DECISION NO. 66707, APPLICATION NO. 45653
(January 28, 1964)

General Order No. 95 modified for partial underground distribution systems (applicable to all California utilities).

[1] CONSTRUCTION AND OPERATION OF PLANT AND FACILITIES-OVERHEAD LINE CONSTRUCTION-GENERAL ORDERS. The basic concept of General Order No. 95 is to provide a set of rules for the design and construction of overhead lines, the application of which will insure adequate service and secure safety to persons engaged in the construction, maintenance, operation and use of overhead electrical lines and to the public in general. The General Order does not, however, set forth rules pertaining to operating or working conditions or to the method by which lines are worked upon except in extraordinary instances.

F. T. Searls, John C. Morrissey and Ross Workman, for applicant.

Robert H. Wooden, for International Brotherhood of Electrical Workers; M. A. Walters, for Local Union 1245, I.B.E. W.; interested parties.

H. A. Dannenbrink, Jr., for the Commission staff.

OPINION

This matter was heard before Examiner Emerson on November 20, 1963, at San Francisco.[1]

Heretofore, by Decision No. 64588 issued December 4, 1962, in Application No. 44806, Pacific Gas and Electric Company has been authorized to deviate from certain of the provisions of General Order No. 95, on a system-wide basis, in order to permit construction and operation of overhead high voltage conductors (nominally 12 kV) in vertical configuration on metal poles, in a new design termed" partial underground distribution ". Such authority to deviate was limited to the use of not more than two conductors of a single circuit of 7500 20,000 volts.

The new design, an attempt partially to meet the public's desire for elimination of overhead lines within residential districts and at the same time to keep the costs of distribution within reasonable economic limits and substantially below the costs of full undergrounding, has found ready acceptance by civic

[1] Also Heard, on a consolidated record, were Applications Nos. 45638, 45755, 45778, 45807, 45845 and 45846, such other matters dealings with specific instances of the general issues before the Commission.

groups, real estate developers and governmental bodies. Both trial and permanent installations, as authorized by the Commission, have been closely viewed by many interested persons and have engendered numerous requests for similar installations to be made in various sections of the State.

In view of the wide acceptance and, indeed, the number of demands [or such construction, Pacific Gas and Electric Company has completed or is currently constructing 15 partial underground distribution; systems and has 28 such systems in the planning stage. In compliance with the limited authority heretofore granted, such systems may accommodate only single-phase usage. Where customer demands call for three-phase service the new design may not, under present authority, be used. In order to meet this situation, two installations of three-phase systems were authorized by this Commission's Resolution No. E-1130, issued April 2, 1963, to be erected and operated in Alameda County. Construction of one of them was completed on June 21, 1963. Twelve others are contemplated and in the planning stage.

To date, the authorized construction has been confined to the so-called nonworkable voltages and to the Pacific Gas and Electric Company system through permitted deviations granted to that company alone The Commission staff, in recognition of the widespread interest in the new design and visualizing its state-wide application, suggested that Pacific Gas and Electric Company in any contemplated future application for authority to deviate, apply instead for modification of General Order No. 95 so that, if granted by the Commission, the new design might be utilized by any or all utilities in California. The instant application therefore seeks modification of General Order No. 95 itself and would apply state-wide.

The principal features of the new design are:

1. Uniformly tapered rigid steel poles, requiring no guying.
2. Transformers in specially-designed tanks mounted directly on the tops of poles.
3. Street lights, mounted on brackets attached to the poles, supplied by internal wiring and controlled by individual photocell units.
4. Primary lines supported in vertical configuration on the poles, just below the transformers.
5. Secondary conductors extending from the transformer down inside the pole to an underground secondary distribution system.
6. Poles are nonclimbable and energized primary conductors supported thereon are worked upon only from aerial lifts and by means of live-line tools.

Utility, labor union and Commission staff representatives have viewed and studied installations in the field. Their expert testimony is to the effect that such installations are satisfactory when viewed in the light of the principles embodied in the rules of General Order No. 95. In view of this expert testimony, the Commission finds that safety to workmen and to the public will not be lessened, that no undue hazard will result from the design and construction for which the proposed modification of the rules is intended, and that General Order No. 95 should be modified to the extent hereinafter ordered. The following discussion constitutes an explanation of the rule changes hereinafter ordered:

Rule .20.6-Since "partial underground construction" makes no provision for the poles being climbed by workmen and access to overhead equipment and conductors must be previded by means of aerial lifts, climbing space has no real meaning on such poles. The rule, therfore, will be clarified as being intended for climbable poles and structures.

Rule 20.8-D-The insulated conductors from the secondary terminals of the transformer to the splice box at the base of the pole are to be completely enclosed within the transformer case and the pole itself. Other risers and vertical runs (for example, secondary conductors to the street light) will be similarly encased. They will not be "unprotected conductors" and the rule will so provide.

New Rule 21.10-A definition of “partial underground distribution” is needed to describe the salient features of the new design. The details are to be described in other rules

New Rule 22.0-D-A definition of "nonclimbable" poles is needed and will be' made as an addition to Rule 22.0. Rule 31.5 and Rule 91.1-0nly supply conductors are to be supported by the poles in "partial underground distribution". These rules will emphasize such condition.

Rule 37, Table 1, Cases 8 and 9, Column E-The distance of 750.20,000 volt conductors from either line of pole and from surface of pole may be decreased to those distances which a post clamp-top or dead-end type insulator will provide, such conductors being not less than 6 inches from surface of pole when so supported. A new footnote (jj) will be added to show a reference to

Rule 54.4-D2 for the departure from the basic clearances set forth in Cases 8 and 9, Column E, Table 1.

Rule 38, Table 2, Case 10, Column E

Rule 38, Table 2, Case 11, Column F -It is intended that the spacing of high-voltage conductors in "partial underground distribution" systems be no greater than the normal crossarm pin spacing employed by a utility. For this

reason, Cases 10 and 11, Columns E and F will be footnoted and reference will be made to New Rule 54.4-C4c wherein the minimum vertical separations will be specified.

Rule 54.4-C4b and New Rule 54.4-C4c-It is intended that the present rule remain in full force and effect where climbable poles involved, whether in dead-end or tangent configuration. With respect to the new design using non climbable metal poles, it is intended that the vertical extent of line conductors (which are less than "normal" clearances from center-line and surface of pole) be held within practical limits and that the possible exposure of workmen to energized high-voltage conductors be held to a practical minimum. This rule will therefore be modified to indicate its applicability to climbable poles and a NEW RULE 54.4-C4c will be applicable to the nonclimbable poles contemplated for partial underground distribution.

Rule 54.4-D2-The present rule is primarily to amplify Table 1 clearances by showing clearances for 750-7500, for 7500-46,000 and for above 46,000 volts, and the rule applies generally to all poles, irrespective of pole material and whether or not the poles are climbable. In the new design, not only are the poles nonclimbable but, more importantly, work is performed only from aerial lifts. Under these special circumstances, the clearances may appropriately be lessened for voltage of 750-20,000 volts and the rule will be so modified.

Rule 54.4-D6b and New Rule 54.4-D6c-The principles discussed under Rule 54.4-C4b, above, are applicable here also and similar treatment will be accorded these rules.

Rule 54.6-D and R1tle 54.6-E-These rules did not contemplate runs and risers within a pole. They will be clarified so as to clearly provide for the encasement of conductors with the new type of metal pole construction.

Rule 54.6-F-In the vertical line conductor configuration of partial underground distribution, one or more riser terminals must be above the level of conductors of other phases. In addition, the terminals may appropriately be at no greater distance from surface of pole than are the line conductors to which they attach. Modification of the present rule will so provide.

[1] Rule 54.7-A-The basic concept of General Order No. 95 is to provide a set of rules for the design and construction of overhead lines, the application of which will insure adequate service and secure safety to persons engaged in the construction, maintenance, operation and use of overhead electrical lines and to the public in general. The General Order does not, however, set forth rules pertaining to operating or working conditions or to the methods by which lines are worked upon except in extraordinary instances. Experience through the

many years in which this General Order and its predecessors have been in use has, we believe, amply demonstrated the wisdom of adhering to the basic concept of providing rules for design rather than rules for working conditions. In the instant proceeding one of these extraordinary instances arises, wherein operating rules must be specified, because the new design pertaining to partial underground distribution is predicated on all overhead line work being done only from aerial lifts and by means of liveline tools. An appropriate place in which to set forth the necessary working methods appears to be in the climbing space rule, Rule 54.7 -A, and this rule will be modified accordingly.

Rule 55.3-D-In view of the special nature of the transformer tank construction and the line conductor placement on the pole, additional insulator requirements will be specified. Transformer bushings shall have ratings of .not less than 95 kV BIL and 60 kV dry flash-over. Insulators for 750-20,000 kV line conductors shall have not less than an 80 kV dry flash-over rating.

Rule 58.3-D3-The present rule, which recommends against hanging transformers on metal poles or structures, did not contemplate the exclusive use of aerial lifts for work on such poles or that the transformer tank would be an integral part of the pole structure. The rule will be modified to recognize these developments.

Rule 58.3-D-Since climbing space is not necessary in the new design, this rule may appropriately be modified.

Rule 58.5-D-This rule deals with both conductor clearances and climbing space requirements. While the rule may be modified respecting climbing space requirements, no convincing evidence was presented respecting a proposal to lessen conductor clearances. The rule governs line switches and line disconnecting devices. No such equipment especially used or adaptable to the type of construction proposed in this proceeding is known by or has been brought to the attention of the Commission. Pending development of such equipment and experience with its use, modification of this rule will be deferred.

ORDER

IT IS ORDERED that this Commission's General Order No. 95 "Rules for Overhead Electric Line Construction," be and it is hereby modified to the extent set forth in Appendix A attached to this order, said modifications to become effective on the tenth day following the date of this order.

IT IS FURTHER ORDERED that the Secretary shall cause a copy of this order and its Appendix A to be served upon each electric and telephone utility subject to the jurisdiction of this Commission and, further, to cause a suitable

number of copies to be made available for distribution to such of the general public as may request the same.

The effective date of this order shall be the date hereof.

Dated at San Francisco, California, this 28th day of January, 1964.

BENNETT, President

MITCHELL, McKEAGE, GROVER, HOLOBOFF, Commissioners

Appendix A

The rules of General Order No. 95 are modified, amended or added to as set forth below:

1. Rule 20.6

   This rule is amended to read as follows:

   > "CLIMBING SPACE means the space reserved along the surface of a climbable pole or structure to permit ready access for linemen to equipment and conductors located on the pole or structure."

2. Rule 20.8-D

   This rule is amended to read as follows:

   > "UNPROTECTED CONDUCTORS mean supply conductors not covered by a "suitable protective covering" (see Rule 22.2), grounded metal conduit, grounded metal sheath or shield, or impregnated fiber, and not enclosed in a grounded metal pole. The provisions for the use of these various types of coverings are specified in certain of these rules."

3. Rule 21.10

   This is a new rule which shall read as follows:

   > "21.10 PARTIAL UNDERGROUND DISTRIBUTION means a supply system of overhead primary conductors supported in vertical configuration, without, crossarms, on nonclimbable, non-joint-poles, and with underground secondary distribution facilities (see .App. G, Fig. 87)."

4. Rule 22.0-D

   This is a new rule, which shall read as follows:

   > "D. NON-CLIMBABLE POLE means a metal pole of smooth exterior surface" (not latticed), that is not equipped with pole steps or other provisions for.1 climbing, and upon which work is performed only from aerial lifts." '

5. Rule 31.5

Add to the existing rule a paragraph which shall read as follows:

> "Non-climbable poles in partail underground distribution systems (see Rules 22.0-D and 21.10) shall not be jointly used."

6. Rule 37, Table 1

In Table 1, Case 8, Column E and in Case 9, Column E, add footnote (jj) and in the "references to rules modifying minimum clearances in Table 1" add the following:

" (jj) May be decreased in partial underground distribution" 54.4-D2

7. Rule 38, Table 2

In Table 2, Case 10, Column E and in Case 11, Column F, add footnote (ee) and in "references to rules modifying minimum clearances in Table 2" add the following:

"(ee) May be decreased in partial underground distribution 54.4-C4c

8 Rule 54.4-C4b

The first paragraph of this rule is revised to read as follows:

> "b) Conductors of More than 750 Volts supported on climbable poles: Where conductors of more than 750 volts are supported in vertical configuration directly on a climbable pole without the use of crossarms at line terminations, angles or corners, the following requirements apply:"

9. Rule 54.4-C4c .

This is a new rule, which shall read as follows:

> "c) Conductors of More than 750 Volts supported on non-climbable pole,: Where conductors of more than 750 volts are supported in vertical configuration on non-climbable poles in partial underground distribution at line terminations, angles, or corners, the following requirements apply:
>
> > Not more than three conductors of a single circuit of 750-20,000 volts shall be supported directly on the pole in vertical configuration without the use of crossarms, Branch

circuits may be taken from such construction without the use of crossarms provided that conductors are supported on not more than three sides of the pole, there being four sides (see App. G, Fig. 88);

The vertical separation between conductors shall be not less than the pin spacings specified in Table 2, Case 15;

The clearance of conductors from surface of pole shall be not less than, as specified in Rule 54.4-D2."

10. Rule 54.4-D2

This rule is modified by adding thereto a new paragraph which shall read as follows:

"These clearances from center line of pole need not apply to conductors of 750-7500 volts and 7500-20,000 volts supported in vertical configuration in partial underground distribution provided: a) such conductors have clearances from surface of pole of not less than 6 inches, b) in tangent construction, conductors so supported are not attached to more than one side of pole, and c) in dead-end construction conductors so supported are not attached to more than three sides of a pole (there being four sides, see App. G, Fig. 88)."

11. Rule 54.4-D6b

The first sentence of this rule is revised to read as follows:

"b) More than 750 Volts supported on climbable poles: Where conductors are dead-ended on a climbable pole in vertical configuration, the energized portions of such conductors shall have clearances of not less than 15 inches : from the surface of pole for voltages between 750 and 7500 volts and 18 ; inches from surface of pole for voltages in excess of 7500 volts."

12. Rule 54.4-D6c

This is a new rule, which shall read as follows:

"b) More than 750 Volts supported on non-climbable poles: Where conductors : are dead-ended on a non-climbable pole in partial

underground distribution, the energized portions of such conductors shall be not less than 6 inches from surface of pole (see Rule 54.4-D2)."

