *Journal of Experimental Psychology: Human Perception and Performance*, 24, 1296-1310.
- Moore, C. M., Yantis, S., & Vaughan, B. (1998). Object-based visual selection: Evidence from perceptual completion. *Psychological Science*, 9, 104-110.
- Moore, C. M., & Egeth, H. (1997). Perception without attention: Evidence of grouping under conditions of inattention. *Journal of Experimental Psychology: Human Perception and Performance*, 23, 339-352.
- Moore, G. M., Egeth, H., Berglan, L., & Luck, S. J. (1996). Are attentional dwell times inconsistent with serial visual search? *Psychonomic Bulletin & Review*, 3, 360-365.
- Moore, C. M. (1996). Does negative priming imply preselective identification of irrelevant stimuli? *Psychonomic Bulletin & Review*, 3, 91-94.
- Vaughan, J., Rosenbaum, D. A., Diedrich, F. J., & Moore, C. M. (1996). Cooperative selection of movements: The optimal selection model. *Psychological Research*, 58, 254-273.
- Osman, A., Moore, C. M., & Ulrich, R. (1995). Bisecting RT with lateralized readiness potentials: Precue effects after LRP onset. *Acta Psychologica*, 90, 111-127.

- Moore, C. M. (1994). Negative priming depends on probe-trial conflict: Where has all the inhibition gone? *Perception & Psychophysics*, 56, 133-147.
- Ulrich, R., Moore, C. M., & Osman, A. M. (1994). Lateralized readiness potential and reaction time: The effect of partial response cues. *The German Journal of Psychology*, 18, 36-37.
- Moore, C. M., & Osman, A. M. (1993). Looking for two targets at the same time: One search or two? *Perception & Psychophysics*, 53, 381-390.
- Osman, A. M., & Moore, C. M. (1993). The locus of dual-task interference: Psychological refractory effects on movement-related brain potentials. *Journal of Experimental Psychology: Human Perception and Performance*, 18, 1292-1312.
- Ulrich, R., Moore, C. M., & Osman, A. M. (1993). Lateralisiertes Bereitschaftspotential und Reaktionsgeschwindigkeit bei partieller Vorinformation eines Handlungsparameters. *Zeitschrift für Experimentelle und Angewandte Psychologie*, 40, 310-325.
- Andrzejewski, S. J., Moore, C. M., Corvete, M., & Herrmann, D. (1991). Prospective memory skill. *Bulletin of the Psychonomic Society*, 29, 304-306.
- Petro, S. J., Herrmann, D., Burrows, D., & Moore, C. M. (1991). Usefulness of commercial memory aids as a function of age. *International Journal of aging and human development*, 33, 295-309.

Book Chapters and Reviews

- Moore, C. M. (2010). *Attention and consciousness*, (pp 112-115), in B. Goldstein (Ed.) *Encyclopedia of Perception*, Sage Publications.
- Moore, C. M. (2009). Inattentional Blindness in *Oxford Companion to Consciousness*. A. Cleermans, T. Bayne, & P. Wilken (Eds.): Oxford University Press: Oxford, UK.
- Enns, J. T., Lleras, A., & Moore, C. M. (2009). Object updating: A force for perceptual continuity and scene stability in human vision. In *Issues of space and time in perception and action*. R. Nijhawan (Ed.): Cambridge University Press: Cambridge, UK.
- Moore, C. M. (2004). Objects, objects everywhere, so what are we to think? *Objects and attention* by Brian J. Scholl (Ed.). *Contemporary Psychology*.
- Moore, C. M. (2001). Extensive and fresh coverage, but lacks theoretical focus: *Visual Attention* by Richard D. Wright (Ed.). *Contemporary Psychology*, 46, 147-149.
- Moore, C. M., & Wolfe, J. M. (2001). Getting beyond the serial/parallel debate in visual search: A hybrid approach. In K. Shapiro (Ed.) *The limits of attention: Temporal constraints on human information processing*. (pp. 178-198) Oxford: Oxford University Press.

Outreach publications

- Griffiths, T., & Moore, C. M. (2004). A matter of perception: Why lifeguards sometimes fail to see victims on the bottom of the pool. *Aquatics International*, 16, 14-15.
- Moore, C. M., & Lanagan-Letizel, L. K. (2006). Research refutes 'Misconceptions'. *Aquatics International*. 18, 10-11.

