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June 9, 2008

RECEIVED
JUN 10 2008
PUBLIC SERVICE COMMISSION

FEDEX

Ms. Stephanie Stumbo
Public Service Commission
211 Sower Boulevard
Frankfort, Kentucky 40601

Re: Kenergy Corp.
Case No. 2008-00164

Dear Ms. Stumbo:

Enclosed for filing in the above case please find the original and six (6) copies of Response of Kenergy Corp. Further enclosed for filing is a motion of Kenergy Corp. to schedule an informal conference in this matter.

Your assistance in this matter is appreciated.

Very truly yours,

DORSEY, KING, GRAY, NORMENT & HOPGOOD

By Frank N. King

Frank N. King, Jr.
Attorney for Kenergy Corp.

FNKJr/cds
Encls.
Copy/w/encls.: Mr. Sandy Novick, Kenergy Corp.
Mr. Gerald Ford, Kenergy Corp.
Mr. John Newland, Kenergy Corp.

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

RECEIVED
JUN 10 2008
PUBLIC SERVICE COMMISSION

In the Matter of

KENERGY CORP.	)	
	)	**CASE NO. 2008-00164**
	)	
ALLEGED FAILURE TO COMPLY	)	
WITH KRS 278.042	)	

RESPONSE OF KENERGY CORP.

This is the Response of Kenergy Corp. ("Kenergy") to the allegation contained in the Electric Utility Personal Injury Accident Report ("Report") dated April 4, 2008, of Commission Staff and is submitted as directed in the Commission's May 22, 2008, order. In the Report Kenergy is alleged to have violated National Electrical Safety Code ("NESC") clearance requirements. The alleged violation arises under Section 232-B-1 of the NESC, 2007 edition.

Kenergy acknowledges that at the time of the electric contact of victim Jason Koger on March 1, 2008, the ground clearances of the neutral and phase conductors were less than the stated clearances set forth in NESC Table 232-1. The electric contact of Mr. Koger is the incident that called the attention of Kenergy and Commission Staff to these sagging lines, and obviously this electric contact is very regrettable. However, the bad fortune of Mr. Koger is not relevant to the sole issue in this proceeding which is whether Kenergy should be subject to the penalties of KRS 278.990 because it was in violation of the NESC clearance requirements.

For convenience attached hereto is a copy of the cover of NESC, 2007 edition, and pertinent pages 81–94, marked "Attachment 1."

History of Subject Pole and Guy Wire; Inspections

The sagging electric lines that Mr. Koger came into contact with are part of Kenergy's facilities located in Daviess County. The pole adjacent to these sagging lines was leaning approximately five degrees (5°) or two (2) feet. Kenergy identifies the pole in question as No. 170-25-58. The guy wire supporting the pole was broken. The pole and the accompanying guy wire with guy marker were installed in 1971. Around 1994 the original guy marker was replaced with the one that is shown in one of the photographs that are part of Commission Staff's Report. The subject pole and broken guy wire are original equipment. Attached as "Attachment 2" is the Affidavit of Gerald Ford ("Ford Affidavit"), Kenergy's Vice President of Operations. See paragraph 2 of Ford Affidavit.

Pole no. 170-25-58 and the original appurtenances including conductors and guy wire were installed in 1971 by Kenergy's predecessor, Green River Electric Corporation ("GREC"). As set forth in paragraph 3 of the Ford Affidavit NESC minimum designs for wind and ice loads were the same in 1971 as those contained in the NESC, 2007 edition, and GREC adhered to these minimum design standards.

Kenergy conducts a line inspection on a regular basis every two (2) years as required by Commission regulation and addresses deficiencies as they are discovered. Pole no. 170-25-58 was inspected in August 2006 and no deficiencies were found. However, during that inspection a deficiency was noted in a guy wire that supported pole no. 170-25-48 which was three (3) spans or approximately 1500 feet from the subject pole. That guy wire was replaced on August 22, 2006, as shown in Kenergy's Job Order 06-0046353. See Ford Affidavit at paragraph 4.

<u>Ice Storms of February 2008</u>

During February 2008 the Kenergy system, including Daviess County, was hit hard by two (2) major ice and sleet storms. The first occurred on February 11 and 12 and produced ice accumulation of approximately one inch in Daviess County as shown on map of National Weather Service, attached to Ford Affidavit as "Exhibit D." The second storm occurred on February 21 and produced up to one-half (1/2) inch accumulation as shown on map of National Weather Service attached to the Ford Affidavit as "Exhibit E." See Ford Affidavit at paragraph 6.

<u>NESC Criteria; No Violation</u>

The 2007 edition of NESC establishes zones in the United States for determining the radial thickness of ice to be used in calculating sags for clearance purposes. Kentucky is listed in Zone 2 as shown in Figure 230-1 of NESC, 2007 edition. See page 84 of "Attachment 1." The ice thickness for purposes of calculating clearances in Zone 2 is 0.25 inches as shown in Table 203-1 of NESC, 2007 edition. See page 85 of "Attachment 1." NESC recognizes that clearances are not intended to be maintained during the course of or as a result of abnormal events, such as excessive weather events, stating in Section 230.I. as follows:

> The clearances of Section 23 are not intended to be maintained during the course of or as a result of abnormal events such as, but not limited to, actions of others or weather events in excess of those described under Section 23.

The ice storms of February 2008 produced accumulations of one inch on February 11 and 12 and up to one-half (1/2) inch on February 21, both in excess of the 0.25 inch NESC minimum requirement. These ice storms were weather events well in excess of the NESC minimum requirement criteria and triggered the applicability of NESC Section 230.I.

Kenergy's Gerald Ford, Vice President of Operations, is an electrical engineer with over 20 years experience in designing and constructing electric distribution systems. See Ford Affidavit at paragraph 1. He is of the opinion that the most probable cause of the sagging lines with which Jason Koger came into contact on March 1, 2008, was the weight of the ice accumulation from the February 2008 ice and sleet storms. He notes that Kenergy continued to clean up storm related problems through the first week of March 2008. See Ford Affidavit at paragraph 7.

NESC minimum requirements were followed when the subject pole and appurtenances were installed in 1971. The minimum designs for wind and ice then were the same as those contained in the 2007 edition of NESC. The expert opinion of Kenergy's Gerald Ford is that the weight of the ice accumulations was the most probable cause of the sagging lines. Since NESC recognizes that the specified clearances are not expected to be maintained "during the course of or as a result of" weather events such as occurred in February 2008, Kenergy is not in violation of Section 232-B-1 of the NESC, 2007 edition.

Kenergy Has Shown Cause

KRS 278.990 specifies that jurisdictional utilities that have willfully violated the NESC are subject to penalties. The foregoing should satisfy the Commission that Kenergy is not in violation of the NESC requirements, either willfully or otherwise. The Commission should enter an order stating that Kenergy has shown cause why it should not be penalized in this matter.

DORSEY, KING, GRAY, NORMENT & HOPGOOD
318 Second Street
Henderson, Kentucky 42420
Attorneys for Kenergy Corp.

By Frank N. King, Jr.
Frank N. King, Jr.

NESC

National Electrical **Safety Code**®

C2-2007

IEEE

Attachment 1

3 Park Avenue, New York, NY 10016-5997, USA

Section 23.
Clearances

230. General

A. Application

This section covers all clearances, including climbing spaces, involving overhead supply and communication lines.

NOTE The more than 70 years of historical development and specification of clearances in Rules 232, 233, and 234 were reviewed for consistency among themselves and with modern practice and were appropriately revised in both concept and content for the 1990 Edition. See Appendix A.

1. Permanent and temporary installations

The clearances of Section 23 are required for permanent and temporary installations.

2. Emergency installations

The clearances required in Section 23 may be decreased for emergency installations if the following conditions are met.

NOTE See Rule 14.

a. Open supply conductors of 0 to 750 V and supply cables meeting Rule 230C; and communication conductors and cables, guys, messengers, and neutral conductors meeting Rule 230E1 shall be suspended not less than 4.8 m (15.5 ft) above areas where trucks are expected, or 2.70 m (9 ft) above areas limited to pedestrians or restricted traffic only where vehicles are not expected during the emergency, unless Section 23 permits lesser clearances.

For the purpose of this rule, trucks are defined as any vehicle exceeding 2.5 m (8 ft) in height. Areas not subject to truck traffic are areas where truck traffic is neither normally encountered nor reasonably anticipated or is otherwise limited.