13. Rule 54.6-D

The third paragraph of this rule is revised to read as follows:

"Vertical runs, where encased in grounded non-climbable metal poles, grounded metal conduit, sheath, or shield, shall be treated as risers."

14. Rule 54.6-E

The last paragraph of this rule (page 110) is revised to read as follows:

"Protective covering (suitable) is not required over risers encased in effectively grounded non-climbable metal poles or in iron or steel pipe attached to a steel pole, tower or other metal structure, provided the iron or steel pipe is effectively grounded and is metallically connected to such metal structure."

15. Rule 54.6-F

The first paragraph of this rule is modified to read as follows:

"Terminals of risers or runs shall not extend above the level of line conductors to which terminal leads are connected except as follows:

Where the line conductors are installed in vertical configuration in partial underground distribution, or where the line conductors are dead-ended on the opposite side of crossarms from the terminals and no line conductors supported on the same crossarm and the same side of pole extend past the terminals and no buckarm construction is involved, or

Where conductors in excess of 7500 volts are installed in vertical configuration on crossarms, and the terminals are mounted on the same arms which support the conductors to which the terminals are connected."

The third paragraph of this rule is revised to read as follows:

"Cable or conduit bends and the terminals of risers or runs of conductors of more than 750 volts supported on climbable poles or

structures shall be arranged with as little exposed surface as practicable but are not required to be covered by a protective covering provided that no portion of the terminal or associated unprotected conductors are within the climbing space or within the clearance from center line of pole specified in Table 1, Case 8 (15 or 18 inches). All exposed grounded surfaces of such terminal fittings and bends of risers and runs shall be not less than 18 inches vertically above the conductor level, and not less than 2 feet radially from any conductor at the next conductor level, of unprotected conductors of another circuit which is entirely below the level of the circuit to which the riser is connected."

Following the above paragraph, the following new paragraph shall be inserted:

"In partial underground distribution (750-20,000 volts in vertical configuration on non-climbable poles), energized portions of the terminals may be less than the clearances from center line of pole specified in Table 1, Case 8, Column E (15 or 18 inches) but shall be not less than 6 inches from the surface of the non-climbable metal pole and grounded metal surfaces associated therewith."

16. Rule 54.7-A

The following new paragraph shall be added to this rule (page 113).

"This Rule 54.7-A need not apply to non-climbable metal poles in partial underground distribution, provided the regular written operating rules of the utility concerned specify that all work on conductors and equipment supported by such poles shall be performed only from aerial lifts and (1) in the case of primary conductors, shall be done with live-line tools after installing adequate insulating and protective devices or barriers in order to (a) prevent accidental contact by the workman with the energized conductors other than the conductor being worked on and (b) to minimize the possibility of simultaneous contact of the metal parts of live-line tools with the grounded pole and the energized conductor and (2) in the case of secondary conductors shall be done after suitably covering all energized primary conductors with adequate insulating and protective devices or barriers."

17. Rule 55.3-D

This rule is amended to read as follows:

"Insulators used in territories where fog or lightning conditions prevail should be given more liberal factors of safety than those indicated in Table 12.

In partial underground distribution, the primary transformer bushings shall have ratings of not less than 95 kV BIL and a dry flashover of not less than 60 kV; line conductor insulators, either post clamp or dead-end type, shall have a dry flashover rating of not less than 80 kV.

Insulators used at crossings or conflicts shall conform to Rules 104 and 114."

18. Rule 58.3-C3

The first sentence of the second paragraph of this rule is amended to read as follows:

"Except in the case of partial underground distribution systems (see Rule 21.10), the hanging or placing of transformers on metal poles or structures is not recommended, particularly with respect to transformers connected to circuits of less than 14,000 volts."

19. Rule 58.3-D

The following paragraph is added to this rule:

"The provisions of this rule shall not apply to partial underground distribution systems."

20. Rule 91.1

Add to the existing rule a paragraph which shall read as follows:

"Non-climbable metal poles in partial underground construction (see Rules 22;O-D and 21.10) shall not be jointly used."

21. Appendix G

Figures 87 and 88 are added to Appendix G in order to illustrate the type of construction and clearances involved in partial underground distribution.

Strikeout and Underline Section added by Raymond Fugere on April 3, 2002

Original Version
Rule 20.6

20.6 Climbing Space means the space reserved along the surface of a pole or structure to permit ready access for lineman to equipment and conductors located on the pole or structure.

Strikeout and Underline Version
Rule 20.6

20.6 Climbing Space means the space reserved along the surface of a climbable pole or structure to permit ready access for linemen to equipment and conductors located on the pole or structure.

Final Version
Rule 20.6

20.6 Climbing Space means the space reserved along the surface of a climbable pole or structure to permit ready access for linemen to equipment and conductors located on the pole or structure.

Original Version
Rule 20.8-D

20.8 Conductor

D Unprotected Conductor mean supply conductors not covered by a "suitable protective covering" (see Rule 22.2), grounded metal conduit, grounded metal sheath or shield, or impregnated fiber. The provisions for the use of these various types of coverings are specified in certain of these rules.

Strikeout and Underline Version
Rule 20.8-D

20.8 Conductor

D Unprotected Conductors mean supply conductors not covered by a "suitable protective covering" (see Rule 22.2), grounded metal conduit, grounded metal sheath or shield, or impregnated fiber, and not enclosed in a grounded metal pole. The provisions for the use of these various types of coverings are specified in certain of these rules.

Final Version
Rule 20.8-D

20.8 Conductor

D Unprotected Conductors mean supply conductors not covered by a "suitable protective covering" (see Rule 22.2), grounded metal conduit, grounded metal sheath or shield, or impregnated fiber, and not enclosed in a grounded metal pole. The provisions for the use of these various types of coverings are specified in certain of these rules.

Original Version
Rule 21.10

New rule

Strikeout and Underline Version
Rule 21.10

21.10 Partial Underground Distribution means a supply system of overhead primary conductors supported in vertical configuration, without, crossarms, on nonclimbable, non-joint-poles, and with underground secondary distribution facilities (see .App. G, Fig. 87).

Final Version
Rule 21.10

21.10 Partial Underground Distribution means a supply system of overhead primary conductors supported in vertical configuration, without, crossarms, on nonclimbable, non-joint-poles, and with underground secondary distribution facilities (see .App. G, Fig. 87).

Original Version
Rule 22.0-D

New Rule

Strikeout and Underline Version
Rule 22.0-D

22.0 Pole

D Non-Climbable Pole means a metal pole of smooth exterior surface" (not latticed), that is not equipped with pole steps or other provisions for.1 climbing, and upon which work is performed only from aerial lifts.

Final Version
Rule 22.0-D

22.0 Pole

D Non-Climbable Pole means a metal pole of smooth exterior surface" (not latticed), that is not equipped with pole steps or other provisions for.1 climbing, and upon which work is performed only from aerial lifts.

Original Version
Rule 31.5

31.5 Joint Use of Poles

Joint use of poles shall be given consideration by all interested parties where construction or reconstruction is involved and where used it shall be subject to the appropriate grade of construction as specified in Section IV. Nothing herein shall be construed as requiring joint use of the same poles, or as granting authority for the use of any poles without the owner's consent. (See Rule 32.2 and Section IX.)

Each party should definitely designate its space requirements on joint use poles, which space shall not be occupied without consent, by equipment of any other party.

Strikeout and Underline Version
Rule 31.5

31.5 Joint Use of Poles

Joint use of poles shall be given consideration by all interested parties where construction or reconstruction is involved and where used it shall be subject to the appropriate grade of construction as specified in Section IV. Nothing herein shall be construed as requiring joint use of the same poles, or as granting authority for the use of any poles without the owner's consent. (See Rule 32.2 and Section IX.)

Each party should definitely designate its space requirements on joint use poles, which space shall not be occupied without consent, by equipment of any other party.

<u>Non-climbable poles in partail underground distribution systems (see Rules 22.0-D and 21.10) shall not be jointly used.</u>

Final Version
Rule 31.5

31.5 Joint Use of Poles

Joint use of poles shall be given consideration by all interested parties where construction or reconstruction is involved and where used it shall be subject to the appropriate grade of construction as specified in Section IV. Nothing herein shall be construed as requiring joint use of the same poles, or as granting authority for the use of any poles without the owner's consent. (See Rule 32.2 and Section IX.)

Each party should definitely designate its space requirements on joint use poles, which space shall not be occupied without consent, by equipment of any other party.

Non-climbable poles in partail underground distribution systems (see Rules 22.0-D and 21.10) shall not be jointly used.

Original Version

Table 1

Basic Minimum Allowable Vertical Clearance of Wire Above Railroads, Thoroughfares and Ground; Also clearances from Poles, Buildings, Structures or Other Objects
(Letter References Denote Modifications of Minimum Clearances as Referred to in Note Following this Table)

Case No	Nature of Clearance	Wire or Conductor Concerned					
		A Span wires other than trolley span wires), overhead guys and messengers	B Communication conductors (including open wire, cables and service drops), supply service drops of 0-750 volts	C Trolley Contact, feeder and span wires 0-5000 volts	D Supply conductors of 0-750 volts and supply cables treated as in Rule 57.8	E Supply Conductors and supply cables, 750-20,000 volts	F Supply Conductors and supply cables more than 20,000 volts
1	Crossing above tracks of railroads which transport or propose to transport freight cars (max height 15 ft 1in) where not operated by overhead contact wires (a) (b) (c) (d)	25 ft	25 ft	22 ft	25 ft	28 ft	34 ft
2	Crossing or paralleling above tracks of railroads operated by overhead trolleys (b) (c) (d)	26 ft (e)	26 ft (e) (f) (g)	19 ft (h) (i)	27 ft (e) (g)	30 ft (g)	34 ft (g)
3	Crossing or along thoroughfares in Urban districts or crossings thoroughfares in rural districts (c) (d)	18 ft (j) (k) (ii)	18 ft (j) (l) (m) (ii)	19 ft (hh)	20 ft (ii)	25 ft (n) (o) (ii)	30 ft (o) (ii)
4	Above ground along thoroughfares in rural districts or across other areas capable of being transversed by vehicles or agricultural equipment.	15 ft (k)	15 ft (m) (n) (p)	19 ft	16 ft	25 ft (n) (o)	30 ft (0) (p)
5	Vertical ground in areas accessible to pedestrians only.	7 ft	10 ft (m) (q)	19 ft	12 ft	17 ft	25 ft (o)
6	Vertical clearance above buildings and bridges (or other structures which do not ordinarily support conductors and on which men can walk) whether attached or unattached.	8 ft (r)	8 ft (r)	8 ft	8 ft	12 ft	12 ft
7	Horizontal clearance of conductor from buildings (except generating and substations), bridges or other structures (upon which men may work) where such conductor is not attached thereto. (a) (t)	----------	3 ft (u)	3 ft	3 ft (u) (v)	6 ft (v)	6 ft (v)
8	Distance of conductor from center line of pole, wheter attached or unattached (w) (x) (y)	----------	15 in (a) (aa)	15 in (aa) (bb) (cc)	15 in (aa) (dd)	15 or 18 in (dd) (ee)	18 in (dd) (ee)
9	Distance of conductor from surface of pole, crossarm or other overhead line structure upon which it is supported, providing it complies with Case 8 above (x) (ee)	----------	3 in (aa) (ff)	3 in (aa) (cc) (gg)	3 in (aa) (dd) (gg)	3 in (dd) (gg)	¼ pin spacing shown in Table 2 Case 15 (dd)

(a)	Shall not be reduced more than 5% because of temperature or loading 1. Supply Lines 2. Communication Lines	37 54.4-B1 84.4-B1
(b)	Shall be increased for supply conductors on Suspension insulators, under certain conditions	37
(c)	Special clearances are provided for traffic signal equipment	58.1-C
(d)	Special clearances are provided for street lighting equipment	58.2-B
(e)	Based on trolley pole throw of 26 feet. May be reduced where suitably protected. 1. Supply Guys 2. Supply cables and messengers 3. Communication Guys 4. Communication cables and messengers	 56.4-B2 57.4-B2 86.4-B2 87.4-B2
(f)	May be reduced depending on height of trolley contact conductors. 1. Supply Service Drop 2. Communication service drops	 54.8-C5 84.8-D5
(g)	May be reduced and shall be increased depending on trolley throw 1. Supply conductors (except service drops) 2. Communication conductors (except service drops)	 54.4-B2 84.4-B2
(h)	Shall be increase where freight cars are transported. 1. Trolley contact and feeder conductors 2. Trolley span wires	 74.4-B1 77.4-A
(i)	May be reduced for trolley contact and span wires in subways, tunnels and under bridges 1. Trolley contact conductors 2. Trolley span wires	 74.4-E 77.4-A
(j)	May be reduced at crossings over private thoroughfares and entrances to private property and over private property. 1. Supply Service drops 2. Supply Guys 3. Communication service drops 4. Communication guys	 54.8-B2 56.4-A 84.8-C2 86.4-A
(k)	May be reduced along thoroughfares where not normally accessible to vehicles. 1. Supply Guys 2. Communication Guys	 56.4-A1 86.4-A1
(l)	May be reduced where within 12 feet of curb line of public thoroughfares 1. Supply Service drops 2. Communication service drops	 54.8-B1 84.8-C1
(m)	May be reduced for railways signal cables under special conditions	84.4-A4
(n)	May be reduced in rural districts 1. Supply conductors, 750-20,000 volts, crossing roads or driveways 2. Supply conductors, 750-2000 volts, above agricultural areas and along roads 3. Communication conductors along roads	 54.4-A2a 54.4-A2b 84.4-A2
(o)	May be reduced for transformer, regulator or capacitor leads. 1. Transformer Leads 2. Regulator or Capacitor Leads	 58.3-B1a 58.4-B1
(p)	May be reduced across arid or mountainous areas 1. Supply Conductors of more than 20, 000 Volts 2. Communication conductors	 54.4-A1 84.4-A1