Doctoral Dissertation

- Moore, C. M. (1994). *Negative Priming: Evidence for post-categorical inhibitory selection?* Unpublished doctoral dissertation, University of California, San Diego, La Jolla, CA.

Manuscripts Under Review

- Attarha, M., Moore, C. M., Vecera, S. P. (in press). The limited statistician: Visual summary statistics of size engage fixed-capacity processes. *Journal of Experimental Psychology: Human Perception and performance*.
- Lanagan-Leitzel, L. K., Skow, E., Moore, C. M. (in revision). Great expectations: Perceptual challenges of visual surveillance in lifeguarding. *Applied Cognitive Psychology*.
- Moore, C. M., Hein, E., & Gilchrist, A. (in revision). Is visual search influenced by raw luminance? Turns out probably not. *Journal of Experimental Psychology: Human Perception and Performance*.
- Palmer, J., Boston, B., & Moore, C. M. (in revision). Limited capacity for memory of multiple features within a single object. *Attention, Perception, & Psychophysics*.

Manuscripts In Preparation

- Moore, C. M., Stephens, T., & Hein, E. (in preparation). Object Correspondence: Using perceived causality to infer how the visual system knows what went where when? *Journal of Experimental Psychology: Human Perception and Performance*.
- Hein, E., Stephens, T., & Moore, C. M., (in preparation). Object correspondence is influenced by perceived size. *iPerception*.
- Jardine, N., & Moore, C. M. (in preparation). Severe loss of instantaneous state information in dynamic visual search. *Attention, Perception, & Psychophysics*.
- Attarha, M., Moore, C. M., & Vecera, S. P. (in preparation). Limited window of integration for perceived summary statistics over time. *Attention, Perception, & Psychophysics*.
- Attarha, M., & Moore, C. M. (in preparation). Binocular rivalry is biased by motion direction but not motion pattern.
- Moore, C. M., Stephens, T., & Hein, E. (in preparation). When two are one and one is two: Exploring correspondence processes in apparent motion and object perception.
- Yigit-Elliott, S. Palmer, J., Moore, C. M. (in preparation). Selection occurs through blocking in a color flanker task.
- Hein, E., Hollingworth, A., & Moore, C. M. (in preparation). Contents of visual working memory influence perceived motion in Ternus displays.
- Moore, C. M., & Palmer, J. (in preparation). Toward a general theory of divided visual attention.

Colloquia (2002 – present)

- October 2013, Edwards Lecture, University of Washington, Seattle, WA
- May 2012, Keynote Address, bi-annual Show Me Mental State conference, St. Louis, MO
- April 2011, Department of Psychology, New York University, New York, NY
- November 2010, Keynote Address at OPAM (Object Perception and Memory) annual meeting in St. Louis, MO
- October, 2010, UC, Berkley, 2010 Irvin Rock Memorial Lecture
- June 2009, Salk Institute, University of California, San Diego, La Jolla, CA
- February 2007, Department of Psychology, University of Illinois, Champaign-Urbana

May 2007, Visual Cognition Group, Dept. of Psychology, Yale University, New Haven, CT
January 2007, Department of Psychology, University of Iowa, Iowa City, IA
December 2006, Center for Cognitive Neuroscience, Duke University, Durham, NC
November 2006, Dept. of Psychology, Michigan State University, Lansing, MI
October 2005, Science Building Dedication, Hamilton College, Clinton NY
January 2005, International Conference on Attentional Control at the National Chun-Chang University Chia-Yi, Taiwan.
July 2004, Department of Psychology, University of Arizona, Tucson, AZ
April 2003, Vision and Cognition Group, Dept. of Psych, Univ. of Washington, Seattle, WA
April 2003, Vision Lab, Dept of Psych, UBC, Vancouver, British Columbia
January 2003, Vision Group, Dept. of Psych, UBC, Vancouver, British Columbia
April 2002, Department of Psychology, Hamilton College, Clinton, NY