Spaces and ways subject to pedestrians or restricted traffic only are those areas where riders on horseback, vehicles, or other mobile units exceeding 2.5 m (8 ft) in height are prohibited by regulation or permanent terrain configurations or are otherwise neither normally encountered nor reasonably anticipated or are otherwise limited.

b. Vertical clearances of open supply conductors above 750 V shall be increased above the applicable value of Rule 230A2a as appropriate for the voltage involved and the given local conditions.

c. Reductions in horizontal clearances permitted by this rule shall be in accordance with accepted good practice for the given local conditions during the term of the emergency.

d. Supply and communication cables may be laid directly on grade if they are guarded or otherwise located so that they do not unduly obstruct pedestrian or vehicular traffic and are appropriately marked. Supply cables operating above 600 V shall meet either Rule 230C or 350B.

e. No clearance is specified for areas where access is limited to qualified personnel only.

3. Measurement of clearance and spacing

Unless otherwise stated, all clearances shall be measured from surface to surface and all spacings shall be measured center to center. For clearance measurement, live metallic hardware electrically connected to line conductors shall be considered a part of the line conductors. Metallic bases of potheads, surge arresters, and similar devices shall be considered a part of the supporting structure.

4. Rounding of calculation results

   Unless otherwise specified in a table or rule within Section 23 that requires a calculation, the resultant of the calculation shall be rounded up to the same level of decimal places as the basic value shown in the rule or table, regardless of the numbers of significant digits of individual values required to be used in the calculation.

   EXCEPTION Rules or tables with values in millimeters are shown in units of 5 mm; as a result, resultants of calculations to be expressed in millimeters shall be rounded up to the next multiple of 5 mm.

   EXAMPLES: If the basic value shown in a rule or table has no decimal places, such as 3 in, the resultant will be rounded up to the next whole number. If the basic value shown in the table or rule is shown as having one decimal place, such as 18.5 ft, the resultant of the calculation will be rounded up to one decimal place. If the table or rule contains a basic value expressed in two decimal places, such as 1.27 m, the resultant will be rounded up to two decimal places.

B. Ice and wind loading for clearances

1. Three general degrees of loading due to weather conditions are recognized and are designated as clearance zones 1, 2, and 3. Figure 230-1 shows the zones where these loadings apply.

   NOTE: The localities are classified in the different zones according to the relative simultaneous prevalence of the wind velocity and thickness of ice that accumulates on wires. Zone 3 is for places where little, if any, ice accumulates on wires. See Appendix B.

2. Table 230-1 shows the radial thickness of ice to be used in calculating sags for clearance purposes. See applicable clearance rules in Section 23.

3. Ice and wind loads are specified in Rule 230B1.

   a. Where a cable is attached to a messenger, the specified loads shall be applied to both cable and messenger.

   b. In determining wind loads on a conductor or cable without ice covering, the assumed projected area shall be that of a smooth cylinder whose outside diameter is the same as that of the conductor or cable. The force coefficient (shape factor) for cylindrical surfaces is assumed to be 1.0.

      NOTE: Experience has shown that as the size of multiconductor cable decreases, the actual projected area decreases, but the roughness factor increases and offsets the reduction in projected area.

   c. An appropriate mathematical model shall be used to determine the wind and weight loads on ice-coated conductors and cables. In the absence of a model developed in accordance with Rule 230B5, the following mathematical model shall be used:

      (1) On a conductor, lashed cable, or multiple-conductor cable, the coating of ice shall be considered to be a hollow cylinder touching the outer strands of the conductor or the outer circumference of the lashed cable or multiple-conductor cable.

      (2) On bundled conductors, the coating of ice shall be considered as individual hollow cylinders around each subconductor.

   d. It is recognized that the effects of conductor stranding or of non-circular cross section may result in wind and ice loadings more or less than those calculated according to assumptions stated in Rules 230B3b and 230B3c. No reduction in these loadings is permitted unless testing or a qualified engineering study justifies a reduction.

4. Table 230-2 shows the radial thickness of ice, wind pressures, temperatures, and additive constants to be used in calculating inelastic deformation.

   The load components shall be determined as follows:

   a. Vertical load component

      The vertical load on a wire, conductor, or messenger shall be its own weight plus the weight of conductors, spacers, or equipment that it supports, ice covered where required by Rule 230B1 and Table 230-2 b Horizontal load component

The horizontal load shall be the horizontal wind pressure determined under Rule 230B1 and Table 230-2, applied at right angles to the direction of the line using the projected area of the conductor or messenger and conductors, spacers, or equipment that it supports, ice covered where required by Rule 230B1 and Table 230-2.

c. Total load

The total load on each wire, conductor, or messenger shall be the resultant of components in a) and b) above, calculated at the applicable temperature in Table 230-2, plus the corresponding additive constant in Table 230-2.

5. Final sag calculations shall include the effects of inelastic deformation due to both (a) initial and subsequent combined ice and wind loading, and (b) long-term material deformation (creep). See applicable sag definitions. Ice is assumed to weigh 913 kg/m^3 (57 lb/ft^3).

C. Supply cables

For clearance purposes, supply cables, including splices and taps, conforming to any of the following requirements are permitted lesser clearances than open conductors of the same voltage. Cables should be capable of withstanding tests applied in accordance with an applicable standard.

1. Cables that are supported on or cabled together with an effectively grounded bare messenger or neutral, or with multiple concentric neutral conductors, where any associated neutral conductor(s) meet(s) the requirements of Rule 230E1 and where the cables also meet one of the following:

   a. Cables of any voltage having an effectively grounded continuous metal sheath or shield

   b. Cables designed to operate on a multi-grounded system at 22 kV or less and having semiconducting insulation shielding in combination with suitable metallic drainage

2. Cables of any voltage, not included in Rule 230C1, covered with a continuous auxiliary semi-conducting shield in combination with suitable metallic drainage and supported on and cabled together with an effectively grounded bare messenger

3. Insulated, nonshielded cable operated at not over 5 kV phase to phase, or 2.9 kV phase to ground, supported on and cabled together with an effectively grounded bare messenger or neutral.

D. Covered conductors

Covered conductors shall be considered bare conductors for all clearance requirements except that clearance between conductors of the same or different circuits, including grounded conductors, may be reduced below the requirements for open conductors when the conductors are owned, operated, or maintained by the same party and when the conductor covering provides sufficient dielectric strength to limit the likelihood of a short circuit in case of momentary contact between conductors or between conductors and the grounded conductor. Intermediate spacers may be used to maintain conductor clearance and to provide support.

E. Neutral conductors

1. Neutral conductors that are effectively grounded throughout their length and associated with circuits of 0 to 22 kV to ground may have the same clearances as guys and messengers.

2. All other neutral conductors of supply circuits shall have the same clearances as the phase conductors of the circuit with which they are associated

F Fiber-optic cable

1. Fiber-optic—supply cable

   a. Cable defined as "fiber-optic—supply" supported on a messenger that is effectively grounded throughout its length shall have the same clearance from communications facilities as required for a neutral conductor meeting Rule 230E1

b. Cable defined as "fiber-optic—supply" that is entirely dielectric, or supported on a messenger that is entirely dielectric, shall have the same clearance from communications facilities as required for a neutral conductor meeting Rule 230E1.

c. Fiber-optic—supply cables supported on or within messengers not meeting Rule 230F1a or 230F1b shall have the same clearances from communications facilities required for such messengers.

d. Fiber-optic—supply cables supported on or within a conductor(s), or containing a conductor(s) or cable sheath(s) within the fiber-optic cable assembly shall have the same clearances from communications facilities required for such conductors. Such clearance shall be not less than that required under Rule 230F1a, 230F1b, or 230F1c, as applicable.

e. Fiber-optic—supply cables meeting Rule 224A3 are considered to be communication cables when located in the communication space.

2. Fiber-optic—communication cable

Cable defined as "fiber-optic—communication" shall have the same clearance from supply facilities as required for a communication messenger.

G. Alternating- and direct-current circuits

The rules of this section are applicable to both ac and dc circuits. For dc circuits, the clearance requirements shall be the same as those for ac circuits having the same crest voltage to ground.

NOTE: Although the corresponding crest voltage for a common sinusoidal ac circuit may be calculated by multiplying its rms value by 1.414 (square root of 2), this may not be appropriate for other type ac circuits. An example of the latter is represented by non-sinusoidal power supplies such as used in some coaxial cable type communication systems.