(q)	Shall be increased or may be reduced under special conditions.	
	1. Increased for supply service drops on industrial or commercial premises	54.8-B3a
	2. Supply service drops on residential premises	54.8-B3b
	3. Communication conductors	84.4-A3
	4. Increased for Communication service drops on industrial or commercial premises	84.8-C3a
	5. Communication service drops on residential premises	84.8-C3b
(r)	May be reduced above roofs of buildings under special conditions	
	1. Supply overhead guys	56.4-G
	2. Supply service drops	54.8-B4
	3. Communication overhead guys	86.4-F
	4. Communication conductors and cables	84.4-E
	5. Communication service drops	84.8-C4
(s)	Also applies at fire escapes, etc.	
	1. Supply Conductors	54.4-H1
	2. Supply service drops on industrial or commercial premises	54.8-B4a
	3. Supply service drops on residential premises	54.8-B4b
	4. Communication Conductor	84.4-E
(t)	Special Clearances where attached to buildings, bridges or other structures	
	1. Supply conductors of 750-20,000 volts	54.4-H2
	2. Trolley Contact Conductors	74.4-E
	3. Communication Conductors	84.4-F
(u)	Reduced clearances permitted under special conditions	
	1. Supply service drops on industrial or commercial premises	54.8-B4a
	2. Supply cables, grounded	57.4-G
	3. Communication cables beside buildings, etc.	84.4-E
	4. Communication conductors under bridges, etc.	84.4-F
	5. Communication service drops.	84.8-C4
(v)	May be reduced under special conditions.	
	1. Supply conductors of 750-7500 volts	54.4-H1
	2. Supply transformer lead and bus wires where guarded	58.3-B2
(w)	May be reduced at angles in lines and transportation points	
	1. Supply conductors	54.4-D1
	2. Communication Conductors	84.4-D5
(x)	May be reduced for suitably protected lateral or vertical runs.	
	1. Supply bond wires	53.4
	2. Supply ground wires	54.6-B
	3. Supply lateral conductors	54.6-C
	4. Supply vertical pins	54.6-D
	5. Supply risers	54.6-E
	6. Communication Ground Wires	84.6-B
	7. Communication lateral conductors	84.6-C
	8. Communication vertical runs	84.6-D
	9. Communication risers	84.6-E

(y)	Increased clearances for certain conductors	
	1. Unattached conductors on colinear lines and crossing lines	32.3
	2. Unattached supply conductors	54.4D3
	3. Supply Service drops on clearance crossarms	54.8-C2
	4. Supply Service drops on pole top extensions	54.8-C3
	5. Unattached Supply service drops	54.8-D
	6. Communication lines, collinear, conflicting or crossing	84.4-D3
	7. Communication conductors passing supply poles and unattached thereto	84.4-D4
	8. Communication service drops on clearance crossarms	84.8-D2
	9. Communication service drops on pole top extensions	84.8-D3
	10. Unattached Communication service drops	84.8-E
(z)	Special provisions for police and fire alarm conductors require increased clearances	92.2
(aa)	May be reduced under special provisions.	
	1. Supply conductors of 0-750 volts in rack configuration	54.4-D5
	2. Supply service drops from racks	54.8-F
	3. Supply cables and messengers attached to poles	57.4-F
	4. Communication conductors on communication poles	84.4-D
	5. Communication conductors on crossarms	84.4-D1
	6. Communication conductors attached to poles	84.4-D2
	7. Communication service drops attached to poles	84.8-B
	8. Communication cables and messengers	87.4-D
	9. Supply or communication cables and messengers on jointly used poles	92.1-B
	10. Communication service drops on pole top extensions	92.1-C
(bb)	May be reduced for Class T conductors of not more than 750 volts and of the same potential and polarity	74.4-D
(cc)	Not applicable to trolley span wires	77.4-E
(dd)	Special clearances for pole-top and dead-end construction	
	1. Conductors dead-ended in vertical configuration on poles	54.4-C4
	2. Conductors dead-ended in horizontal configuration	54.4-D7
	3. Conductors in pole-top construction	54.4-D8
(ee)	Clearance requirements for certain voltage classifications	54.4-D2
(ff)	Not applicable to communication conductors	84.4-D
(gg)	Clearance from crossarms may be reduced for certain conductors	
	1. Suitably insulated leads to protected runs	54.4-E
	2. Leads of 0-5000 volts to equipment	54.4-E
	3. Leads of 0-5000 volts to cutouts or switches	58.5-C
(hh)	Reduced clearance permitted from temporary fixtures and lighting circuits 0-300 volts	78.3A(1)
(ii)	Special Clearances Required Above Public and Private Swimming Pools:	
	1. Supply line conductors	54.4–A4
	2. Supply service drops	54.8–B5
	3. Communication line conductors	84.4–A5
	4. Communication service drops	84.8–C5
	5. Supply guys, span wires	56.4–A3
	6. Communication guys	86.4–A3

Strikeout and Underline Version

Table 1

Basic Minimum Allowable Vertical Clearance of Wire Above Railroads, Thoroughfares and Ground; Also clearances from Poles, Buildings, Structures or Other Objects
(Letter References Denote Modifications of Minimum Clearances as Referred to in Note Following this Table)

Case No	Nature of Clearance	Wire or Conductor Concerned					
		A Span wires other than trolley span wires), overhead guys and messengers	B Communication conductors (including open wire, cables and service drops), supply service drops of 0-750 volts	C Trolley Contact, feeder and span wires 0-5000 volts	D Supply conductors of 0-750 volts and supply cables treated as in Rule 57.8	E Supply Conductors and supply cables, 750-20,000 volts	F Supply Conductors and supply cables more than 20,000 volts
1	Crossing above tracks of railroads which transport or propose to transport freight cars (max height 15 ft 1in) where not operated by overhead contact wires (a) (b) (c) (d)	25 ft	25 ft	22 ft	25 ft	28 ft	34 ft
2	Crossing or paralleling above tracks of railroads operated by overhead trolleys (b) (c) (d)	26 ft (e)	26 ft (e) (f) (g)	19 ft (h) (i)	27 ft (e) (g)	30 ft (g)	34 ft (g)
3	Crossing or along thoroughfares in Urban districts or crossings thoroughfares in rural districts (c) (d)	18 ft (j) (k) (ii)	18 ft (j) (l) (m) (ii)	19 ft (hh)	20 ft (ii)	25 ft (n) (o) (ii)	30 ft (o) (ii)
4	Above ground along thoroughfares in rural districts or across other areas capable of being transversed by vehicles or agricultural equipment.	15 ft (k)	15 ft (m) (n) (p)	19 ft	16 ft	25 ft (n) (o)	30 ft (0) (p)
5	Vertical ground in areas accessible to pedestrians only.	7 ft	10 ft (m) (q)	19 ft	12 ft	17 ft	25 ft (o)
6	Vertical clearance above buildings and bridges (or other structures which do not ordinarily support conductors and on which men can walk) whether attached or unattached.	8 ft (r)	8 ft (r)	8 ft	8 ft	12 ft	12 ft
7	Horizontal clearance of conductor from buildings (except generating and substations), bridges or other structures (upon which men may work) where such conductor is not attached thereto. (a) (t)	----------	3 ft (u)	3 ft	3 ft (u) (v)	6 ft (v)	6 ft (v)
8	Distance of conductor from center line of pole, wheter attached or unattached (w) (x) (y)	----------	15 in (a) (aa)	15 in (aa) (bb) (cc)	15 in (aa) (dd)	15 or 18 in (dd) (ee) (jj)	18 in (dd) (ee) (jj)
9	Distance of conductor from surface of pole, crossarm or other overhead line structure upon which it is supported, providing it complies with Case 8 above (x) (ee)	----------	3 in (aa) (ff)	3 in (aa) (cc) (gg)	3 in (aa) (dd) (gg)	3 in (dd) (gg)	¼ pin spacing shown in Table 2 Case 15 (dd)

(a)	Shall not be reduced more than 5% because of temperature or loading 1. Supply Lines 2. Communication Lines	37 54.4-B1 84.4-B1
(b)	Shall be increased for supply conductors on Suspension insulators, under certain conditions	37
(c)	Special clearances are provided for traffic signal equipment	58.1-C
(d)	Special clearances are provided for street lighting equipment	58.2-B
(e)	Based on trolley pole throw of 26 feet. May be reduced where suitably protected. 1. Supply Guys 2. Supply cables and messengers 3. Communication Guys 4. Communication cables and messengers	 56.4-B2 57.4-B2 86.4-B2 87.4-B2
(f)	May be reduced depending on height of trolley contact conductors. 1. Supply Service Drop 2. Communication service drops	 54.8-C5 84.8-D5
(g)	May be reduced and shall be increased depending on trolley throw 1. Supply conductors (except service drops) 2. Communication conductors (except service drops)	 54.4-B2 84.4-B2
(h)	Shall be increase where freight cars are transported. 1. Trolley contact and feeder conductors 2. Trolley span wires	 74.4-B1 77.4-A
(i)	May be reduced for trolley contact and span wires in subways, tunnels and under bridges 1. Trolley contact conductors 2. Trolley span wires	 74.4-E 77.4-A
(j)	May be reduced at crossings over private thoroughfares and entrances to private property and over private property. 1. Supply Service drops 2. Supply Guys 3. Communication service drops 4. Communication guys	 54.8-B2 56.4-A 84.8-C2 86.4-A
(k)	May be reduced along thoroughfares where not normally accessible to vehicles. 1. Supply Guys 2. Communication Guys	 56.4-A1 86.4-A1
(l)	May be reduced where within 12 feet of curb line of public thoroughfares 1. Supply Service drops 2. Communication service drops	 54.8-B1 84.8-C1
(m)	May be reduced for railways signal cables under special conditions	84.4-A4
(n)	May be reduced in rural districts 1. Supply conductors, 750-20,000 volts, crossing roads or driveways 2. Supply conductors, 750-2000 volts, above agricultural areas and along roads 3. Communication conductors along roads	 54.4-A2a 54.4-A2b 84.4-A2
(o)	May be reduced for transformer, regulator or capacitor leads. 1. Transformer Leads 2. Regulator or Capacitor Leads	 58.3-B1a 58.4-B1
(p)	May be reduced across arid or mountainous areas 1. Supply Conductors of more than 20, 000 Volts 2. Communication conductors	 54.4-A1 84.4-A1

(q)	Shall be increased or may be reduced under special conditions.	
	1. Increased for supply service drops on industrial or commercial premises	54.8-B3a
	2. Supply service drops on residential premises	54.8-B3b
	3. Communication conductors	84.4-A3
	4. Increased for Communication service drops on industrial or commercial premises	84.8-C3a
	5. Communication service drops on residential premises	84.8-C3b
(r)	May be reduced above roofs of buildings under special conditions	
	1. Supply overhead guys	56.4-G
	2. Supply service drops	54.8-B4
	3. Communication overhead guys	86.4-F
	4. Communication conductors and cables	84.4-E
	5. Communication service drops	84.8-C4
(s)	Also applies at fire escapes, etc.	
	1. Supply Conductors	54.4-H1
	2. Supply service drops on industrial or commercial premises	54.8-B4a
	3. Supply service drops on residential premises	54.8-B4b
	4. Communication Conductor	84.4-E
(t)	Special Clearances where attached to buildings, bridges or other structures	
	1. Supply conductors of 750-20,000 volts	54.4-H2
	2. Trolley Contact Conductors	74.4-E
	3. Communication Conductors	84.4-F
(u)	Reduced clearances permitted under special conditions	
	1. Supply service drops on industrial or commercial premises	54.8-B4a
	2. Supply cables, grounded	57.4-G
	3. Communication cables beside buildings, etc.	84.4-E
	4. Communication conductors under bridges, etc.	84.4-F
	5. Communication service drops.	84.8-C4
(v)	May be reduced under special conditions.	
	1. Supply conductors of 750-7500 volts	54.4-H1
	2. Supply transformer lead and bus wires where guarded	58.3-B2
(w)	May be reduced at angles in lines and transportation points	
	1. Supply conductors	54.4-D1
	2. Communication Conductors	84.4-D5
(x)	May be reduced for suitably protected lateral or vertical runs.	
	1. Supply bond wires	53.4
	2. Supply ground wires	54.6-B
	3. Supply lateral conductors	54.6-C
	4. Supply vertical pins	54.6-D
	5. Supply risers	54.6-E
	6. Communication Ground Wires	84.6-B
	7. Communication lateral conductors	84.6-C
	8. Communication vertical runs	84.6-D
	9. Communication risers	84.6-E

(y)	Increased clearances for certain conductors	
	1. Unattached conductors on colinear lines and crossing lines	32.3
	2. Unattached supply conductors	54.4D3
	3. Supply Service drops on clearance crossarms	54.8-C2
	4. Supply Service drops on pole top extensions	54.8-C3
	5. Unattached Supply service drops	54.8-D
	6. Communication lines, collinear, conflicting or crossing	84.4-D3
	7. Communication conductors passing supply poles and unattached thereto	84.4-D4
	8. Communication service drops on clearance crossarms	84.8-D2
	9. Communication service drops on pole top extensions	84.8-D3
	10. Unattached Communication service drops	84.8-E
(z)	Special provisions for police and fire alarm conductors require increased clearances	92.2
(aa)	May be reduced under special provisions.	
	1. Supply conductors of 0-750 volts in rack configuration	54.4-D5
	2. Supply service drops from racks	54.8-F
	3. Supply cables and messengers attached to poles	57.4-F
	4. Communication conductors on communication poles	84.4-D
	5. Communication conductors on crossarms	84.4-D1
	6. Communication conductors attached to poles	84.4-D2
	7. Communication service drops attached to poles	84.8-B
	8. Communication cables and messengers	87.4-D
	9. Supply or communication cables and messengers on jointly used poles	92.1-B
	10. Communication service drops on pole top extensions	92.1-C
(bb)	May be reduced for Class T conductors of not more than 750 volts and of the same potential and polarity	74.4-D
(cc)	Not applicable to trolley span wires	77.4-E
(dd)	Special clearances for pole-top and dead-end construction	
	1. Conductors dead-ended in vertical configuration on poles	54.4-C4
	2. Conductors dead-ended in horizontal configuration	54.4-D7
	3. Conductors in pole-top construction	54.4-D8
(ee)	Clearance requirements for certain voltage classifications	54.4-D2
(ff)	Not applicable to communication conductors	84.4-D
(gg)	Clearance from crossarms may be reduced for certain conductors	
	1. Suitably insulated leads to protected runs	54.4-E
	2. Leads of 0-5000 volts to equipment	54.4-E
	3. Leads of 0-5000 volts to cutouts or switches	58.5-C
(hh)	Reduced clearance permitted from temporary fixtures and lighting circuits 0-300 volts	78.3A(1)
(ii)	Special Clearances Required Above Public and Private Swimming Pools:	
	1. Supply line conductors	54.4–A4
	2. Supply service drops	54.8–B5
	3. Communication line conductors	84.4–A5
	4. Communication service drops	84.8–C5
	5. Supply guys, span wires	56.4–A3
	6. Communication guys	86.4–A3
(jj)	May be decreased in partial underground distribution	54.4-D2