Presentations at Academic Meetings

- Jardine, N., & Moore, C. M. (2013). Do perceptually organized surfaces drive oculomotor behavior? Poster presented at the Annual OPAM meeting (Object Perception and Memory), Toronto, Ontario, Canada.
- Moore, C. M., & Chung, A. (2013). The role of perceptual organization in crowding. Talk presented at the 13th Annual Meeting of the Vision Sciences Society, Naples, Florida.
- Jardine, N., & Moore, C. M. (2013). Is search over time functionally equivalent of search over space? Poster presented at the 12th Annual Meeting of the Vision Sciences Society, Naples, Florida.
- Hein, E., Hollingworth, A., & Moore, C. M. (2013). The influence of visual working memory on the Ternus display. Poster presented at the 12th Annual Meeting of the Vision Sciences Society, Naples, Florida.
- Palmer, J., Scharff, A., & Moore, C. M. (2012). Divided attention for shape perception: Limited by objects and locations? Paper presented at the 53rd Annual Meeting of the Psychonomics Society, Minneapolis, MN.
- Moore, C. M., & Chung, A. (2012). The role of object representations in visual crowding. Paper presented at the 53rd Annual Meeting of the Psychonomics Society, Minneapolis, MN.
- Lanagan-Leitzel, L. K., Skow, E., Moore, C. M. (2012). Great expectations: Perceptual challenges of visual surveillance in lifeguarding. Poster presented at the 53rd Annual Meeting of the Psychonomics Society, Minneapolis, MN.
- Yigit-Elliott, S., Palmer, J., Moore, C. M. (2012). Failures of selection can account for color flanker effect. Poster presented at the 53rd Annual Meeting of the Psychonomics Society, Minneapolis, MN.
- Attarha, M., Vecera, S. P., & Moore, C. M. (2012). Summary statistics computed across time are restricted to a 600 ms window. Poster presented at the 53rd Annual Meeting of the Psychonomics Society, Minneapolis, MN.
- Attarha, M., & Moore, (2012). What next? Binocular rivalry is biased by motion direction but not motion pattern. Poster presented at the 12th Annual Meeting of the Vision Sciences Society, Naples, Florida.

- Jardine, N., Skow, E., Attarha, M., Lanagan-Leitzel, L. K., Moore, C. M. (2012). Visual surveillance: What limits the perception of instantaneous information in dynamic displays? Poster presented at the 12th Annual Meeting of the Vision Sciences Society, Naples, Florida.
- Scharff, A., Palmer, J., & Moore, C. M. (2012). Divided attention limits perception of object shape. Poster presented at the 12th Annual Meeting of the Vision Sciences Society, Naples, Florida.
- Skow, E., & Moore, C. M. (2012). Visual surveillance: The effect of delayed target onset in a change-detection task. Poster presented at the 12th Annual Meeting of the Vision Sciences Society, Naples, Florida.
- Yigit-Elliott, S., Palmer, J., Moore, C. M. (2012). Understanding the failures of selection-attention: The flanker congruency effect is consistent with failures of selection not perceptual interactions. Poster to be presented at the 12th Annual Meeting of the Vision Sciences Society, Naples, Florida.
- Moore, C. M., Skow, E., Lanagan-Leitzel, L. K., Attaraha, M. (2011). Severe loss of instantaneous information in a dynamic visual surveillance task. Paper presented at the 52nd Annual Meeting of the Psychonomics Society, Seattle, WA.
- Tas, C., Moore, C. M., & Hollingworth, A. (2011). The role of surface features information in object persistence across saccades. Poster presented at the 11th Annual Meeting of the Vision Sciences Society, Naples, Florida.
- Scharff, A., Palmer, J., Moore, C. M. (2011). Object identification has fixed capacity: Evidence for serial processing in the formation of perceptual objects. Poster presented at the 11th Annual Meeting of the Vision Sciences Society, Naples, Florida.
- Hein, E., Moore, C. M., & Gilchrist, A. Is visual search influenced by raw luminance information? Poster presented at the annual meeting of the Applied Vision Association, Paris, France (2010).
- Scharff, A., Palmer, J., & Moore, C. M. (2010). Visual categorization of objects has fixed capacity. Poster presented at the 51st Annual Meeting of the Psychonomics Society, St. Louis, MO.
- Attaraha, M., & Moore, C. M. (2010). Testing capacity limitations of surface completion using the simultaneous-sequential method. Paper presented at the Annual OPAM meeting (Object Perception and Memory), St. Louis, MO.
- Palmer, J., & Moore, C. M. (2010). Selective attention to transparent motion is by blocking and not by attenuation. Paper presented at the 10th Annual Meeting of the Vision Sciences Society, Naples, Florida.
- Hein, E., & Moore, C. M. (2010). The role of mid-level representations in resolving object correspondence. Paper presented at the 10th Annual Meeting of the Vision Sciences Society, Naples, Florida.
- Hein, E., & Moore, C. M. (2009). Object-based cueing effects depend on peripheral cues. Poster presented at the 50th Annual Meeting of the Psychonomic Society, Boston, MA.
- Moore, C. M., Stephens, T., & Hein, E. (2009). Exploring object correspondence in dynamic displays. Paper presented at the 50th Annual Meeting of the Psychonomic Society, Boston, MA.
- Hein, E. & Moore, C. M. (2009) The role of scene-based versus image-based information in motion correspondence. Poster presented at the European Conference on Visual Perception, Regensburg, Germany.