H. Constant-current circuits

The clearances for constant-current circuits (such as series lighting circuits) shall be determined on the basis of their normal full-load voltage.

I. Maintenance of clearances and spacings

The clearances and spacing required shall be maintained at the values and under the conditions specified in Section 23 of the applicable edition. The clearances of Section 23 are not intended to be maintained during the course of or as a result of abnormal events such as, but not limited to, actions of others or weather events in excess of those described under Section 23.

NOTE: See Rule 13 to determine the applicable edition.

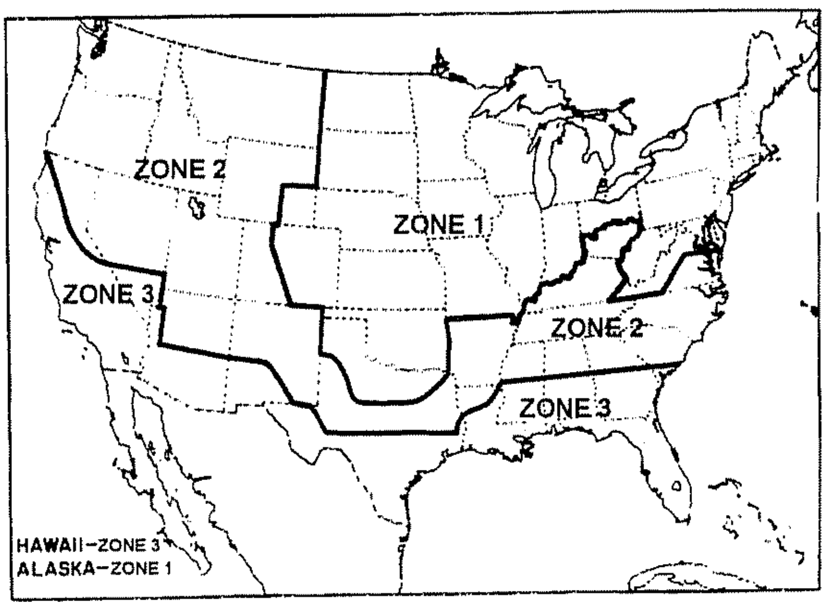

Figure 230-1—Clearance zone map of the United States

Table 230-1—Ice thickness for purposes of calculating clearances

	Clearance zone (for use with Rules 232, 233, 234, and 235)		
	Zone 1	Zone 2	Zone 3
Radial thickness of ice			
(mm)	12.5	6.5	0
(in)	0.50	0.25	0

Table 230-2—Ice, wind pressures, temperatures, and additive constants for purposes of calculating final inelastic deformation

	Clearance zone (for use with Rule 230B)		
	Zone 1	Zone 2	Zone 3
Radial thickness of ice			
(mm)	12.5	6.5	0
(in)	0.50	0.25	0
Horizontal wind pressure			
(Pa)	190	190	430
(lb/ft^2)	4	4	9
Temperature			
(°C)	–20	–10	–1
(°F)	0	+15	+30
Constant to be added to the resultant			
(N/m)	4.40	2.90	0.73
(lb/ft)	0.30	0.20	0.05

231. Clearances of supporting structures from other objects

Supporting structures, support arms, anchor guys, 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 1.2 m (4 ft).

EXCEPTION 1: Where conditions do not permit, a clearance of not less than 900 mm (3 ft) is allowed.

EXCEPTION 2 Clearances in Rule 231A may be reduced by agreement with the local fire authority and the pole owner.

B. From streets, roads, and highways

1. Where there are curbs: supporting structures, support arms, anchor guys, or equipment attached thereto, up to 4.6 m (15 ft) 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. For a redirectional curb, such distance shall be not less than 150 mm (6 in). For paved or concrete swale-type curbs, such facilities shall be located behind the curb.
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 roads, streets, or highways with narrow rights-of-way or 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 6.7 m (22 ft) above the nearest track rail shall have horizontal clearances not less than the values required by Rule 231C1 or 231C2 for the situation concerned.

NOTE: See Rule 234I.

1. Not less than 3.6 m (12 ft) from the nearest track rail.

   EXCEPTION 1 A clearance of not less than 2.13 m (7 ft) 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 2.13 m (7 ft) shall be permitted, provided sufficient space is left where cars can be loaded or unloaded.

2. The clearances of Rule 231C1 may be reduced by agreement with the railroad(s).

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. 50 °C (120 °F), no wind displacement
2. The maximum conductor temperature for which the line is designed to operate, if greater than 50 °C (120 °F), with no wind displacement
3. 0 °C (32 °F), no wind displacement, with radial thickness of ice, if any, specified in Table 230-1 for the zone concerned

   EXCEPTION The conductor temperature and loading condition for trolley and electrified railroad contact conductors shall be 15 °C (60 °F), 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, equipment, and support arms mounted on supporting structures

1. Clearance to wires, conductors, and cables

The vertical clearance of wires, conductors, and cables aboveground 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, roadway, or water 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. For clearances of drip loops of service drops, see Table 232-1.

3. Clearance to support arms, switch handles, and equipment cases

The vertical clearance of switch handles, equipment cases, support arms, platforms, and braces that extend beyond the surface of the structure shall be not less than that shown in Table 232-2. These clearances do not apply to internal structural braces for latticed towers, X-braces between poles, and pole-type push braces.

4. Street and area lighting

a. The vertical clearance of street and area lighting luminaires shall be not less than that shown in Table 232-2. For this purpose, grounded luminaire cases and brackets shall be considered as effectively grounded equipment cases; ungrounded luminaire cases and brackets shall be considered as a rigid live part of the voltage contained.

EXCEPTION: This rule does not apply to post-top mounted luminaires with grounded or entirely dielectric cases.

b. Insulators, as specified in Rule 279A, should be inserted at least 2.45 m (8 ft) 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 kV

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 10 mm (0.4 in) 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 300 m (1000 ft) in excess of 1000 m (3300 ft) 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, or local regulations governing the area under the line. For this determination, the conductors shall be at a final unloaded sag at 50 °C (120 °F).

D. Alternate clearances for voltages exceeding 98 kV ac to ground or 139 kV dc to ground

The clearances specified in Rules 232B and 232C may be reduced for circuits with known switching-surge factors, but shall be not less than the alternate clearance, which is computed by adding the reference height from Rule 232D2 to the electrical component of clearance from Rule 232D3.

1. Sag conditions of line conductors

The vertical clearance shall be maintained under the conductor temperature and loading condition given in Rule 232A.

2. Reference heights

The reference height shall be selected from Table 232-3.

3. Electrical component of clearance

a. The electrical component (D) shall be computed using the following equations. Selected values of D are listed in Table 232-4.

$$D = 1.00\left[\frac{V \cdot (PU) \cdot a}{500K}\right]^{1.667} bc \quad \text{(m)}$$

$$D = 3.28\left[\frac{V \cdot (PU) \cdot a}{500K}\right]^{1.667} bc \quad \text{(ft)}$$

where

V = maximum ac crest operating voltage to ground or maximum dc operating voltage to ground in kilovolts

PU = maximum switching-surge factor expressed in per-unit peak voltage to ground and defined as a switching-surge level for circuit breakers corresponding to 98% probability that the maximum switching surge generated per breaker operation does not exceed this surge level, or the maximum anticipated switching-surge level generated by other means, whichever is greater

a = 1.15, the allowance for three standard deviations

b = 1.03, the allowance for nonstandard atmospheric conditions

c = 1.2, the margin of safety

K = 1.15, the configuration factor for conductor-to-plane gap

b. The value of D shall be increased 3% for each 300 m (1000 ft) in excess of 450 m (1500 ft) 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, or local regulations governing the area under the line. For this determination, the conductors shall be at a final unloaded sag at 50 °C (120 °F).

4. Limit

The alternate clearance shall be not less than the clearance given in Table 232-1 or 232-2 computed for 98 kV ac to ground in accordance with Rule 232C.