Final Version

Table 1

Basic Minimum Allowable Vertical Clearance of Wire Above Railroads, Thoroughfares and Ground; Also clearances from Poles, Buildings, Structures or Other Objects
(Letter References Denote Modifications of Minimum Clearances as Referred to in Note Following this Table)

Case No	Nature of Clearance	Wire or Conductor Concerned					
		A Span wires other than trolley span wires), overhead guys and messengers	B Communication conductors (including open wire, cables and service drops), supply service drops of 0-750 volts	C Trolley Contact, feeder and span wires 0-5000 volts	D Supply conductors of 0-750 volts and supply cables treated as in Rule 57.8	E Supply Conductors and supply cables, 750-20,000 volts	F Supply Conductors and supply cables more than 20,000 volts
1	Crossing above tracks of railroads which transport or propose to transport freight cars (max height 15 ft 1in) where not operated by overhead contact wires (a) (b) (c) (d)	25 ft	25 ft	22 ft	25 ft	28 ft	34 ft
2	Crossing or paralleling above tracks of railroads operated by overhead trolleys (b) (c) (d)	26 ft (e)	26 ft (e) (f) (g)	19 ft (h) (i)	27 ft (e) (g)	30 ft (g)	34 ft (g)
3	Crossing or along thoroughfares in Urban districts or crossings thoroughfares in rural districts (c) (d)	18 ft (j) (k) (ii)	18 ft (j) (l) (m) (ii)	19 ft (hh)	20 ft (ii)	25 ft (n) (o) (ii)	30 ft (o) (ii)
4	Above ground along thoroughfares in rural districts or across other areas capable of being transversed by vehicles or agricultural equipment.	15 ft (k)	15 ft (m) (n) (p)	19 ft	16 ft	25 ft (n) (o)	30 ft (0) (p)
5	Vertical ground in areas accessible to pedestrians only.	7 ft	10 ft (m) (q)	19 ft	12 ft	17 ft	25 ft (o)
6	Vertical clearance above buildings and bridges (or other structures which do not ordinarily support conductors and on which men can walk) whether attached or unattached.	8 ft (r)	8 ft (r)	8 ft	8 ft	12 ft	12 ft
7	Horizontal clearance of conductor from buildings (except generating and substations), bridges or other structures (upon which men may work) where such conductor is not attached thereto. (a) (t)	----------	3 ft (u)	3 ft	3 ft (u) (v)	6 ft (v)	6 ft (v)
8	Distance of conductor from center line of pole, wheter attached or unattached (w) (x) (y)	----------	15 in (a) (aa)	15 in (aa) (bb) (cc)	15 in (aa) (dd)	15 or 18 in (dd) (ee) (jj)	18 in (dd) (ee) (jj)
9	Distance of conductor from surface of pole, crossarm or other overhead line structure upon which it is supported, providing it complies with Case 8 above (x) (ee)	----------	3 in (aa) (ff)	3 in (aa) (cc) (gg)	3 in (aa) (dd) (gg)	3 in (dd) (gg)	¼ pin spacing shown in Table 2 Case 15 (dd)

(a)	Shall not be reduced more than 5% because of temperature or loading 1. Supply Lines 2. Communication Lines	37 54.4-B1 84.4-B1
(b)	Shall be increased for supply conductors on Suspension insulators, under certain conditions	37
(c)	Special clearances are provided for traffic signal equipment	58.1-C
(d)	Special clearances are provided for street lighting equipment	58.2-B
(e)	Based on trolley pole throw of 26 feet. May be reduced where suitably protected. 1. Supply Guys 2. Supply cables and messengers 3. Communication Guys 4. Communication cables and messengers	 56.4-B2 57.4-B2 86.4-B2 87.4-B2
(f)	May be reduced depending on height of trolley contact conductors. 1. Supply Service Drop 2. Communication service drops	 54.8-C5 84.8-D5
(g)	May be reduced and shall be increased depending on trolley throw 1. Supply conductors (except service drops) 2. Communication conductors (except service drops)	 54.4-B2 84.4-B2
(h)	Shall be increase where freight cars are transported. 1. Trolley contact and feeder conductors 2. Trolley span wires	 74.4-B1 77.4-A
(i)	May be reduced for trolley contact and span wires in subways, tunnels and under bridges 1. Trolley contact conductors 2. Trolley span wires	 74.4-E 77.4-A
(j)	May be reduced at crossings over private thoroughfares and entrances to private property and over private property. 1. Supply Service drops 2. Supply Guys 3. Communication service drops 4. Communication guys	 54.8-B2 56.4-A 84.8-C2 86.4-A
(k)	May be reduced along thoroughfares where not normally accessible to vehicles. 1. Supply Guys 2. Communication Guys	 56.4-A1 86.4-A1
(l)	May be reduced where within 12 feet of curb line of public thoroughfares 1. Supply Service drops 2. Communication service drops	 54.8-B1 84.8-C1
(m)	May be reduced for railways signal cables under special conditions	84.4-A4
(n)	May be reduced in rural districts 1. Supply conductors, 750-20,000 volts, crossing roads or driveways 2. Supply conductors, 750-2000 volts, above agricultural areas and along roads 3. Communication conductors along roads	 54.4-A2a 54.4-A2b 84.4-A2
(o)	May be reduced for transformer, regulator or capacitor leads. 1. Transformer Leads 2. Regulator or Capacitor Leads	 58.3-B1a 58.4-B1
(p)	May be reduced across arid or mountainous areas 1. Supply Conductors of more than 20, 000 Volts 2. Communication conductors	 54.4-A1 84.4-A1

(q)	Shall be increased or may be reduced under special conditions.	
	1. Increased for supply service drops on industrial or commercial premises	54.8-B3a
	2. Supply service drops on residential premises	54.8-B3b
	3. Communication conductors	84.4-A3
	4. Increased for Communication service drops on industrial or commercial premises	84.8-C3a
	5. Communication service drops on residential premises	84.8-C3b
(r)	May be reduced above roofs of buildings under special conditions	
	1. Supply overhead guys	56.4-G
	2. Supply service drops	54.8-B4
	3. Communication overhead guys	86.4-F
	4. Communication conductors and cables	84.4-E
	5. Communication service drops	84.8-C4
(s)	Also applies at fire escapes, etc.	
	1. Supply Conductors	54.4-H1
	2. Supply service drops on industrial or commercial premises	54.8-B4a
	3. Supply service drops on residential premises	54.8-B4b
	4. Communication Conductor	84.4-E
(t)	Special Clearances where attached to buildings, bridges or other structures	
	1. Supply conductors of 750-20,000 volts	54.4-H2
	2. Trolley Contact Conductors	74.4-E
	3. Communication Conductors	84.4-F
(u)	Reduced clearances permitted under special conditions	
	1. Supply service drops on industrial or commercial premises	54.8-B4a
	2. Supply cables, grounded	57.4-G
	3. Communication cables beside buildings, etc.	84.4-E
	4. Communication conductors under bridges, etc.	84.4-F
	5. Communication service drops.	84.8-C4
(v)	May be reduced under special conditions.	
	1. Supply conductors of 750-7500 volts	54.4-H1
	2. Supply transformer lead and bus wires where guarded	58.3-B2
(w)	May be reduced at angles in lines and transportation points	
	1. Supply conductors	54.4-D1
	2. Communication Conductors	84.4-D5
(x)	May be reduced for suitably protected lateral or vertical runs.	
	1. Supply bond wires	53.4
	2. Supply ground wires	54.6-B
	3. Supply lateral conductors	54.6-C
	4. Supply vertical pins	54.6-D
	5. Supply risers	54.6-E
	6. Communication Ground Wires	84.6-B
	7. Communication lateral conductors	84.6-C
	8. Communication vertical runs	84.6-D
	9. Communication risers	84.6-E

(y)	Increased clearances for certain conductors	
	1. Unattached conductors on colinear lines and crossing lines	32.3
	2. Unattached supply conductors	54.4D3
	3. Supply Service drops on clearance crossarms	54.8-C2
	4. Supply Service drops on pole top extensions	54.8-C3
	5. Unattached Supply service drops	54.8-D
	6. Communication lines, collinear, conflicting or crossing	84.4-D3
	7. Communication conductors passing supply poles and unattached thereto	84.4-D4
	8. Communication service drops on clearance crossarms	84.8-D2
	9. Communication service drops on pole top extensions	84.8-D3
	10. Unattached Communication service drops	84.8-E
(z)	Special provisions for police and fire alarm conductors require increased clearances	92.2
(aa)	May be reduced under special provisions.	
	1. Supply conductors of 0-750 volts in rack configuration	54.4-D5
	2. Supply service drops from racks	54.8-F
	3. Supply cables and messengers attached to poles	57.4-F
	4. Communication conductors on communication poles	84.4-D
	5. Communication conductors on crossarms	84.4-D1
	6. Communication conductors attached to poles	84.4-D2
	7. Communication service drops attached to poles	84.8-B
	8. Communication cables and messengers	87.4-D
	9. Supply or communication cables and messengers on jointly used poles	92.1-B
	10. Communication service drops on pole top extensions	92.1-C
(bb)	May be reduced for Class T conductors of not more than 750 volts and of the same potential and polarity	74.4-D
(cc)	Not applicable to trolley span wires	77.4-E
(dd)	Special clearances for pole-top and dead-end construction	
	1. Conductors dead-ended in vertical configuration on poles	54.4-C4
	2. Conductors dead-ended in horizontal configuration	54.4-D7
	3. Conductors in pole-top construction	54.4-D8
(ee)	Clearance requirements for certain voltage classifications	54.4-D2
(ff)	Not applicable to communication conductors	84.4-D
(gg)	Clearance from crossarms may be reduced for certain conductors	
	1. Suitably insulated leads to protected runs	54.4-E
	2. Leads of 0-5000 volts to equipment	54.4-E
	3. Leads of 0-5000 volts to cutouts or switches	58.5-C
(hh)	Reduced clearance permitted from temporary fixtures and lighting circuits 0-300 volts	78.3A(1)
(ii)	Special Clearances Required Above Public and Private Swimming Pools:	
	1. Supply line conductors	54.4–A4
	2. Supply service drops	54.8–B5
	3. Communication line conductors	84.4–A5
	4. Communication service drops	84.8–C5
	5. Supply guys, span wires	56.4–A3
	6. Communication guys	86.4–A3
(jj)	May be decreased in partial underground distribution	54.4-D2

Original Version

Table 2

Basic Minimum Allowable Clearance of Wires from Other Wires at Crossings and at Supports
(Letter references Denote Modifications of Minimum Clearances Referred to in Notes Following this Table)
All Clearances Are in Inches

Case No.	Nature of Clearance and Class of Voltage of wire, cable or conductor concerned	Other Wire, cable or conductor concerned								
					Supply conductor (including supply cables)					
		A Span wires, guys and messengers	B Trolley contact conductors 0-750 volts	C Communication conductors (including open wire, cables and service drops)	D 0-750 volts (including service drops and trolley feeders (a))	E 750-7,500 Volts	F 7,500-20,000 volts	G 20,000-35,000 volts	H 35,000-68,000 volts	I Over 68,000 volts
	Clearance between wires, cables, and conductors not supported on the same poles, vertically at crossings in spans, and radially where collinear or approaching crossing									
1	Span wires, guys and messengers (b)	18 (c)	48 (d, e)	24 (e)	24 (e)	36 (f)	36	72	72	72(g)
2	Trolley contact conductors 0-750 volts	48 (d, e)	----------	48 (d)	48 (d, h)	48	72	96	96	96(g)
3	Communication conductors	24 (e)	48 (d)	24	48 (i)	48 (dd)	72	96	96	96(g)
4	Supply conductors, service drops and trolley feeders 0-750 volts	24 (e)	48 (d, h)	48 (i)	24	48	48	96	96	96(g)
5	Supply conductors, 750-7500 volts	36 (f)	48	48 (dd)	48	48 (h)	72	96	96	96(g)
6	Supply conductors 7500-20,000 volts	36	72	72	48	72	72	96	96	96(g)
7	Supply conductors, more than 20,000 volts	72	96	96	96	96	96	96	96	96(g)
	Vertical separation between conductors and / or cables on separate crossarms or other supports at different levels (excepting on related line and buck arms on the same pole)									
8	Communication conductors and service drops	----------	----------	12 (j)	48 (k, l, m, n)	48 (k)	72 (m, n)	72(m)	72	72
9	Supply Conductors, service drops and trolley feeders 0-750 volts	----------	----------	48 (k, l, m, n)	24 (h, k, m, o)	48 (k, m, p)	48 (k, m, q)	72(m)	72	72
10	Supply conductors, 750-7500 volts	----------	----------	48 (k)	48 (k, m, p)	48 (m, o, r)	48 (m, q)	48(q)	48(q)	60(q)
11	Supply conductors 7500-20,000 volts	----------	----------	72 (m, n)	48 (k, m, q)	48 (m, q)	48 (m, o, q, r)	48(q)	48(q)	60(q)
12	Supply conductors 20,000-68,000 volts	----------	----------	72 (m)	72 (m)	48 (m, q)	48 (m, q)	48(o, q)	48(o, q)	60(q)
13	Supply conductors, more than 68,000 volts	----------	----------	72	72	60 (q)	60 (q)	60(q)	60(q)	60(o, q)
	Vertical arms above or below conductors on related line arms and buck arms.									
14	Line arms above or below related buck arms (s, t)	----------	----------	6	12 (u)	18 (u)	18 (u)	24	36	48(g)
	Horizontal separation of conductors on same crossarm									
15	Pin spacings of longitudinal conductors, vertical conductors and service drops	----------	----------	3(x)	11 ½ (h, x)	11 ½ (x)	17 ½ (x)	24 (x)	36	48(g)