- Lanagan-Leitzel, L. K., & Moore, C. M. (2009). Novice and expert performance on a computerized lifeguarding task: A second look. Poster presented at the 9th Annual Meeting of the Vision Sciences Society, Naples, Florida.
- Anderson, D. & Moore, C. M. (2009). Dissociation between figure and ground during binocular rivalry. Poster presented at the 9th Annual Meeting of the Vision Sciences Society, Naples, Florida.
- Stephens, T., & Moore, C. M. (2009). Using surface features to disambiguate what went where in the perception of causality. Poster presented at the 9th Annual Meeting of the Vision Sciences Society, Naples, Florida.
- Hein, E. & Moore, C.M. (2009). Do surface features help? How the visual system disambiguates ambiguous motion. Poster presented at the 9th Annual Meeting of the Vision Sciences Society, Naples, Florida.
- Moore, C.M., Stephens, T., Hein, E. (2009). Disrupting surface features disrupts established object representations. Poster presented at the 9th Annual Meeting of the Vision Sciences Society, Naples, Florida.
- Hein, E., & Moore, C. M. (2008). Using the standing wave illusion to explore correspondence cues in apparent motion. Poster presented at the 49th Annual Meeting of the Psychonomic Society, Chicago, IL
- Yigit, S., Moore, C. M., & Palmer, J. (2008). Spatial filtering and partially valid cueing reveal different kinds of selection. Paper presented at the 49th Annual Meeting of the Psychonomic Society, Chicago, IL.
- Moore, C. M. (2008). Using the Simon Effect to measure inattentional processing. Responding to the source of stimulation: An interdisciplinary conference in tribute to J.Richard Simon, Iowa City, IA.
- Hein, E. & Moore, C.M. (2008, August). *Unmasking the standing wave illusion: the role of apparent motion*. Poster presented at the 31st European Conference on Visual Perception, Utrecht, Netherlands.
- Grosjean, M., Rinkenauer, G., Moore, C.M. & Hein, E. (2008, August). *Spatial Control of attention in depth*. Poster presented at the 31st European Conference on Visual Perception, Utrecht, Netherlands.
- Yigit, S., Palmer, J., & Moore, C. M. (2008). Partially valid cueing and spatial filtering reveal different kinds of selection. Talk presented at the annual meeting of the Cognitive Science and Interdisciplinary Learning conference, Hood River, OR.
- Hein, E., Moore, C. M., & Palmer, J. (2008). Perceptual structure facilitates spatial filtering. Talk presented at the annual meeting of the Cognitive Science and Interdisciplinary Learning conference, Hood River, OR.
- Yigit, S., Palmer, J., & Moore, C. M. (2008). Partially valid cueing and spatial filtering reveal different kinds of selection. Poster presented at the 8th annual meeting of the Vision Sciences Society, Naples, FL.
- Lanagan-Leitzel, L. K., & Moore, C. M., (2008). Novice and expert performance on a computerized lifeguarding task. Poster presented at the 8th annual meeting of the Vision Sciences Society, Naples, FL.
- Hein, E., Moore, C. M., & Palmer, J. (2008). Perceptual structure facilitates spatial filtering. Poster presented at the 8th annual meeting of the Vision Sciences Society, Naples, FL.