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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 communication conductors and cable; messengers; overhead shield/surge-protection wires; grounded guys; ungrounded guys exposed to 0 to 300 V [11] [15]; neutral conductors meeting Rule 230E1; supply cables meeting Rule 230C1 (m)	Noninsulated communication conductors; supply cables of 0 to 750 V meeting Rule 230C2 or 230C3 (m)	Supply cables over 750 V meeting Rule 230C2 or 230C3; open supply conductors, 0 to 750 V [3]; ungrounded guys exposed to over 300 V to 750 V [14] (m)	Open supply conductors, over 750 V to 22 kV; ungrounded guys exposed to 750 V to 22 kV [14] (m)	Trolley and electrified railroad contact conductors and associated span or: 0 to 750 V to ground (m)	Trolley and electrified railroad contact conductors and associated span or: Over 750 V to 22 kV to ground (m)
Where wires, conductors, or cables cross over or overhang						
1. Track rails of railroads (except electrified railroads using overhead trolley conductors) [1] [18] [22]	7.2	7.3	7.5	8.1	6.7 [4]	6.7 [4]
2. Roads, streets, and other areas subject to truck traffic [22]	4.7	4.9	5.0	5.6	5.5 [5]	6.1 [5]
3. Driveways, parking lots, and alleys [22]	4.7 [7] [13]	4.9 [7] [13]	5.0 [7]	5.6	5.5 [5]	6.1 [5]
4. Other land traversed by vehicles, such as cultivated, grazing, forest, orchard, etc. [22]	4.7	4.9	5.0	5.6	—	—
5. Spaces and ways subject to pedestrians or restricted traffic only [9]	2.9	3.6 [8]	3.8 [8]	4.4	4.9	5.5
6. Water areas not suitable for sailboating or where sailboating is prohibited [21]	4.0	4.4	4.6	5.2	—	—
7. Water areas suitable for sailboating including lakes, ponds, reservoirs, tidal waters, rivers, streams, and canals with an unobstructed surface area of [17] [18] [19] [20] [21]						
a. Less than 0.08 km^2	5.3	5.5	5.6	6.2	—	—

m

Table 232-1— *(continued)*
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 communication conductors and cable; messengers; overhead shield/surge-protection wires; grounded guys; ungrounded guys exposed to 0 to 300 V[11] [15]; neutral conductors meeting Rule 230E1; supply cables meeting Rule 230C1 (m)	Noninsulated communication conductors; supply cables of 0 to 750 V meeting Rule 230C2 or 230C3 (m)	Supply cables over 750 V meeting Rule 230C2 or 230C3; open supply conductors, 0 to 750 V[3]; ungrounded guys exposed to over 300 V to 750 V[18] (m)	Open supply conductors, over 750 V to 22 kV; ungrounded guys exposed to 750 V to 22 kV[14] (m)	Trolley and electrified railroad contact conductors and associated span or	
					0 to 750 V to ground (m)	Over 750 V to 22 kV to ground (m)
b. Over 0.08 to 0.8 km^2	7.8	7.9	8.1	8.7	—	—
c. Over 0.8 to 8 km^2	9.6	9.8	9.9	10.5	—	—
d. Over 8 km^2	11.4	11.6	11.7	12.3	—	—
8. Established boat ramps and associated rigging areas; areas posted with sign(s) for rigging or launching sail boats	Clearance aboveground shall be 1.5 m greater than in 7 above, for the type of water areas served by the launching sites					
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	4.7[24]	4.9	5.0	5.6	5.5[5]	6.1[5]
10. Roads where it is unlikely that vehicles will be crossing under the line	4.1[19] [12]	4.3[18]	4.4[18]	5.0	5.5[5]	6.1[5]

①Where 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.

②For 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 6.1 m, but the clearance shall not be reduced below that required for street crossings.

③Does not include neutral conductors meeting Rule 230E1.

④In communities where 6.4 m 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.)

⑤In communities where 4.9 m has been established for trolley and electrified railroad contact conductors 0 to 750 V to ground, or 5.5 m for trolley and electrified railroad contact conductors exceeding 750 V, or where local conditions make it impractical to obtain in the clearance given in the table, these reduced clearances may be used if carefully maintained.

⑥This footnote not used in this edition.

⑦Where the height of a residential building does not permit its service drop(s) to meet these values, the clearances over residential driveways only may be reduced to the following:

		(m)
(a)	Insulated supply service drops limited to 300 V to ground	3.8
(b)	Insulated drip loops of supply service drops limited to 300 V to ground	3.2
(c)	Supply service drops limited to 150 V to ground and meeting Rule 230C1 or 230C3	3.6
(d)	Drip loops only of service drops limited to 150 V to ground and meeting Rule 230C1 or 230C3	3.0
(e)	Insulated communication service drops	3.5

⑧Where the height of a residential building does not permit its service drop(s) to meet these values, the clearances may be reduced to the following:

		(m)
(a)	Insulated supply service drops limited to 300 V to ground	3.2
(b)	Insulated drip loops of supply service drops limited to 300 V to ground	3.2
(c)	Supply service drops limited to 150 V to ground and meeting Rule 230C1 or 230C3	3.0
(d)	Drip loops only of supply service drops limited to 150 V to ground and meeting Rule 230C1 or 230C3	3.0

⑨Spaces and ways subject to pedestrians or restricted traffic only are those areas where riders on horses or other large animals, vehicles, or other mobile units exceeding a total height of 2.45 m, are prohibited by regulation or permanent terrain configurations, or are otherwise not normally encountered nor reasonably anticipated.

⑩Where 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:

		(m)
(a)	Insulated communication conductor and communication cables	2.9
(b)	Conductors of other communication circuits	2.9
(c)	Supply cables of any voltage meeting Rule 230C1, supply cables limited to 150 V to ground meeting Rule 230C2 or 230C3, and neutral conductors meeting Rule 230E1	2.9
(d)	Insulated supply conductors limited to 300 V to ground	3.8
(e)	Guys	2.9

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

⑫This clearance may be reduced to 4.0 m for communication conductors and guys.

⑬Where this construction crosses over or runs along alleys, driveways, or parking lots not subject to truck traffic this clearance may be reduced to 4.6 m.

⑭Ungrounded guys and ungrounded portions of span guys between guy insulators shall have clearances based on the highest voltage to which they may be exposed due to a slack conductor or guy.

⑮ Anchor guys insulated in accordance with Rule 279 may have the same clearance as grounded guys.

⑯Adjacent to tunnels and overhead bridges that restrict the height of loaded rail cars to less than 6.1 m, these clearances may be reduced by the difference between the highest loaded rail car handled and 6.1 m, if mutually agreed to by the parties at interest.

⑰For controlled impoundments, the surface area and corresponding clearances shall be based upon the design high-water level.

⑱For uncontrolled water flow areas, the surface area shall be that enclosed by its annual high-water mark. Clearances shall be based on the normal flood level; if available, the 10-year flood level may be assumed as the normal flood level.

⑲The clearance over rivers, streams, and canals shall be based upon the largest surface area of any 1.6 km-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.

⑳Where 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.

㉑Where the US Army Corps of Engineers, or the state, or surrogate thereof has issued a crossing permit, clearances of that permit shall govern.

㉒See Rule 234I for the required horizontal and diagonal clearances to rail cars.

㉓For the purpose of this rule, trucks are defined as any vehicle exceeding 2.45 m in height. Areas not subject to truck traffic are areas where truck traffic is not normally encountered nor reasonably anticipated.

㉔Communication cables and conductors may have a clearance of 4.6 m 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.

㉖When designing a line to accommodate oversized vehicles, these clearance values shall be increased by the difference between the known height of the oversized vehicle and 4.3 m ft

Table 232-1— Vertical clearance of wires, conductors, and cables above ground, roadway, rail, or water surfaces㉕

(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 communication conductors and cable; messengers; overhead shield/ surge-protection wires; grounded guys; ungrounded guys exposed to 0 to 300 V ⑪ ⑮; neutral conductors meeting Rule 230E1; supply cables meeting Rule 230C1 (ft)	Noninsulated communication conductors; supply cables of 0 to 750 V meeting Rule 230C2 or 230C3 (ft)	Supply cables over 750 V meeting Rule 230C2 or 230C3; open supply conductors, 0 to 750 V ③; ungrounded guys exposed to over 300 V to 750 V ⑭ (ft)	Open supply conductors, over 750 V to 22 kV; ungrounded guys exposed to 750 V to 22 kV ⑭ (ft)	Trolley and electrified railroad contact conductors and associated span or messenger wires	
					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) ② ⑯ ㉒	23.5	24.0	24.5	26.5	22.0 ④	22.0 ④
2. Roads, streets, and other areas subject to truck traffic ㉓	15.5	16.0	16.5	18.5	18.0 ⑤	20.0 ⑤
3. Driveways, parking lots, and alleys ㉓	15.5 ⑦ ⑬	16.0 ⑦ ⑬	16.5 ⑦	18.5	18.0 ⑤	20.0 ⑤
4. Other land traversed by vehicles, such as cultivated, grazing, forest, orchards, etc. ㉔	15.5	16.0	16.5	18.5	—	—
5. Spaces and ways subject to pedestrians or restricted traffic only ⑨	9.5	12.0 ⑧	12.5 ⑧	14.5	16.0	18.0
6. Water areas not suitable for sailboating or where sailboating is prohibited ㉑	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 ⑰ ⑱ ⑲ ⑳ ㉑						

ft

Table 232-1— *(continued)*
Vertical clearance of wires, conductors, and cables above ground, roadway, rail, or water surfaces㉕