	Radial separation of conductors on same crossarm, pole or structure Incidental pole wiring									
16	Conductors, tap or lead wires of different circuits (v, y, z)	----------	----------	3 (x)	11 ½ (h, x)	11 ½ (x)	17 ½ (x)	24 (x)	36	48(g)
17	Conductors, tap or lead wires of same circuits (v, y, z)	----------	----------	3	3	6	6	12	18	24
	Radial separation between guys and conductors		----------							
18	Guys passing conductors supported on other poles, and guys approximately parallel to conductors supported on the same poles	----------	----------	9 (bb)	12	18	18	30	36	36
19	Guys and spans wires passing conductors supported on the same poles	(ee)	----------	3	3	6	9	12	18	24

(a)	The clearances in Column D are also applicable to supply cables of any voltage under certain conditions	57.4
(b)	Clearances for guys and span wires apply vertically at crossings; see Case 18 for radial clearances from conductors.	
	1. Supply guys and span wires from conductors	56.4-C
	2. Supply guys and span wires from guys and span wires	56.4-D1
	3. Communication guys and span wires from conductors	86.4-C
	4. Communication guys and span wires from guys and span wires	86.4-D1
(c)	Not applicable between messengers or span wires of the same system.	
	1. Supply messengers	57.4-E
	2. Trolley span wires	77.4-D
	3. Communication messengers	87.4-G
(d)	Protection required on guys, span wires, messengers, and cables where within trolley throw	
	1. Supply Guys and Span wires	56.4-B2
	2. Supply Messengers and Cables	57.4-B2
	3. Communication guys and span wires	86.4-B2
	4. Communication messengers	87.4-B2
(e)	Not applicable to certain conductors supported on trolley span wires.	
	1. Trolley contact and feeder conductors	74.4-G
	2. Trolley feeder conductors	78.1
	3. Trolley system communication conductors	78.2
	4. Foreign conductors	78.3
(f)	Increased clearance required over trolley contact conductors of 750-7500 volts	74.4-G2
(g)	Shall be increased for conductors of more than 68,000 volts.	
	1. Conductors not supported on the same poles	54.4-C7a
	2. Conductors supported on the same crossarm, pole or structure.	54.4-C7b
(h)	May be reduced for certain conductors of Class T circuits of the same system	74.4-C
(i)	May be reduced for service drops under special conditions.	
	1. Supply service drops and communication line conductors	54.8-C1a
	2. Supply service drops and communication service drops	54.8-C4
	3. Communication service drops and supply line conductors	84.8-D1a
	4. Communication service drops and supply service drops	84.8-D4
(j)	May be reduced or shall be increased for certain communication conductors or cables.	
	1. Open wire conductors, attached to poles, within 3 feet of topmost conductor	84.4-C1a
	2. Line conductors of police or fire-alarm circuits and service drops from other communication circuits.	84.8-D1b
	3. Cables and messengers attached to poles	87.4-C3
(k)	Special clearances for 0-750 volt conductors in rack configuration and messengers and cables attached to poles.	
	1. Supply conductors of 0-750 volts in rack configuration	54.9
	2. Supply cables and messengers attached to poles	57.4-F
	3. Communication cables and messengers attached to poles	87.4-C3
	4. On Jointly used poles	92.1

(l)	May be reduced for service drops, and police or fire-alarm conductors, under special conditions.	
	1. Supply service drops and communication line conductors	54.8-C1b
	2. Supply service drops on clearance arms	54.8-C2
	3. Supply service drops on pole-top extensions	54.8-C3
	4. Supply service drops and communication service drops	54.8-C4
	5. Communication service drops and police, fire-alarm or supply line conductors	84.8-D1b
	6. Communication service drops on clearance arms	84.8-D2
	7. Communication service drops on pole-top extensions	84.8-D3
	8. Communication service drops and supply service drops	84.8-D4
	9. Police or fire-alarm conductors	92.2
(m)	May be reduced for lead wires	
	1. Supply lead wires above supply conductors	54.4-C6
	2. Supply drip loops above communication conductors	92.1-F3
(n)	May be reduced for supply conductors and private communication conductors of the same ownership	89.2-B
(o)	May be reduced or increased for triangular or vertical configuration or for pole-top construction.	
	1. Triangular or vertical configuration on crossarms	54.4-C1c
	2. Dead-ended on pole in vertical configuration	54.4-C4
	3. Conductors of 0-7500 volts in triangular configuration at top of pole	54.4-D8a
	4. Conductors of more than 7500 volts at top of pole	54.4-D8b
(p)	May be reduced for supply service drops of 0-750 volts	54.8-C6
(q)	Shall be increased between circuits where conductors of more than 7500 volts are at pole top.	54.4-D8b
(r)	May be reduced under special conditions	
	1. Supply conductors of 750-7500 volts	54.4-C1a
	2. Supply conductors of 7500-20,000 volts	54.4-C1b
(s)	Does not apply where conductors do not cross.	
	1. Supply conductors of different phase polarity	54.4-C2a
	2. Communication conductors	84.4-C1a
(t)	Shall not be applied consecutively both above and below the same supply conductors	54.4-2a
(u)	Shall be increased where conductors of different classifications are supported on the same crossarms.	
	1. Supply conductors of 0-750 volts and conductors of 7500-20,000 volts	32.4-A2
	2. Supply conductors of 0-750 volts and conductors of 750-7500 volts	32.4-A3
(v)	Not applicable to certain kinds of conductors.	
	1. Supply conductors of same phase or polarity	54.4-C3c
	2. Insulated supply conductors in multiple-conductor cables	57.4-C
	3. Communication insulated conductors or multiple-conductor cables	87.4-C1
(w)	Shall apply radially to conductors on brackets attached to crossarms.	
	1. Supply conductors	54.4-C3b
	2. Communication conductors	84.8-C1b

(x)	Shall be increased between conductors of different classifications supported on the same crossarm. 1. Supply conductors of different voltage classification 2. Supply circuits of 0-750 volts and communication circuits 3. Supply circuits and private communication circuits.	 32.4-A 32.4-B 89.2-A
(y)	Special clearances for unprotected supply conductors from one level to another level	 54.6-A 58.2-B3 92.1-F5
(z)	Not applicable to the following: 1. Clearances between conductors at different levels specified in Cases 8 to 13 inclusive. 2. Supply lateral conductors, suitably protected 3. Supply vertical runs, suitably protected 4. Supply risers, suitably protected 5. Communication Conductors	 54.6-C 54.6-D 54.6-E 87.4-C1
(aa)	Not applicable between cables and their supporting messengers. 1. Supply 2. Communication	 57.4-D 87.4-F
(bb)	May be reduced for communication guys and communication conductors supported on the same poles	 86.4-C3
(cc)	Clearance required between guys. 1. Supply guys, crossing 2. Supply guys, approximately parallel 3. Communication guys, crossing 4. Communication guys, approximately parallel	 56.4-D2 56.4-D3 86.4-D2 86.4-D3
(dd)	Shall be increased where within 6 feet of a pole	103.5

Strikeout and Underline Version

Table 2

Basic Minimum Allowable Clearance of Wires from Other Wires at Crossings and at Supports

(Letter references Denote Modifications of Minimum Clearances Referred to in Notes Following this Table)

All Clearances Are in Inches

Case No.	Nature of Clearance and Class of Voltage of wire, cable or conductor concerned	Other Wire, cable or conductor concerned								
					Supply conductor (including supply cables)					
		A Span wires, guys and messengers	B Trolley contact conductors 0-750 volts	C Communication conductors (including open wire, cables and service drops)	D 0-750 volts (including service drops and trolley feeders (a))	E 750-7,500 Volts	F 7,500-20,000 volts	G 20,000-35,000 volts	H 35,000-68,000 volts	I Over 68,000 volts
	Clearance between wires, cables, and conductors not supported on the same poles, vertically at crossings in spans, and radially where collinear or approaching crossing									
1	Span wires, guys and messengers (b)	18 (c)	48 (d, e)	24 (e)	24 (e)	36 (f)	36	72	72	72(g)
2	Trolley contact conductors 0-750 volts	48 (d, e)	----------	48 (d)	48 (d, h)	48	72	96	96	96(g)
3	Communication conductors	24 (e)	48 (d)	24	48 (i)	48 (dd)	72	96	96	96(g)
4	Supply conductors, service drops and trolley feeders 0-750 volts	24 (e)	48 (d, h)	48 (i)	24	48	48	96	96	96(g)
5	Supply conductors, 750-7500 volts	36 (f)	48	48 (dd)	48	48 (h)	72	96	96	96(g)
6	Supply conductors 7500-20,000 volts	36	72	72	48	72	72	96	96	96(g)
7	Supply conductors, more than 20,000 volts	72	96	96	96	96	96	96	96	96(g)
	Vertical separation between conductors and / or cables on separate crossarms or other supports at different levels (excepting on related line and buck arms on the same pole)									
8	Communication conductors and service drops	----------	----------	12 (j)	48 (k, l, m, n)	48 (k)	72 (m, n)	72(m)	72	72
9	Supply Conductors, service drops and trolley feeders 0-750 volts	----------	----------	48 (k, l, m, n)	24 (h, k, m, o)	48 (k, m, p)	48 (k, m, q)	72(m)	72	72
10	Supply conductors, 750-7500 volts	----------	----------	48 (k)	48 (k, m, p)	48 (m, o, r, ee)	48 (m, q)	48(q)	48(q)	60(q)
11	Supply conductors 7500-20,000 volts	----------	----------	72 (m, n)	48 (k, m, q)	48 (m, q)	48 (m, o, q, r, ee)	48(q)	48(q)	60(q)
12	Supply conductors 20,000-68,000 volts	----------	----------	72 (m)	72 (m)	48 (m, q)	48 (m, q)	48(o, q)	48(o, q)	60(q)
13	Supply conductors, more than 68,000 volts	----------	----------	72	72	60 (q)	60 (q)	60(q)	60(q)	60(o, q)
	Vertical arms above or below conductors on related line arms and buck arms.									
14	Line arms above or below related buck arms (s, t)	----------	----------	6	12 (u)	18 (u)	18 (u)	24	36	48(g)
	Horizontal separation of conductors on same crossarm									

15	Pin spacings of longitudinal conductors, vertical conductors and service drops **Radial separation of conductors on same crossarm, pole or structure Incidental pole wiring**	----------	----------	3(x)	11 ½ (h, x)	11 ½ (x)	17 ½ (x)	24 (x)	36	48(g)
16	Conductors, tap or lead wires of different circuits (v, y, z)	----------	----------	3 (x)	11 ½ (h, x)	11 ½ (x)	17 ½ (x)	24 (x)	36	48(g)
17	Conductors, tap or lead wires of same circuits (v, y, z) Radial separation between guys and conductors	----------	---------- ----------	3	3	6	6	12	18	24
18	Guys passing conductors supported on other poles, and guys approximately parallel to conductors supported on the same poles	----------	----------	9 (bb)	12	18	18	30	36	36
19	Guys and spans wires passing conductors supported on the same poles	(ee)	----------	3	3	6	9	12	18	24

(a)	The clearances in Column D are also applicable to supply cables of any voltage under certain conditions	57.4
(b)	Clearances for guys and span wires apply vertically at crossings; see Case 18 for radial clearances from conductors.	
	1. Supply guys and span wires from conductors	56.4-C
	2. Supply guys and span wires from guys and span wires	56.4-D1
	3. Communication guys and span wires from conductors	86.4-C
	4. Communication guys and span wires from guys and span wires	86.4-D1
(c)	Not applicable between messengers or span wires of the same system.	
	1. Supply messengers	57.4-E
	2. Trolley span wires	77.4-D
	3. Communication messengers	87.4-G
(d)	Protection required on guys, span wires, messengers, and cables where within trolley throw	
	1. Supply Guys and Span wires	56.4-B2
	2. Supply Messengers and Cables	57.4-B2
	3. Communication guys and span wires	86.4-B2
	4. Communication messengers	87.4-B2
(e)	Not applicable to certain conductors supported on trolley span wires.	
	1. Trolley contact and feeder conductors	74.4-G
	2. Trolley feeder conductors	78.1
	3. Trolley system communication conductors	78.2
	4. Foreign conductors	78.3
(f)	Increased clearance required over trolley contact conductors of 750-7500 volts	74.4-G2
(g)	Shall be increased for conductors of more than 68,000 volts.	
	1. Conductors not supported on the same poles	54.4-C7a
	2. Conductors supported on the same crossarm, pole or structure.	54.4-C7b
(h)	May be reduced for certain conductors of Class T circuits of the same system	74.4-C
(i)	May be reduced for service drops under special conditions.	
	1. Supply service drops and communication line conductors	54.8-C1a
	2. Supply service drops and communication service drops	54.8-C4
	3. Communication service drops and supply line conductors	84.8-D1a
	4. Communication service drops and supply service drops	84.8-D4
(j)	May be reduced or shall be increased for certain communication conductors or cables.	
	1. Open wire conductors, attached to poles, within 3 feet of topmost conductor	84.4-C1a
	2. Line conductors of police or fire-alarm circuits and service drops from other communication circuits.	84.8-D1b
	3. Cables and messengers attached to poles	87.4-C3
(k)	Special clearances for 0-750 volt conductors in rack configuration and messengers and cables attached to poles.	
	1. Supply conductors of 0-750 volts in rack configuration	54.9
	2. Supply cables and messengers attached to poles	57.4-F
	3. Communication cables and messengers attached to poles	87.4-C3
	4. On Jointly used poles	92.1