- Moore, C. M., & Stephens, T. (2008) When two are one and one is two: Apparent motion, visible persistence, and scene organization. Poster presented at the 8th annual meeting of the Vision Sciences Society, Naples, FL.
- Hein, E. & Moore, C. M. (2007). Feature migration in the standing wave illusion. Poster presented at the 48th Annual Meeting of the Psychonomic Society, Long Beach, CA.
- Palmer, J., & Moore, C. M. (2007). Using foils to measure spatial tuning functions for visual attention. Paper presented at the presented at the 48th Annual Meeting of the Psychonomic Society, Long Beach, CA.
- Moore, C. M., & Stephens (2007). How robust is apparant motion across stimulus change? Poster presented at the 7th annual meeting of the Vision Sciences Society Meeting, Sarasota, FL.
- Hein, E. & Moore, C. M. (2007). Spatial limits of shifting attention as revealed through the attentional walk task. Poster presented at the 7th annual meeting of the Vision Sciences Society Meeting, Sarasota, FL.
- Palmer, J., & Moore, C. M. (2007). Evidence against contrast gain as the mechanism for ignoring foils in a selective attention task. Talk presented at the 2nd International Workshop on Visual Attention to be held in Buenos Aires, Argentina in March 2007.
- Chen, P., Moore, C. M., Mordkoff, J. T. (2006). On the Spatial Metric of Short-SOA Costs of Exogenous Cuing. Presented at the 16th annual Object Perception, Attention, and Memory conference, Houston, TX.
- Hein, E. & Moore, C. M. (2006) Involuntary attention does affect accuracy. Poster presented at the annual meeting of the Psychonomics Society, Houston, TX.
- Moore, C. M. & Lanagan, L. K. (2006). No evidence (so far) of accruing representations of change over time. Poster presented at the 6th annual meeting of the Vision Sciences Society in Sarasota, Florida.
- Fine, E. M. & Moore, C. M. (2006). Path length and number of saccades affect saccade accuracy Poster presented at the 6th annual meeting of the Vision Sciences Society in Sarasota, Florida.
- Fine, E. M., Yergunson, S., & Moore, C. M. (2005). Number of distractors and distractor spacing differentially affect attention and saccade tasks. Paper presented at the European Conference on Visual Perception in A Coruña, Spain.
- Fine, E. M., Yergunson, S., & Moore, C. M. (2005). Accuracy of eye movements does not parallel accuracy of attentional movements. Poster presented at the 13th annual European Conference on Eye Movements, in Bern, Switzerland.
- Moore, C. M. & Enns, J. T. (2005). The path of least persistence: Apparent release from motion deblurring caused by disrupted object continuity: Talk presented at the 5th annual meeting of the Vision Sciences Society in Sarasota, FL.
- Fine, E. M., Yergunson, S., & Moore, C. M. (2005). Poor saccadic control in a simple search task. Poster to be presented at the 5th annual meeting of the Vision Sciences Society in Sarasota, FL.
- Chen, P., Mordkoff, J. T., Moore, C. M. (2005). Responding to the second of two events: The farther away the better. Poster to be presented at the 5th annual meeting of the Vision Sciences Society in Sarasota, FL.
- Lanagan, L., Chen, P., Fine, E. M., & Moore, C. M. (2005). Standing out in a crowd: Item discriminability increases attentional resolution. Poster to be presented at the 5th annual meeting of the Vision Sciences Society in Sarasota, FL.