(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 communication conductors and cable; messengers; overhead shield/surge-protection wires; grounded guys; ungrounded guys exposed to 0 to 300 V ⑪ ⑮; neutral conductors meeting Rule 230E1; supply cables meeting Rule 230C1 (ft)	Noninsulated communication conductors; supply cables of 0 to 750 V meeting Rule 230C2 or 230C3 (ft)	Supply cables over 750 V meeting Rule 230C2 or 230C3; open supply conductors, 0 to 750 V ③; ungrounded guys exposed to over 300 V to 750 V ⑯ (ft)	Open supply conductors, over 750 V to 22 kV; ungrounded guys exposed to 750 V to 22 kV ⑭ (ft)	Trolley and electrified railroad contact conductors and associated span or messenger wires	
					0 to 750 V to ground (ft)	Over 750 V to 22 kV to ground (ft)
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. Established boat ramps and associated rigging areas; areas posted with sign(s) for rigging or launching sail boats	Clearance aboveground 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 ㉑	16.0	16.5	18.5	18.0 ⑤	20.0 ⑤
10. Roads where it is unlikely that vehicles will be crossing under the line	13.5 ⑱ ⑫	14.0 ⑱	14.5 ⑱	16.5	18.0 ⑤	20.0 ⑤

①Where 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.

②For 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.

③Does not include neutral conductors meeting Rule 230E1.

④In 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.)

⑤In 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.

⑥This footnote not used in this edition.

⑦Where the height of a residential building does not permit its service drop(s) to meet these values, the clearances over residential driveways only may be reduced to the following:

		(ft)
(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 Rule 230C1 or 230C3	12.0
(d)	Drip loops only of service drops limited to 150 V to ground and meeting Rule 230C1 or 230C3	10.0
(e)	Insulated communication service drops	11.5

⑧Where the height of a residential building does not permit its service drop(s) to meet these values, the clearances may be reduced to the following:

		(ft)
(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 Rule 230C1 or 230C3	10.0
(d)	Drip loops only of supply service drops limited to 150 V to ground and meeting Rule 230C1 or 230C3	10.0

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

⑩Where 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:

		(ft)
(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, supply cables limited to 150 V to ground meeting Rule 230C2 or 230C3, and neutral conductors meeting Rule 230E1	9.5
(d)	Insulated supply conductors limited to 300 V to ground	12.5
(e)	Guys	9.5

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

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

⑬Where this construction crosses over or runs along alleys, driveways, or parking lots not subject to truck traffic this clearance may be reduced to 15 ft.

⑭Ungrounded guys and ungrounded portions of span guys between guy insulators shall have clearances based on the highest voltage to which they may be exposed due to a slack conductor or guy.

⑮Anchor guys insulated in accordance with Rule 279 may have the same clearance as grounded guys.

⑯Adjacent 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.

⑰For controlled impoundments, the surface area and corresponding clearances shall be based upon the design high-water level.

⑱For uncontrolled water flow areas, the surface area shall be that enclosed by its annual high-water mark. Clearances shall be based on the normal flood level; if available, the 10-year flood level may be assumed as the normal flood level.

⑲The 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.

⑳Where 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.

㉑Where the US Army Corps of Engineers, or the state, or surrogate thereof has issued a crossing permit, clearances of that permit shall govern.

㉒See Rule 234I for the required horizontal and diagonal clearances to rail cars.

㉓For 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.

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

㉕The 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.

㉖When designing a line to accommodate oversized vehicles, these clearance values shall be increased by the difference between the known height of the oversized vehicle and 14 ft.

AFFIDAVIT OF GERALD FORD

The affiant, **GERALD FORD**, before first duly sworn, states upon personal knowledge as follows:

1. I am Vice President of Operations of Kenergy Corp. I am an electrical engineer, having obtained my degree from the University of Kentucky in 1973. I have served as Vice President of Operations of Kenergy since January 2000. Prior to that I was employed by Green River Electric Corporation as Vice President of Engineering from 1996 until 1999, which followed 12 years as manager of the planning section in charge of line design. My duties as an employee of Kenergy and Green River Electric have included designing and constructing electric distribution systems.

2. The sagging electric lines that Jason Koger came into contact with on March 1, 2008, are part of Kenergy's facilities located in Daviess County. The pole adjacent to these sagging lines was leaning approximately five (5) degrees or two (2) feet. Kenergy identifies the pole in question as No. 170-25-58. The guy wire supporting the pole was broken. The pole and the accompanying guy wire with guy marker were installed in 1971. Around 1994 the original guy marker was replaced with the one that is shown in one of the photographs that are part of Commission Staff's Electric Utility Personal Injury Accident Report ("Report") dated April 4, 2008. The subject pole and broken guy wire are original equipment.

3. Pole no. 170-25-58 and the original appurtenances including conductors and guy wire were installed in 1971 by Kenergy's predecessor, Green River Electric Corporation ("GREC"), which followed National Electrical Safety Code ("NESC") minimum requirements for strength and clearances. Attached as "Exhibit A" is a copy of the Staking Sheet for this installation and attached as "Exhibit B" are copies of the cover of Engineering and Operations Manual for Rural Electric Systems, REA Bulletin 160-2, July 1969, and Section II thereof which contains in Chapter I-1 the required NESC minimum designs for wind and ice loads. The zone for Kentucky at that time was referred to as "Medium" and the minimum designs for wind and ice were the same as in the NESC 2007 edition, namely radial ice thickness of one-fourth (1/4) inch and wind pressure of four lbs/ft.^{2}. These minimum design standards were adhered to by GREC.

4. Kenergy conducts a line inspection on a regular basis every two (2) years as required by Commission regulation and addresses deficiencies as they are discovered. Pole no. 170-25-58 was inspected in August 2006 and no deficiencies were found. However, during that inspection a deficiency was noted in a guy wire that supported pole no. 170-25-48 which was three (3) spans or approximately 1500 feet from the subject pole. That guy wire was replaced on August 22, 2006, as shown in Kenergy's Job Order 06-0046353, a copy attached hereto as "Exhibit C."

5. The most recent edition of the NESC is the 2007 edition, which establishes zones in the United States for determining the radial thickness of ice to

be used in calculating sags for clearance purposes. Kentucky is listed in Zone 2 as shown in Figure 230-1 of NESC, 2007 edition. The ice thickness for purposes of calculating clearances in Zone 2 is 0.25 inches as shown in Table 230-1 of NESC, 2007 edition.

6. During February 2008 the Kenergy system, including Daviess County, was subjected to two (2) major ice and sleet storms. The first occurred on February 11 and 12 and produced ice accumulation of approximately one inch in Daviess County as shown on map of National Weather Service, attached as "Exhibit D." The second storm occurred on February 21 and produced up to one-half (1/2) inch accumulation as shown on map of National Weather Service attached as "Exhibit E." Both storms exceeded the design criteria for this line, thus Section 230-I, Maintenance of clearances and spaces, became applicable. The clearances are not intended to be maintained during the course of or as a result of abnormal events such as, but not limited to, actions of others or weather events in excess of those described under Section 23.

7. I am of the opinion that the most probable cause of the sagging lines with which Jason Koger came into contact on March 1, 2008, was the weight of the ice accumulation from the February 2008 ice and sleet storms. Kenergy continued to clean up storm related problems through the first week of March 2008.

Further affiant saith not.

Gerald Ford

STATE OF KENTUCKY

COUNTY OF DAVIESS

Subscribed and sworn to before me by GERALD FORD, this 6 day of June, 2008.