(l)	May be reduced for service drops, and police or fire-alarm conductors, under special conditions.	
	1. Supply service drops and communication line conductors	54.8-C1b
	2. Supply service drops on clearance arms	54.8-C2
	3. Supply service drops on pole-top extensions	54.8-C3
	4. Supply service drops and communication service drops	54.8-C4
	5. Communication service drops and police, fire-alarm or supply line conductors	84.8-D1b
	6. Communication service drops on clearance arms	84.8-D2
	7. Communication service drops on pole-top extensions	84.8-D3
	8. Communication service drops and supply service drops	84.8-D4
	9. Police or fire-alarm conductors	92.2
(m)	May be reduced for lead wires	
	1. Supply lead wires above supply conductors	54.4-C6
	2. Supply drip loops above communication conductors	92.1-F3
(n)	May be reduced for supply conductors and private communication conductors of the same ownership	89.2-B
(o)	May be reduced or increased for triangular or vertical configuration or for pole-top construction.	
	1. Triangular or vertical configuration on crossarms	54.4-C1c
	2. Dead-ended on pole in vertical configuration	54.4-C4
	3. Conductors of 0-7500 volts in triangular configuration at top of pole	54.4-D8a
	4. Conductors of more than 7500 volts at top of pole	54.4-D8b
(p)	May be reduced for supply service drops of 0-750 volts	54.8-C6
(q)	Shall be increased between circuits where conductors of more than 7500 volts are at pole top.	54.4-D8b
(r)	May be reduced under special conditions	
	1. Supply conductors of 750-7500 volts	54.4-C1a
	2. Supply conductors of 7500-20,000 volts	54.4-C1b
(s)	Does not apply where conductors do not cross.	
	1. Supply conductors of different phase polarity	54.4-C2a
	2. Communication conductors	84.4-C1a
(t)	Shall not be applied consecutively both above and below the same supply conductors	54.4-2a
(u)	Shall be increased where conductors of different classifications are supported on the same crossarms.	
	1. Supply conductors of 0-750 volts and conductors of 7500-20,000 volts	32.4-A2
	2. Supply conductors of 0-750 volts and conductors of 750-7500 volts	32.4-A3
(v)	Not applicable to certain kinds of conductors.	
	1. Supply conductors of same phase or polarity	54.4-C3c
	2. Insulated supply conductors in multiple-conductor cables	57.4-C
	3. Communication insulated conductors or multiple-conductor cables	87.4-C1
(w)	Shall apply radially to conductors on brackets attached to crossarms.	
	1. Supply conductors	54.4-C3b
	2. Communication conductors	84.8-C1b

(x)	Shall be increased between conductors of different classifications supported on the same crossarm. 1. Supply conductors of different voltage classification 2. Supply circuits of 0-750 volts and communication circuits 3. Supply circuits and private communication circuits.	 32.4-A 32.4-B 89.2-A
(y)	Special clearances for unprotected supply conductors from one level to another level	 54.6-A 58.2-B3 92.1-F5
(z)	Not applicable to the following: 1. Clearances between conductors at different levels specified in Cases 8 to 13 inclusive. 2. Supply lateral conductors, suitably protected 3. Supply vertical runs, suitably protected 4. Supply risers, suitably protected 5. Communication Conductors	 54.6-C 54.6-D 54.6-E 87.4-C1
(aa)	Not applicable between cables and their supporting messengers. 1. Supply 2. Communication	 57.4-D 87.4-F
(bb)	May be reduced for communication guys and communication conductors supported on the same poles	 86.4-C3
(cc)	Clearance required between guys. 1. Supply guys, crossing 2. Supply guys, approximately parallel 3. Communication guys, crossing 4. Communication guys, approximately parallel	 56.4-D2 56.4-D3 86.4-D2 86.4-D3
(dd)	Shall be increased where within 6 feet of a pole	103.5
(ee)	May be decreased in partial underground distribution	54.4-C4c

Final Version

Table 2

Basic Minimum Allowable Clearance of Wires from Other Wires at Crossings and at Supports

(Letter references Denote Modifications of Minimum Clearances Referred to in Notes Following this Table)

All Clearances Are in Inches

Case No.	Nature of Clearance and Class of Voltage of wire, cable or conductor concerned	Other Wire, cable or conductor concerned								
					Supply conductor (including supply cables)					
		A Span wires, guys and messengers	B Trolley contact conductors 0-750 volts	C Communication conductors (including open wire, cables and service drops)	D 0-750 volts (including service drops and trolley feeders (a))	E 750-7,500 Volts	F 7,500-20,000 volts	G 20,000-35,000 volts	H 35,000-68,000 volts	I Over 68,000 volts
	Clearance between wires, cables, and conductors not supported on the same poles, vertically at crossings in spans, and radially where collinear or approaching crossing									
1	Span wires, guys and messengers (b)	18 (c)	48 (d, e)	24 (e)	24 (e)	36 (f)	36	72	72	72(g)
2	Trolley contact conductors 0-750 volts	48 (d, e)	----------	48 (d)	48 (d, h)	48	72	96	96	96(g)
3	Communication conductors	24 (e)	48 (d)	24	48 (i)	48 (dd)	72	96	96	96(g)
4	Supply conductors, service drops and trolley feeders 0-750 volts	24 (e)	48 (d, h)	48 (i)	24	48	48	96	96	96(g)
5	Supply conductors, 750-7500 volts	36 (f)	48	48 (dd)	48	48 (h)	72	96	96	96(g)
6	Supply conductors 7500-20,000 volts	36	72	72	48	72	72	96	96	96(g)
7	Supply conductors, more than 20,000 volts	72	96	96	96	96	96	96	96	96(g)
	Vertical separation between conductors and / or cables on separate crossarms or other supports at different levels (excepting on related line and buck arms on the same pole)									
8	Communication conductors and service drops	----------	----------	12 (j)	48 (k, l, m, n)	48 (k)	72 (m, n)	72(m)	72	72
9	Supply Conductors, service drops and trolley feeders 0-750 volts	----------	----------	48 (k, l, m, n)	24 (h, k, m, o)	48 (k, m, p)	48 (k, m, q)	72(m)	72	72
10	Supply conductors, 750-7500 volts	----------	----------	48 (k)	48 (k, m, p)	48 (m, o, r, ee)	48 (m, q)	48(q)	48(q)	60(q)
11	Supply conductors 7500-20,000 volts	----------	----------	72 (m, n)	48 (k, m, q)	48 (m, q)	48 (m, o, q, r, ee)	48(q)	48(q)	60(q)
12	Supply conductors 20,000-68,000 volts	----------	----------	72 (m)	72 (m)	48 (m, q)	48 (m, q)	48(o, q)	48(o, q)	60(q)
13	Supply conductors, more than 68,000 volts	----------	----------	72	72	60 (q)	60 (q)	60(q)	60(q)	60(o, q)
	Vertical arms above or below conductors on related line arms and buck arms.									
14	Line arms above or below related buck arms (s, t)	----------	----------	6	12 (u)	18 (u)	18 (u)	24	36	48(g)
	Horizontal separation of conductors on same crossarm									

15	Pin spacings of longitudinal conductors, vertical conductors and service drops **Radial separation of conductors on same crossarm, pole or structure Incidental pole wiring**	----------	----------	3(x)	11 ½ (h, x)	11 ½ (x)	17 ½ (x)	24 (x)	36	48(g)
16	Conductors, tap or lead wires of different circuits (v, y, z)	----------	----------	3 (x)	11 ½ (h, x)	11 ½ (x)	17 ½ (x)	24 (x)	36	48(g)
17	Conductors, tap or lead wires of same circuits (v, y, z) Radial separation between guys and conductors	----------	---------- ----------	3	3	6	6	12	18	24
18	Guys passing conductors supported on other poles, and guys approximately parallel to conductors supported on the same poles	----------	----------	9 (bb)	12	18	18	30	36	36
19	Guys and spans wires passing conductors supported on the same poles	(ee)	----------	3	3	6	9	12	18	24

(a)	The clearances in Column D are also applicable to supply cables of any voltage under certain conditions	57.4
(b)	Clearances for guys and span wires apply vertically at crossings; see Case 18 for radial clearances from conductors.	
	1. Supply guys and span wires from conductors	56.4-C
	2. Supply guys and span wires from guys and span wires	56.4-D1
	3. Communication guys and span wires from conductors	86.4-C
	4. Communication guys and span wires from guys and span wires	86.4-D1
(c)	Not applicable between messengers or span wires of the same system.	
	1. Supply messengers	57.4-E
	2. Trolley span wires	77.4-D
	3. Communication messengers	87.4-G
(d)	Protection required on guys, span wires, messengers, and cables where within trolley throw	
	1. Supply Guys and Span wires	56.4-B2
	2. Supply Messengers and Cables	57.4-B2
	3. Communication guys and span wires	86.4-B2
	4. Communication messengers	87.4-B2
(e)	Not applicable to certain conductors supported on trolley span wires.	
	1. Trolley contact and feeder conductors	74.4-G
	2. Trolley feeder conductors	78.1
	3. Trolley system communication conductors	78.2
	4. Foreign conductors	78.3
(f)	Increased clearance required over trolley contact conductors of 750-7500 volts	74.4-G2
(g)	Shall be increased for conductors of more than 68,000 volts.	
	1. Conductors not supported on the same poles	54.4-C7a
	2. Conductors supported on the same crossarm, pole or structure.	54.4-C7b
(h)	May be reduced for certain conductors of Class T circuits of the same system	74.4-C
(i)	May be reduced for service drops under special conditions.	
	1. Supply service drops and communication line conductors	54.8-C1a
	2. Supply service drops and communication service drops	54.8-C4
	3. Communication service drops and supply line conductors	84.8-D1a
	4. Communication service drops and supply service drops	84.8-D4
(j)	May be reduced or shall be increased for certain communication conductors or cables.	
	1. Open wire conductors, attached to poles, within 3 feet of topmost conductor	84.4-C1a
	2. Line conductors of police or fire-alarm circuits and service drops from other communication circuits.	84.8-D1b
	3. Cables and messengers attached to poles	87.4-C3
(k)	Special clearances for 0-750 volt conductors in rack configuration and messengers and cables attached to poles.	
	1. Supply conductors of 0-750 volts in rack configuration	54.9
	2. Supply cables and messengers attached to poles	57.4-F
	3. Communication cables and messengers attached to poles	87.4-C3
	4. On Jointly used poles	92.1

(l)	May be reduced for service drops, and police or fire-alarm conductors, under special conditions.	
	1. Supply service drops and communication line conductors	54.8-C1b
	2. Supply service drops on clearance arms	54.8-C2
	3. Supply service drops on pole-top extensions	54.8-C3
	4. Supply service drops and communication service drops	54.8-C4
	5. Communication service drops and police, fire-alarm or supply line conductors	84.8-D1b
	6. Communication service drops on clearance arms	84.8-D2
	7. Communication service drops on pole-top extensions	84.8-D3
	8. Communication service drops and supply service drops	84.8-D4
	9. Police or fire-alarm conductors	92.2
(m)	May be reduced for lead wires	
	1. Supply lead wires above supply conductors	54.4-C6
	2. Supply drip loops above communication conductors	92.1-F3
(n)	May be reduced for supply conductors and private communication conductors of the same ownership	89.2-B
(o)	May be reduced or increased for triangular or vertical configuration or for pole-top construction.	
	1. Triangular or vertical configuration on crossarms	54.4-C1c
	2. Dead-ended on pole in vertical configuration	54.4-C4
	3. Conductors of 0-7500 volts in triangular configuration at top of pole	54.4-D8a
	4. Conductors of more than 7500 volts at top of pole	54.4-D8b
(p)	May be reduced for supply service drops of 0-750 volts	54.8-C6
(q)	Shall be increased between circuits where conductors of more than 7500 volts are at pole top.	54.4-D8b
(r)	May be reduced under special conditions	
	1. Supply conductors of 750-7500 volts	54.4-C1a
	2. Supply conductors of 7500-20,000 volts	54.4-C1b
(s)	Does not apply where conductors do not cross.	
	1. Supply conductors of different phase polarity	54.4-C2a
	2. Communication conductors	84.4-C1a
(t)	Shall not be applied consecutively both above and below the same supply conductors	54.4-2a
(u)	Shall be increased where conductors of different classifications are supported on the same crossarms.	
	1. Supply conductors of 0-750 volts and conductors of 7500-20,000 volts	32.4-A2
	2. Supply conductors of 0-750 volts and conductors of 750-7500 volts	32.4-A3
(v)	Not applicable to certain kinds of conductors.	
	1. Supply conductors of same phase or polarity	54.4-C3c
	2. Insulated supply conductors in multiple-conductor cables	57.4-C
	3. Communication insulated conductors or multiple-conductor cables	87.4-C1
(w)	Shall apply radially to conductors on brackets attached to crossarms.	
	1. Supply conductors	54.4-C3b
	2. Communication conductors	84.8-C1b

(x)	Shall be increased between conductors of different classifications supported on the same crossarm. 1. Supply conductors of different voltage classification 2. Supply circuits of 0-750 volts and communication circuits 3. Supply circuits and private communication circuits.	 32.4-A 32.4-B 89.2-A
(y)	Special clearances for unprotected supply conductors from one level to another level	 54.6-A 58.2-B3 92.1-F5
(z)	Not applicable to the following: 1. Clearances between conductors at different levels specified in Cases 8 to 13 inclusive. 2. Supply lateral conductors, suitably protected 3. Supply vertical runs, suitably protected 4. Supply risers, suitably protected 5. Communication Conductors	 54.6-C 54.6-D 54.6-E 87.4-C1
(aa)	Not applicable between cables and their supporting messengers. 1. Supply 2. Communication	 57.4-D 87.4-F
(bb)	May be reduced for communication guys and communication conductors supported on the same poles	 86.4-C3
(cc)	Clearance required between guys. 1. Supply guys, crossing 2. Supply guys, approximately parallel 3. Communication guys, crossing 4. Communication guys, approximately parallel	 56.4-D2 56.4-D3 86.4-D2 86.4-D3
(dd)	Shall be increased where within 6 feet of a pole	103.5
(ee)	May be decreased in partial underground distribution	54.4-C4c

Original Version
Rule 54.4-C4b

54.4C-4 Dead Ended on Pole in Vertical Configuration:

b) Conductors of More than 750 Volts: Where conductors of more than 750 Volts are supported in vertical configuration directly on a pole without the use of crossarms at the line terminations, angles or corners, the following requirements apply:

The vertical separation between conductors of the same circuit shall not be less than the pin spacings specified in Table 2, Case 15;

The vertical separation between conductors of different circuits shall not be less than the clearances specified in Table 2, cases 8 to 13, inclusive;

Not more than two conductors of a circuit of 750-5000 volts shall be supported directly on a pole in vertical configuration without the use of crossarms. The number of conductors of a circuit of more than 5000 volts so supported is not limited. Branch circuits may be taken from such construction without the use of crossarms provided a climbing and working space as specified in Rule 54.7 is maintained; and

The clearance of conductors from surface of pole shall not be less than as specified in Rule 54.4-D6b.