- Chen, P., Mordkoff, J. T., Moore, C. M. (2004). A spatially invariant object-dependent visual detection effect. Poster presented at 12th annual Object Perception and Memory conference, Minneapolis, MN.
- Lanagan, L., Mordkoff, J. T., Moore, C. M. (2004). Wipe out! Can preview eliminate items from perceptual representations? Poster presented at 12th annual Object Perception and Memory conference, Minneapolis, MN.
- Moore, C. M., & Enns, J. T. (2003). Object substitution and the flash-lag effect. Paper presented at the 44th Annual Meeting of the Psychonomic Society, Vancouver, BC.
- Lanagan, L. E., & Moore, C. M. (2003). Contrasting the resolution of exogenously and endogenously controlled attention. Poster presented at the 3rd annual meeting of the Vision Sciences Society in Sarasota, FL.
- Moore, C. M., & Lleras, A. (2003). Object-token individuation protects targets from object substitution masking. Poster presented at the 3rd annual meeting of the Vision Sciences Society in Sarasota, FL.
- Lleras, A., & Moore, C. M. (2002). Perception during perceptual filling-in. Poster presented at the 43rd Annual Meeting of the Psychonomic Society, Kansas City, MO.
- Moore, C. M., & Lleras, A. (2002). Isolating the object component of object substitution masking. Poster presented at the Attention & Performance XX meeting in Erice, Italy.
- Moore, C. M., & Lleras, A. (2002). Object substitution masking and object-token individuation. Paper presented at the 2nd annual meeting of the Vision Sciences Society in Sarasota, FL.
- Lleras, A., & Moore, C. M. (2002). Is the physical presence of the mask necessary for object-substitution masking to occur? Paper presented at the 5th annual meeting of the perception and attention conference, Boston, MA.
- Lleras, A., & Moore, C. M. (2001). Introducing a Probe-Detection Technique for the Study of the Troxler Fading Effect. Poster presented at the 42nd Annual Meeting of the Psychonomic Society, Orlando, FL.
- Moore, C. M., Lleras, A., & Grosjean, M. (2001). Perception and action under conditions of inattention. Poster presented at the 1st annual meeting of the Vision Sciences Society, Sarasota, FL.
- Lleras, A., & Moore, C. M. (2001). Attentional modulation of Troxler fading. Poster presented at the 1st annual meeting of the Vision Sciences Society, Sarasota, FL.
- Fulton, C. S., & Moore, C. M. (2001). The selection of environmental frames of reference. Poster presented at the 1st annual meeting of the Vision Sciences Society, Sarasota, FL.
- Lleras, A., & Moore, C. M. (2001). Relating peripheral fading to attentional selection. Paper presented at the 4th annual meeting of the perception and attention conference, Washington D.C.
- Fulton, C. S., & Moore, C. M. (2001). Local and global environmental frames of reference in mental rotation. Paper presented at the 4th annual meeting of the perception and attention conference, Washington D.C.
- Moore, C. M., Grosjean, M., & Lleras, A. (2000). Evidence of inattentive perceptual completion of occluded and illusory surfaces. Paper presented at the 41st Annual Meeting of the Psychonomic Society, New Orleans, LA.

- Lleras, A., Moore, C. M., & Mordkoff, J. T. (2000). Where is attention in a Simon task? Poster presented at the 2000 Annual Meeting of Association for Research in Vision and Ophthalmology; Fort Lauderdale, FL.
- Brown, L. E. & Moore, C. M. (2000). Differential Processing of color and depth for recognition and action. Poster presented at the 2000 Annual Meeting of Association for Research in Vision and Ophthalmology; Fort Lauderdale, FL.
- Lleras, A., Moore, C. M., & Mordkoff, J. T. (2000). Where is attention in a Simon task? Paper presented at the 3rd annual meeting of the perception and attention conference, Baltimore, PA.
- Brown, L. E. & Moore, C. M. (2000). Differential Processing of color and depth for recognition and action. Paper presented at the 3rd annual meeting of the perception and attention conference, Baltimore, PA.
- Moore, C. M., & Brown, L. E. (1999). Beware the shadows! Preconstancy information can influence visual search. Paper presented at the 40th Annual Meeting of the Psychonomic Society, Los Angeles, CA.
- Moore, C. M., & Marrara, M. T. (1999). The apprehension of spatial relations between and within objects. Poster presented at the 1999 Annual Meeting of the Association for Research in Vision and Ophthalmology; Fort Lauderdale, FL.
- Marrara, M. T. & Moore, C. M. (1999). The contribution of edge alignment and surface attributes to the perceptual completion of occluded objects. Poster presented at the 1999 Annual Meeting of the Association for Research in Vision and Ophthalmology; Fort Lauderdale, FL.
- Moore, C. M., Marrara, M. T., Elsinger, C. L. (1998). Visual attention and the apprehension of spatial relations. Paper presented at the 39th Annual Meeting of the Psychonomic Society; Dallas, TX.
- Moore, C. M., & Brown, L. E. (1998). A spotlight in the shadows: Visual search and lightness constancy. Paper presented at the 1998 meeting of CSAIL (Cognitive Science Association for Interdisciplinary Learning), Mount Hood, OR.
- Moore, C. M., & Brown, L. E. (1998). Is visual search based on pre- or post-constancy representations? The case of lightness constancy. Poster presented at the 1998 Annual Meeting of the Association for Research in Vision and Ophthalmology; Fort Lauderdale, FL.
- Marrara, M. T., & Moore, C. M. (1998). Allocating visual attention in depth. Poster presented at the 1998 Annual Meeting of the Association for Research in Vision and Ophthalmology; Fort Lauderdale, FL.
- Moore, C. M., & Marrara, M. T. (1997). Visual attention in depth. Paper presented at the 38th Annual Meeting of the Psychonomic Society; Philadelphia, PA.
- Moore, C. M., & Egeth, H. (1996). Attending to stimulus features: Contrasting results from reaction time and masked accuracy. Poster presented at the 1996 Annual Meeting of the Association for Research in Vision and Ophthalmology; Fort Lauderdale, FL.
- Moore, C. M. (1996). Are attentional dwell times inconsistent with serial visual search? Symposium Paper presented at the 1996 Annual Meeting of the Eastern Psychological Association; Philadelphia, PA.