My commission expires April 24, 2010

Notary Public, State of Kentucky at Large

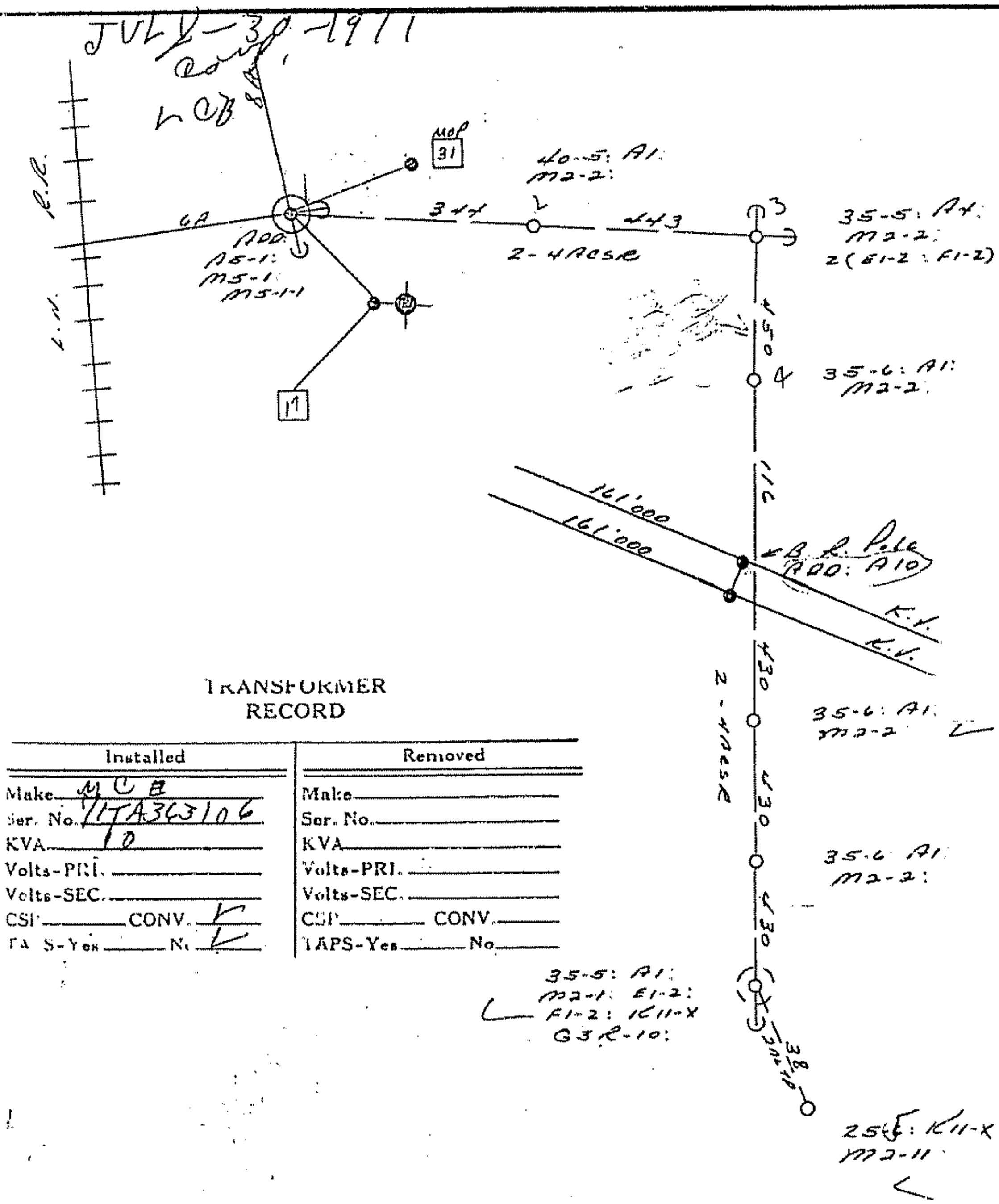
(seal)

GREEN RIVER RURAL ELECTRIC
COOPERATIVE CORPORATION
OWENSBORO, KENTUCKY

STAKING SHEET

SYSTEM DESIGNATION KY 33 DAVIESS

JULY-30-1971



TRANSFORMER RECORD

Installed		Removed	
Make	MCB	Make	
Ser. No.	71TA363106	Ser. No.	
KVA	10	KVA	
Volts-PRI.		Volts-PRI.	
Volts-SEC.		Volts-SEC.	
CSP	CONV. ✓	CSP	CONV.
TAPS-Yes	No ✓	TAPS-Yes	No

DATE COMPLETED		STAKED BY WH	DATE 7-16-71
SIGNED		DRAWN BY RC	DATE 7-22-71
DATE INSPECTED		CHECKED BY	DATE
SIGNED		MAP REFERENCE	170-25-31

LOCATED IN DA COUNTY ON THE ROAD
ABOUT MILES OF AT SUTHERLAND

Pump

NO. OF MEMBERS 1

METER SIZE	CONSUMER'S NAME
3W	Charles Wm. Hayden
	M.P.

DESCRIPTION: O.A.S.

SHEET NO. 1 OF 2

LINE SUB. UTICA

WORK ORDER NO. 3207

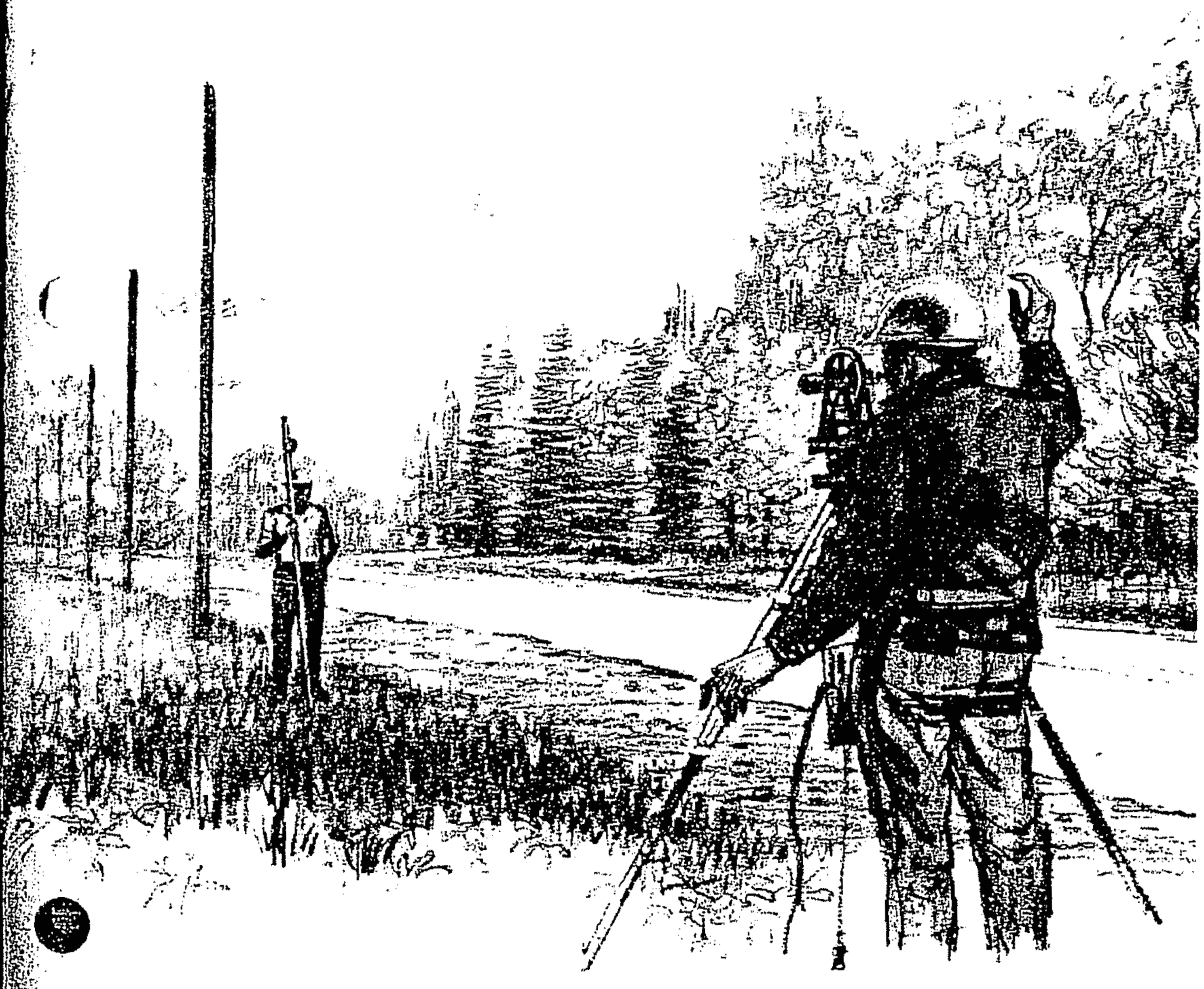
EP-3

EXHIBIT
A

REA Bulletin 160-2
July 1969

ENGINEERING and OPERATIONS MANUAL FOR RURAL ELECTRIC SYSTEMS

Distribution Line Design (mechanical)