See Rule 54.7-A1 for climbing space requirements for conductors dead ended on poles in vertical configuration.

Strikeout and Underline Version
Rule 54.4-C4b

54.4C-4 Dead Ended on Pole in Vertical Configuration:

b) Conductors of More than 750 Volts supported on climbable poles: Where conductors of more than 750 Volts are supported in vertical configuration directly on a climbable pole without the use of crossarms at the line terminations, angles or corners, the following requirements apply:

The vertical separation between conductors of the same circuit shall not be less than the pin spacings specified in Table 2, Case 15;

The vertical separation between conductors of different circuits shall not be less than the clearances specified in Table 2, cases 8 to 13, inclusive;

Not more than two conductors of a circuit of 750-5000 volts shall be supported directly on a pole in vertical configuration without the use of crossarms. The number of conductors of a circuit of more than 5000 volts so supported is not limited. Branch circuits may be taken from such construction without the use of crossarms provided a climbing and working space as specified in Rule 54.7 is maintained; and

The clearance of conductors from surface of pole shall not be less than as specified in Rule 54.4-D6b.

See Rule 54.7-A1 for climbing space requirements for conductors dead ended on poles in vertical configuration

Final Version
Rule 54.4-C4b

54.4C-4 Dead Ended on Pole in Vertical Configuration:

b) Conductors of More than 750 Volts supported on climbable poles: Where conductors of more than 750 Volts are supported in vertical configuration directly on a climbable pole without the use of crossarms at the line terminations, angles or corners, the following requirements apply:

The vertical separation between conductors of the same circuit shall not be less than the pin spacings specified in Table 2, Case 15;

The vertical separation between conductors of different circuits shall not be less than the clearances specified in Table 2, cases 8 to 13, inclusive;

Not more than two conductors of a circuit of 750-5000 volts shall be supported directly on a pole in vertical configuration without the use of crossarms. The number of conductors of a circuit of more than 5000 volts so supported is not limited. Branch circuits may be taken from such construction without the use of crossarms provided a climbing and working space as specified in Rule 54.7 is maintained; and

The clearance of conductors from surface of pole shall not be less than as specified in Rule 54.4-D6b.

See Rule 54.7-A1 for climbing space requirements for conductors dead ended on poles in vertical configuration

Original Version
Rule 54.4-C4c

New Rule

Strikeout and Underline Version
Rule 54.4-C4c

54.4C-4 Dead Ended on Pole in Vertical Configuration:

c) Conductors of More than 750 Volts supported on non-climbable pole,: Where conductors of more than 750 volts are supported in vertical configuration on non-climbable poles in partial underground distribution at line terminations, angles, or corners, the following requirements apply:

Not more than three conductors of a single circuit of 750-20,000 volts shall be supported directly on the pole in vertical configuration without the use of crossarms, Branch circuits may be taken from such construction without the use of crossarms provided that conductors are supported on not more than three sides of the pole, there being four sides (see App. G, Fig. 88);

The vertical separation between conductors shall be not less than the pin spacings specified in Table 2, Case 15;

The clearance of conductors from surface of pole shall be not less than, as specified in Rule 54.4-D2.

Final Version
Rule 54.4-C4c

54.4C-4 Dead Ended on Pole in Vertical Configuration:

c) Conductors of More than 750 Volts supported on non-climbable pole,: Where conductors of more than 750 volts are supported in vertical configuration on non-climbable poles in partial underground distribution at line terminations, angles, or corners, the following requirements apply:

Not more than three conductors of a single circuit of 750-20,000 volts shall be supported directly on the pole in vertical configuration without the use of crossarms, Branch circuits may be taken from such construction without the use of crossarms provided that conductors are supported on not more than three sides of the pole, there being four sides (see App. G, Fig. 88);

The vertical separation between conductors shall be not less than the pin spacings specified in Table 2, Case 15;

The clearance of conductors from surface of pole shall be not less than, as specified in Rule 54.4-D2.

Original Version
Rule 54.4-D2

54.4- D From Poles

2 Center Line Clearances For 750 Volts and Above: The clearances referred to in Table 1, Case 8 Columns E and F, apply as follows with respect to voltage.

750-7500volts - 15 inches
7500-46,000 volts- - - - - - - - - - - - - - - - - - - 18 inches
46,000 volts and above - - - - - - - - - - - - - - - 18 inches plus
½ inch per kV in excess of 46kV

Strikeout and Underline Version
Rule 54.4-D2

54.4- D From Poles

2 Center Line Clearances For 750 Volts and Above: The clearances referred to in Table 1, Case 8 Columns E and F, apply as follows with respect to voltage.

750-7500volts - 15 inches
7500-46,000 volts- - - - - - - - - - - - - - - - - - - 18 inches
46,000 volts and above - - - - - - - - - - - - - - - 18 inches plus
½ inch per kV in excess of 46kV

<u>These clearances from center line of pole need not apply to conductors of 750-7500 volts and 7500-20,000 volts supported in vertical configuration in partial underground distribution provided: a) such conductors have clearances from surface of pole of not less than 6 inches, b) in tangent construction, conductors so supported are not attached to more than one side of pole, and c) in dead-end construction conductors so supported are not attached to more than three sides of a pole (there being four sides, see App. G, Fig. 88).</u>

Final Version
Rule 54.4-D2

54.4- D From Poles

2 Center Line Clearances For 750 Volts and Above: The clearances referred to in Table 1, Case 8 Columns E and F, apply as follows with respect to voltage.

750-7500volts - 15 inches
7500-46,000 volts- 18 inches
46,000 volts and above - - - - - - - - - - - - - - - - 18 inches plus
½ inch per kV in excess of 46kV

These clearances from center line of pole need not apply to conductors of 750-7500 volts and 7500-20,000 volts supported in vertical configuration in partial underground distribution provided: a) such conductors have clearances from surface of pole of not less than 6 inches, b) in tangent construction, conductors so supported are not attached to more than one side of pole, and c) in dead-end construction conductors so supported are not attached to more than three sides of a pole (there being four sides, see App. G, Fig. 88).

Original Version
Rule 54.4-D6b

Rule 54.4-D6 Dead Ended on Poles

b) More Than 750 Volts: Where conductors are dead ended on a pole in vertical configuration, the energized portions of such conductors shall have clearances of not less than 15 inches from the surface of pole for voltages between 750 and 7500 volts and 18 inches from the surface of pole for voltages in excess of 7500 volts. Where conductors of more than one circuit are dead ended on a pole in vertical configuration, increased pole clearances are required as follows:

All energized portions of conductors of a circuit dead ended in vertical configuration below any other circuit on a pole shall be maintained at a clearance of not less than 3 feet from the surface of the pole for conductors of more than 7500 volts; and

Not more than two conductors of a circuit of 750-5000 volts shall be attached directly to a pole in vertical configuration without the use of crossarms. The number of conductors of a circuit of more than 5000 volts so supported on a pole is not limited. Branch circuits may be taken from such construction without the use of crossarms provided a climbing and working space as specified in Rule 54.7 is maintained.

Strikeout and Underline Version
Rule 54.4-D6b

Rule 54.4-D6 Dead Ended on Poles

b) More Than 750 Volts <u>supported on climbable poles</u>: Where conductors are dead ended on a <u>climbable</u> pole in vertical configuration, the energized portions of such conductors shall have clearances of not less than 15 inches from the surface of pole for voltages between 750 and 7500 volts and 18 inches from the surface of pole for voltages in excess of 7500 volts. Where conductors of more than one circuit are dead ended on a pole in vertical configuration, increased pole clearances are required as follows:

All energized portions of conductors of a circuit dead ended in vertical configuration below any other circuit on a pole shall be maintained at a clearance of not less than 3 feet from the surface of the pole for conductors of more than 7500 volts; and

Not more than two conductors of a circuit of 750-5000 volts shall be attached directly to a pole in vertical configuration without the use of crossarms. The number of conductors of a circuit of more than 5000 volts so supported on a pole is not limited. Branch circuits may be taken from such construction without the use of crossarms provided a climbing and working space as specified in Rule 54.7 is maintained.

Final Version
Rule 54.4-D6b

Rule 54.4-D6 Dead Ended on Poles

b) More Than 750 Volts supported on climbable poles: Where conductors are dead ended on a climbable pole in vertical configuration, the energized portions of such conductors shall have clearances of not less than 15 inches from the surface of pole for voltages between 750 and 7500 volts and 18 inches from the surface of pole for voltages in excess of 7500 volts. Where conductors of more than one circuit are dead ended on a pole in vertical configuration, increased pole clearances are required as follows:

All energized portions of conductors of a circuit dead ended in vertical configuration below any other circuit on a pole shall be maintained at a clearance of not less than 3 feet from the surface of the pole for conductors of more than 7500 volts; and

Not more than two conductors of a circuit of 750-5000 volts shall be attached directly to a pole in vertical configuration without the use of crossarms. The number of conductors of a circuit of more than 5000 volts so supported on a pole is not limited. Branch circuits may be taken from such construction without the use of crossarms provided a climbing and working space as specified in Rule 54.7 is maintained.

Original Version
Rule 54.4-D6c

New Rule

Strikeout and Underline Version
Rule 54.4-D6c

Rule 54.4-D6 Dead Ended on Poles

c) More than 750 Volts supported on non-climbable poles: Where conductors : are dead-ended on a non-climbable pole in partial underground distribution, the energized portions of such conductors shall be not less than 6 inches from surface of pole (see Rule 54.4-D2).

Final Version
Rule 54.4-D6c

Rule 54.4-D6 Dead Ended on Poles

c) More than 750 Volts supported on non-climbable poles: Where conductors : are dead-ended on a non-climbable pole in partial underground distribution, the energized portions of such conductors shall be not less than 6 inches from surface of pole (see Rule 54.4-D2).

Original Version
Rule 54.6-D

54.6 Vertical and Lateral Conductors

D Vertical Runs

Conductors installed in the form of vertical runs on the surface of poles or not more than 18 inches from the center line of a pole shall be suitably insulated and covered throughout by a suitable protective covering. (See Rule 22.2 for the definition of suitable protective covering) This protective covering is not required over vertical runs in metal conduit attached to metal poles, towers or other structures provided pipe and structure are metallically connected and effectively grounded.

Conductors in the form of vertical runs more than 18 inches from the center line of any pole shall be suitably insulated and covered by a suitable protective covering or by securely supported impregnated fiber conduit without metal pipe. Such runs shall be located outside of the climbing and working spaces and shall not pass between conductors of different ownership except between the pole pair and at a clearance thereform of not less than 6 inches.

Vertical runs, where encased in grounded metal conduit, sheath, or shield shall be treated as risers.

Conductors installed in the form of vertical runs which extend within 8 feet of the ground shall be enclosed in securely grounded metal casing or covering and shall be treated as risers.

The radial clearances between conductors, specified in Table 2, Cases 16 and 17, are not required between suitably insulated conductors in the same vertical run.

Strikeout and Underline Version
Rule 54.6-D

54.6 Vertical and Lateral Conductors

D Vertical Runs

Conductors installed in the form of vertical runs on the surface of poles or not more than 18 inches from the center line of a pole shall be suitably insulated and covered throughout by a suitable protective covering. (See Rule 22.2 for the definition of suitable protective covering) This protective covering is not required over vertical runs in metal conduit attached to metal poles, towers or other structures provided pipe and structure are metallically connected and effectively grounded.

Conductors in the form of vertical runs more than 18 inches from the center line of any pole shall be suitably insulated and covered by a suitable protective covering or by securely supported impregnated fiber conduit without metal pipe. Such runs shall be located outside of the climbing and working spaces and shall not pass between conductors of different ownership except between the pole pair and at a clearance thereform of not less than 6 inches.

Vertical runs, where encased in <u>grounded non-climbable metal poles</u>, grounded metal conduit, sheath, or shield, shall be treated as risers.

Conductors installed in the form of vertical runs which extend within 8 feet of the ground shall be enclosed in securely grounded metal casing or covering and shall be treated as risers.

The radial clearances between conductors, specified in Table 2, Cases 16 and 17, are not required between suitably insulated conductors in the same vertical run.

Final Version
Rule 54.6-D

54.6 Vertical and Lateral Conductors

D Vertical Runs

Conductors installed in the form of vertical runs on the surface of poles or not more than 18 inches from the center line of a pole shall be suitably insulated and covered throughout by a suitable protective covering. (See Rule 22.2 for the definition of suitable protective covering) This protective covering is not required over vertical runs in metal conduit attached to metal poles, towers or other structures provided pipe and structure are metallically connected and effectively grounded.

Conductors in the form of vertical runs more than 18 inches from the center line of any pole shall be suitably insulated and covered by a suitable protective covering or by securely supported impregnated fiber conduit without metal pipe. Such runs shall be located outside of the climbing and working spaces and shall not pass between conductors of different ownership except between the pole pair and at a clearance thereform of not less than 6 inches.

Vertical runs, where encased in grounded non-climbable metal poles, grounded metal conduit, sheath, or shield, shall be treated as risers.

Conductors installed in the form of vertical runs which extend within 8 feet of the ground shall be enclosed in securely grounded metal casing or covering and shall be treated as risers.

The radial clearances between conductors, specified in Table 2, Cases 16 and 17, are not required between suitably insulated conductors in the same vertical run.

Original Version
Rule 54.6-E

54.6 Vertical and Lateral Conductors

E Risers

Risers from underground cables or other conductors shall be encased in grounded iron or steel shall (or other metal covering of equal strength) from the ground line to a level not less than 8 feet above ground line (see App. G, Fig. 61)

Any riser on the surface of a pole or not more than 18 inches from the center line of a pole shall be covered by a suitable protective covering where within a vertical distance of 8 feet from the level of communication conductors (including cables) or unprotected supply conductors (including the leads from the terminal) supported by the same pole or where within a radial distance of 6 feet from conductors not supported by the same pole.

The portion of any riser between the insulating covering required on the upper section and the metal covering required on the lower section by the foregoing shall be covered by the extension of either metal pipe is used as a protective covering, the fiber conduit shall not extend within 8 feet of the ground line and shall be installed in a workmanlike manner and securely supported in order to prevent it from slipping downward and exposing any upper section of the metal pipe.