- Moore, C. M., & Egeth, H. (1995). Ach, I've been Ponzoed! Evidence for grouping under conditions of inattention. Poster presented at the 36th Annual Meeting of the Psychonomic Society; Los Angeles, CA.
- Yantis, S., & Moore, C. M. (1995). Spread of visual attention behind an occluding surface. Paper presented at the 36th Annual Meeting of the Psychonomic Society; Los Angeles, CA.
- Osman, A., Moore, C. M., & Ulrich, R. (1994). Precuing effects on perceptual-motor overlap. Invited talk at the KNAW Symposium on discreet versus continuous processing of information, Amsterdam Holland.
- Moore, C. M., Luck, S. J., Hillyard, S. A., & Osman, A. (1994). The locus of negative priming: A convergence approach. Poster presented at the Conference on the Use of Converging Operations in the Study of Visual Selective Attention in Honor of C. W. Eriksen; Champaign, IL.
- Osman, A. M., & Moore, C. M. (1992). Psychological refractory effects on movement-related brain potentials. Paper presented at the 5th International Conference on Cognitive Neurosciences (ICON); Jerusalem, Israel.
- Vaughan, J., Rosenbaum, D. A., & Moore, C. M. (1991). Cooperative selection of action in tapping: A quantitative model. Paper presented at the 32nd Annual Meeting of the Psychonomic Society; San Francisco, CA.
- Osman, A. M., & Moore, C. M. (1990). Where is attention limited: The effects of dual-task interference on the lateralized readiness potential. Poster presented at the 30th Annual Meeting of the Society for Psychophysiological Research (SPR); Boston, MA.
- Osman, A. M., & Moore, C. M. (1990). The effects of dual-task interference on movement-related brain potentials. Paper presented at the 31st Annual Meeting of the Psychonomic Society; New Orleans, LA.
- Vaughan, J., Moore, C. M., & Weldon, D. (1989). Either fixation offset or auditory onset may produce express saccades. Paper presented at the 30th Annual Meeting of the Psychonomics Society; Atlanta, GA.
- Vaughan, J., Moore, C. M., & Weldon, D. (1989). The role of auditory and visual stimuli in eliciting express saccades. Paper presented at the 60th Annual Meeting of the Eastern Psychological Association; Boston, MA.
- Moore, C. M., Ouellette, A., Parekh, M., & Mecklenberg, W. (1988). Improving the retrieval of facts by repeated recall. Poster presented at the 59th Annual Meeting of the Eastern Psychological Association; Buffalo, NY.

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SC Court of Appeals

THE STATE OF SOUTH CAROLINA
In The Court of Appeals

APPEAL FROM BERKELEY COUNTY CIRCUIT COURT

Roger M. Young, Sr., Circuit Court Judge

Civil Action Nos.: 14-CP-08-1231, 14-CP-08-1232

Appellate Case No.: 2016-000521

Estate of John Fortney, Deceased,
By His Duly Appointed Personal
Representative, Constance S. Fortney,..... Appellant,

v.

Berkeley Electric Cooperative,.....Respondent.

AND

John Steven Robinson,.....Appellant,

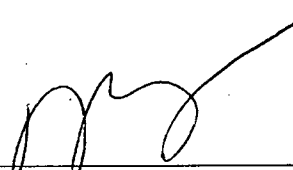
v..

Berkeley Electric Cooperative,.....Respondent.

CERTIFICATE OF COUNSEL

Counsel hereby certifies that this Record on Appeal contains no material which is
irrelevant to the appeal.

January 3, 2017



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