U.S. DEPARTMENT OF AGRICULTURE • RURAL ELECTRIFICATION ADMINISTRATION

EXHIBIT

B

ENGINEERING AND OPERATIONS MANUAL

FOR

RURAL ELECTRIC SYSTEMS

SECTION II

DISTRIBUTION LINE DESIGN
(Mechanical)

JULY 1969

RURAL ELECTRIFICATION ADMINISTRATION

UNITED STATES DEPARTMENT OF AGRICULTURE

MECHANICAL DESIGN

Foreword

Mechanical line design consists of the selection and location of the various physical components required to provide safe, economical distribution line construction.

The National Electrical Safety Code; conductor manufacturers' engineering data; REA Construction Specifications, List of Materials, and other engineering bulletins provide guidelines and aids for the distribution line designer. However, the quality of the design is primarily dependent upon the engineer's knowledge and experience—and his skill in applying this knowledge and experience to rural distribution line design.

Section I of these manuals (REA Bulletin 160-1) provided the operating and technical personnel of today's rural electric systems with a basic understanding of the electrical design aspects of rural distribution systems.

This section will enlarge upon that basic understanding by covering in detail the mechanical design aspects of rural distribution systems.

Section II is divided into four parts:

I. The National Electrical Safety Code (NESC) as a Basis for Distribution Line Design

II. Technical Design Information

III. Staking the Line

IV. REA Unit System of Construction

PART I

THE NATIONAL ELECTRICAL SAFETY CODE AS A BASIS FOR DISTRIBUTION LINE DESIGN

The National Electrical Safety Code (NESC) or local code (General Order 95 in California, for example) specifies the minimum requirements for strength and clearances to be used in power line construction. Because of diverse weather conditions, these requirements differ for lines located in various parts of the country. The type of terrain and the facilities that the line crosses also affect the strength and clearance requirements. While a knowledge of various code requirements is essential, the application of the rules is facilitated by staking tables and engineering data based on REA construction and available from conductor manufacturers.

In the chapters that follow, the more important requirements of the NESC, along with REA specifications, are discussed. These requirements and recommendations are to be considered minimal in nature and should be modified as necessary to meet local operating conditions. Engineering judgment should be used to determine design criteria beyond minimum requirements which should provide for unusual conditions.

CHAPTER I-1. NESC LOADING ZONES

The strength that must be designed into an overhead line depends to a large extent on the wind and ice loads that may be imposed on the conductor and supporting structure. This is related generally to the geographical location of the line.

The NESC divides the country into three weather or loading zones as shown in Exhibit 1. The usual practice is to design the line to withstand the ice and wind loads specified for the loading zone in which the line is located. These design conditions are as follows:

	Design Temp.	Radial Ice Thickness	Wind Pressure	Bare Aluminum Wire Constant
Heavy Loading	0° F.	$\frac{1}{2}$ in.	4 lbs/ft.^{2}	.31 lbs/ft.^{2}
Medium Loading	15° F.	$\frac{1}{4}$ in.	4 lbs/ft.^{2}	.22 lbs/ft.^{2}
Light Loading	30° F.	0 in.	9 lbs/ft.^{2}	.05 lbs/ft.^{2}

The ice and wind loads are assumed to be applied to the conductor which in turn transfers the load to the pole top and pole assembly.

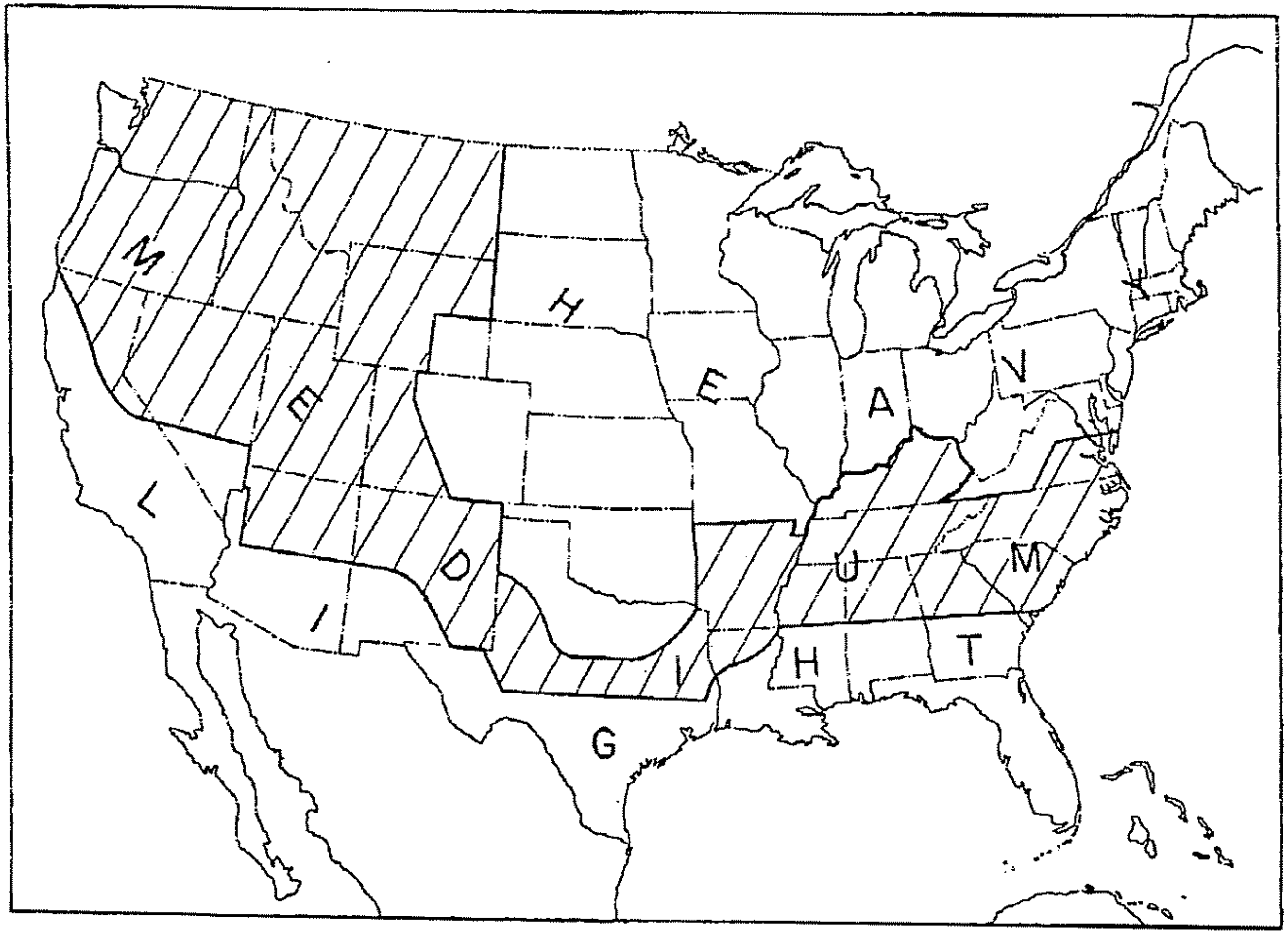


EXHIBIT I

General loading map showing territorial division of the United States with respect to loading of overhead lines

(NESC Sixth Edition)

CHAPTER I-2. NESC GRADES OF CONSTRUCTION

The line must be built with sufficient strength to withstand the assumed ice and wind loadings. The margins of safety for power lines are given in the NESC for three different grades of construction - Grades B, C and N.

- **Grade B** — Grade B is the strongest and is generally used for transmission line construction and for distribution lines crossing railroad tracks or under some conditions for distribution lines crossing communication circuits or major highways.

- **Grade C** — Grade C is the next strongest and is required by REA for rural distribution lines except as noted previously.

- **Grade N** — Grade N is the weakest and although permitted by the NESC is seldom used in practice.

Table 15 of the NESC gives the minimum grades of construction applicable for various situations. The required strength for Grades B and C construction is expressed by the NESC in several ways in Rule 261.

A. New Construction Grade C

1. Poles

a. Unguyed Poles (Rule 261, A, 4, a).

Unguyed wood poles shall withstand maximum design vertical and transverse loadings times a safety factor of 2 except at Grade C crossings where the safety factor shall be 2.67.

b. Deadends (Rule 261, A, 4, b).

At deadends, the safety factor for wood poles calculated at point of guy attachment shall be 1.33 times maximum longitudinal loading.

ID-HBL009
8/22/06

KENERGY CORPORATION
JOB ORDER 06-0046353

8:17:5
170 25 04

KEYED BY: MONTY GREEN
DATE KEYED: 8/22/06
TIME KEYED: 8:13:53

REQUESTED BY: FREEMAN

CREW NUMBER: 14

ASSOCIATED WITH SERVICE ORDER: 06-0046353 JOB ORDER

MS#:

00 P 170 25 048 00 0
POLE LOCATION

PHONE:
COUNTY:
DESIRED COMPLETION DATE: 8/22/06

FEB 2 0 2007

KWH MULT: 0 # OF WIRES: 0
PHASE: 0 VOLTS: 0 AMPS: .0 DEMAND:

LINE INSP

MATERIAL USED

ADDED UNIT	ADDED QTY	REMOVED UNIT	REMOVED QTY

PSC LINE INSPECTION

INSPECTED BY: FREEMAN DATE 8/14/06

COMPLETED BY: 14 DATE 2/16/07

SUBSTATION: UTICA

FEEDER: # 1

POLE NUMBER:

TYPE OF WORK COMPLETED:REPLACE 3/8 GUY
OFF ROAD.

NOTES..............................

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TAILGATE DISCUSSION

LEADER

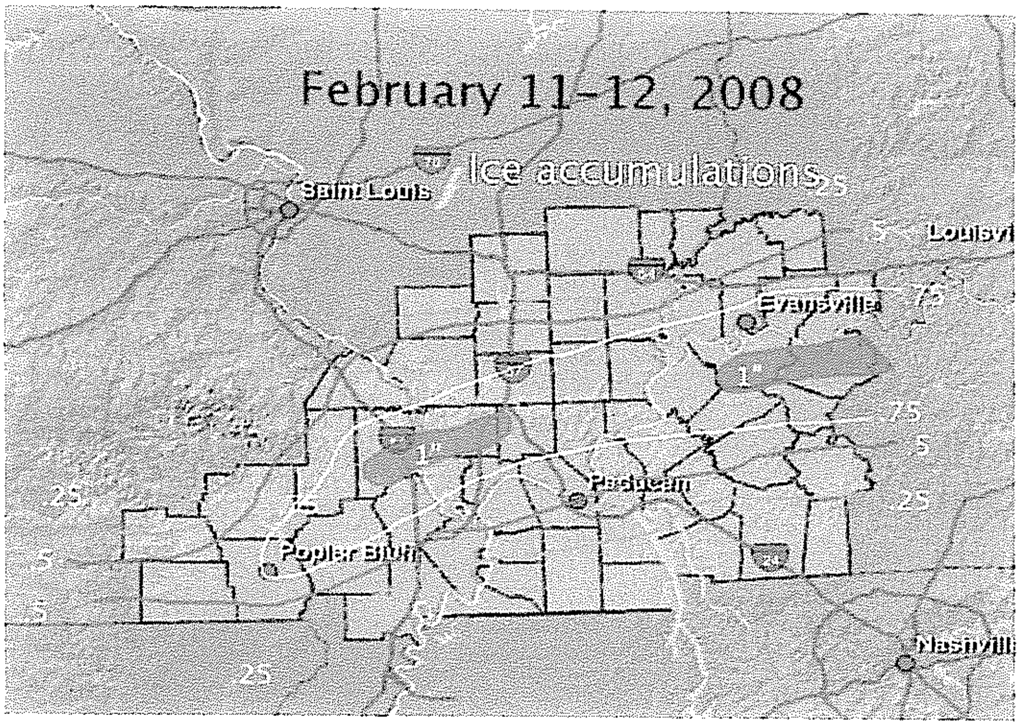
DATE TIME

EMPLOYEES PRESENT RUB GLOVES INSP

Travel Time Hrs Mins

EXHIBIT

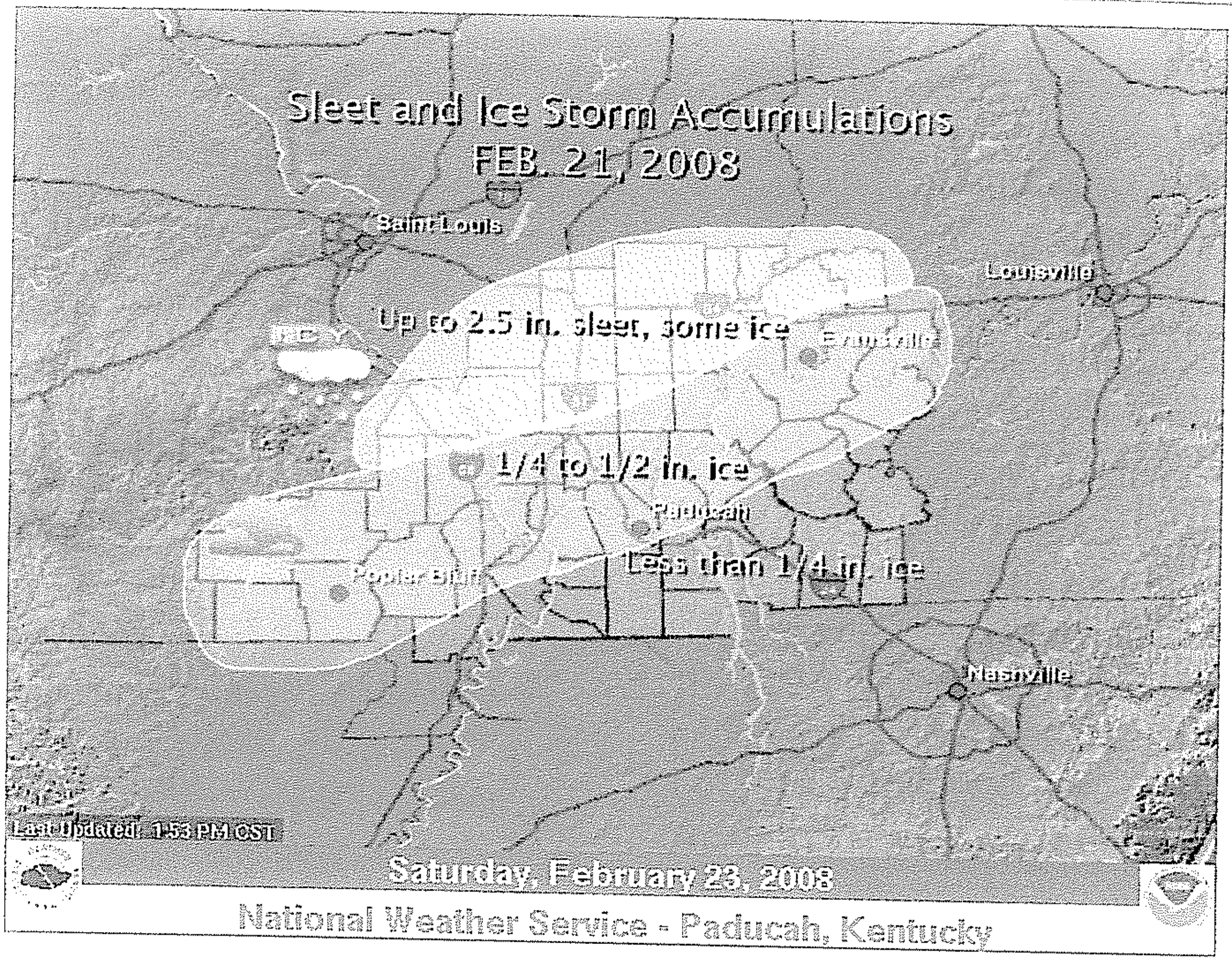
C



NATIONAL WEATHER SERVICE

EXHIBIT

D



EXHIBIT

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