The radial clearances between conductors, specified in Table 2, Cases 16 and 17, are not required between suitably insulated conductors in the same riser.

Protective covering (suitable) is not required over risers in iron or steel pipe attached to a steel pole, tower or other metal structure, provided the iron or steel pipe is effectively grounded and is metallically connected to such metal structure.

Strikeout and Underline Version
Rule 54.6-E

54.6 Vertical and Lateral Conductors

E Risers

Risers from underground cables or other conductors shall be encased in grounded iron or steel shall (or other metal covering of equal strength) from the ground line to a level not less than 8 feet above ground line (see App. G, Fig. 61)

Any riser on the surface of a pole or not more than 18 inches from the center line of a pole shall be covered by a suitable protective covering where within a vertical distance of 8 feet from the level of communication conductors (including cables) or unprotected supply conductors (including the leads from the terminal) supported by the same pole or where within a radial distance of 6 feet from conductors not supported by the same pole.

The portion of any riser between the insulating covering required on the upper section and the metal covering required on the lower section by the foregoing shall be covered by the extension of either metal pipe is used as a protective covering, the fiber conduit shall not extend within 8 feet of the ground line and shall be installed in a workmanlike manner and securely supported in order to prevent it from slipping downward and exposing any upper section of the metal pipe.

The radial clearances between conductors, specified in Table 2, Cases 16 and 17, are not required between suitably insulated conductors in the same riser.

Protective covering (suitable) is not required over risers <u>encased</u> in <u>effectively grounded non-climbable metal poles or</u> iron or steel pipe attached to a steel pole, tower or other metal structure, provided the iron or steel pipe is effectively grounded and is metallically connected to such metal structure.

Final Version
Rule 54.6-E

54.6 Vertical and Lateral Conductors

E Risers

Risers from underground cables or other conductors shall be encased in grounded iron or steel shall (or other metal covering of equal strength) from the ground line to a level not less than 8 feet above ground line (see App. G, Fig. 61)

Any riser on the surface of a pole or not more than 18 inches from the center line of a pole shall be covered by a suitable protective covering where within a vertical distance of 8 feet from the level of communication conductors (including cables) or unprotected supply conductors (including the leads from the terminal) supported by the same pole or where within a radial distance of 6 feet from conductors not supported by the same pole.

The portion of any riser between the insulating covering required on the upper section and the metal covering required on the lower section by the foregoing shall be covered by the extension of either metal pipe is used as a protective covering, the fiber conduit shall not extend within 8 feet of the ground line and shall be installed in a workmanlike manner and securely supported in order to prevent it from slipping downward and exposing any upper section of the metal pipe.

The radial clearances between conductors, specified in Table 2, Cases 16 and 17, are not required between suitably insulated conductors in the same riser.

Protective covering (suitable) is not required over risers encased in effectively grounded non-climbable metal poles or iron or steel pipe attached to a steel pole, tower or other metal structure, provided the iron or steel pipe is effectively grounded and is metallically connected to such metal structure.

Original Version
Rule 54.6-F

54.6 Vertical and Lateral Conductors

F Terminals of Encased Riser and Runs

Terminals of risers or runs shall not extend above the level of line conductors to which the terminal leads are connected except as follows:

Where the line conductors are dead-ended on the opposite side of the arms from the terminals and no line conductors supported on the same crossarm and the same side of pole extend past the terminals and no buckram construction is involved, or

Where conductors in excess of 7500 volts are installed in vertical configuration on crossarms, and the terminals are mounted on the same arms which support the conductors to which the terminals are connected.

At the upper end of vertical runs or risers on wood poles, any terminal or terminal fitting within distances from center line of poles less than as specified in Table 1, Case 8, shall be protected by a crossarm or wood block placed above it at a distance not exceeding 4 inches. The wood block may be omitted if the terminal or terminal fitting at the upper end of a vertical run or riser of 750 volts or less is on the same side of a pole as, and not more than 1 foot below a transformer.

Cable or conduit bends and the terminals of riser or runs of conductors of more than 750 volts shall be arranged with as little exposed surface as practicable but are not required to be covered by a protective covering provided that no portion of the terminal or associated unprotected conductors are within the climbing space or within the clearance from center line of pole specified in Table 1, case 8 (15 or 18 inches). All exposed grounded surfaces of such terminal fittings and bends of risers and runs shall not be less than 18 inches vertically above the conductor level, and not less than 2 feet radially from any conductor at the next conductor level, of unprotected conductors of another circuit which is entirely below the level of the circuit to which the

riser is connected.

The terminal fittings of risers or runs of conductors of 0-750 volts installed on the surfaces of poles shall of be within the climbing space and unprotected leads to or from such terminals shall not pass within the climbing space but may have a clearance of less than 15 inches from center line of pole (Table 1, Case 8) and less than 3 inches from the surface of pole or crossarm (Table 1, Case 9). It is recommended that conductors from such terminal fittings be suitably installed and, where practicable, carried as protected lateral runs on the bottom surface of crossarms (see Rule 54.6-C)

The Vertical clearances between the lowest point of lead wires of a riser or run (vertical or lateral) and the next conductor level below shall conform to the requirements specified in Rule 54.4-C6.

See App. G, Fig. 61

Strikeout and Underline Version
Rule 54.6-F

54.6 Vertical and Lateral Conductors

F Terminals of Encased Riser and Runs

Terminals of risers or runs shall not extend above the level of line conductors to which the terminal leads are connected except as follows:

Where the line conductors are installed in vertical configuration in partial underground distribution, or where the line conductors are dead-ended on the opposite side of the arms from the terminals and no line conductors supported on the same crossarm and the same side of pole extend past the terminals and no buckram construction is involved, or

Where conductors in excess of 7500 volts are installed in vertical configuration on crossarms, and the terminals are mounted on the same arms which support the conductors to which the terminals are connected.

At the upper end of vertical runs or risers on wood poles, any terminal or terminal fitting within distances from center line of poles less than as specified in Table 1, Case 8, shall be protected by a crossarm or wood block placed above it at a distance not exceeding 4 inches. The wood block may be omitted if the terminal or terminal fitting at the upper end of a vertical run or riser of 750 volts or less is on the same side of a pole as, and not more than 1 foot below a transformer.

Cable or conduit bends and the terminals of riser or runs of conductors of more than 750 volts on climbable poles or structures shall be arranged with as little exposed surface as practicable but are not required to be covered by a protective covering provided that no portion of the terminal or associated unprotected conductors are within the climbing space or within the clearance from center line of pole specified in Table 1, case 8 (15 or 18 inches). All exposed grounded surfaces of such terminal fittings and bends of

risers and runs shall not be less than 18 inches vertically above the conductor level, and not less than 2 feet radially from any conductor at the next conductor level, of unprotected conductors of another circuit which is entirely below the level of the circuit to which the riser is connected.

The terminal fittings of risers or runs of conductors of 0-750 volts installed on the surfaces of poles shall of be within the climbing space and unprotected leads to or from such terminals shall not pass within the climbing space but may have a clearance of less than 15 inches from center line of pole (Table 1, Case 8) and less than 3 inches from the surface of pole or crossarm (Table 1, Case 9). It is recommended that conductors from such terminal fittings be suitably installed and, where practicable, carried as protected lateral runs on the bottom surface of crossarms (see Rule 54.6-C)

In partial underground distribution (750-20,000 volts in vertical configuration on non-climbable poles), energized portions of the terminals may be less than the clearances from center line of pole specified in Table 1, Case 8, Column E (15 or 18 inches) but shall be not less than 6 inches from the surface of the non-climbable metal pole and grounded metal surfaces associated therewith.

The Vertical clearances between the lowest point of lead wires of a riser or run (vertical or lateral) and the next conductor level below shall conform to the requirements specified in Rule 54.4-C6.

See App. G, Fig. 61

Final Version
Rule 54.6-F

54.6 Vertical and Lateral Conductors

F Terminals of Encased Riser and Runs

Terminals of risers or runs shall not extend above the level of line conductors to which the terminal leads are connected except as follows:

Where the line conductors are installed in vertical configuration in partial underground distribution, or where the line conductors are dead-ended on the opposite side of the arms from the terminals and no line conductors supported on the same crossarm and the same side of pole extend past the terminals and no buckram construction is involved, or

Where conductors in excess of 7500 volts are installed in vertical configuration on crossarms, and the terminals are mounted on the same arms which support the conductors to which the terminals are connected.

At the upper end of vertical runs or risers on wood poles, any terminal or terminal fitting within distances from center line of poles less than as specified in Table 1, Case 8, shall be protected by a crossarm or wood block placed above it at a distance not exceeding 4 inches. The wood block may be omitted if the terminal or terminal fitting at the upper end of a vertical run or riser of 750 volts or less is on the same side of a pole as, and not more than 1 foot below a transformer.

Cable or conduit bends and the terminals of riser or runs of conductors of more than 750 volts on climbable poles or structures shall be arranged with as little exposed surface as practicable but are not required to be covered by a protective covering provided that no portion of the terminal or associated unprotected conductors are within the climbing space or within the clearance from center line of pole specified in Table 1, case 8 (15 or 18 inches). All exposed grounded surfaces of such terminal fittings and bends of

risers and runs shall not be less than 18 inches vertically above the conductor level, and not less than 2 feet radially from any conductor at the next conductor level, of unprotected conductors of another circuit which is entirely below the level of the circuit to which the riser is connected.

The terminal fittings of risers or runs of conductors of 0-750 volts installed on the surfaces of poles shall of be within the climbing space and unprotected leads to or from such terminals shall not pass within the climbing space but may have a clearance of less than 15 inches from center line of pole (Table 1, Case 8) and less than 3 inches from the surface of pole or crossarm (Table 1, Case 9). It is recommended that conductors from such terminal fittings be suitably installed and, where practicable, carried as protected lateral runs on the bottom surface of crossarms (see Rule 54.6-C)

In partial underground distribution (750-20,000 volts in vertical configuration on non-climbable poles), energized portions of the terminals may be less than the clearances from center line of pole specified in Table 1, Case 8, Column E (15 or 18 inches) but shall be not less than 6 inches from the surface of the non-climbable metal pole and grounded metal surfaces associated therewith.

The Vertical clearances between the lowest point of lead wires of a riser or run (vertical or lateral) and the next conductor level below shall conform to the requirements specified in Rule 54.4-C6.

See App. G, Fig. 61

Original Version
Rule 54.7-A

54.7 Climbing and Working Space

A Climbing Space

Climbing space, measured from centerline of pole, shall be provided on one side or in one quadrant of all poles or structures, with dimensions as specified in Rules 54.7-A1, 54.7-A2 and 54.7-A3.

The climbing space shall be maintained in the same position for a distance of not less than 4 feet vertically both above and below each conductor level through which it passes. Compliance with this requirement necessitates that the position of the climbing space shall not be changed through conductor levels which are less than 4 feet apart. Where the vertical distance between consecutive conductor levels is 4 feet or more, and less than 8 feet the position of the climbing space through such consecutive levels may be shifted not more than one-quarter of the distance around the pole. Where a conductor is installed at the top of a pole under the provisions of Rule 54.4-D8, the climbing space shall extend up to the level of such pole-top conductor but need not be provided through and above such level.

Allowable obstruction of these climbing spaces, where necessary, are specified in Rule 54.7-A4

Strikeout and Underline Version
Rule 54.7-A

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Climbing space, measured from centerline of pole, shall be provided on one side or in one quadrant of all poles or structures, with dimensions as specified in Rules 54.7-A1, 54.7-A2 and 54.7-A3.

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Allowable obstruction of these climbing spaces, where necessary, are specified in Rule 54.7-A4

<u>This Rule 54.7-A need not apply to non-climbable metal poles in partial underground distribution, provided the regular written operating rules of the utility concerned specify that all work on conductors and equipment supported by such poles shall be performed only from aerial lifts and (1) in the case of primary conductors, shall be done with live-line tools after installing adequate insulating and protective devices or barriers in order to (a) prevent accidental contact by the workman with the energized conductors other than the conductor being worked on and (b) to minimize the possibility of simultaneous contact of the metal parts of live-line tools with the grounded pole and the energized conductor and (2) in the case of secondary conductors shall be done after suitably covering all energized primary conductors with adequate insulating and protective devices or barriers.</u>

Final Version
Rule 54.7-A

54.7 Climbing and Working Space

A Climbing Space

Climbing space, measured from centerline of pole, shall be provided on one side or in one quadrant of all poles or structures, with dimensions as specified in Rules 54.7-A1, 54.7-A2 and 54.7-A3.

The climbing space shall be maintained in the same position for a distance of not less than 4 feet vertically both above and below each conductor level through which it passes. Compliance with this requirement necessitates that the position of the climbing space shall not be changed through conductor levels which are less than 4 feet apart. Where the vertical distance between consecutive conductor levels is 4 feet or more, and less than 8 feet the position of the climbing space through such consecutive levels may be shifted not more than one-quarter of the distance around the pole. Where a conductor is installed at the top of a pole under the provisions of Rule 54.4-D8, the climbing space shall extend up to the level of such pole-top conductor but need not be provided through and above such level.

Allowable obstruction of these climbing spaces, where necessary, are specified in Rule 54.7-A4

This Rule 54.7-A need not apply to non-climbable metal poles in partial underground distribution, provided the regular written operating rules of the utility concerned specify that all work on conductors and equipment supported by such poles shall be performed only from aerial lifts and (1) in the case of primary conductors, shall be done with live-line tools after installing adequate insulating and protective devices or barriers in order to (a) prevent accidental contact by the workman with the energized conductors other than the conductor being worked on and (b) to minimize the possibility of simultaneous contact of the metal parts of live-line tools with the grounded pole and the energized conductor and (2) in the case of secondary conductors shall be done after suitably covering all energized primary conductors with adequate insulating and protective devices or barriers.

Original Version
Rule 55.3-D

55.3 Voltage Requirements

D Additional Insulation

Insulators used in territories where fog or lighting conditions prevail should be given more liberal factors of safety than those indicated in Table 12.

Insulators used at crossings or conflicts shall conform to Rules 104 and 114.

Strikeout and Underline Version
Rule 55.3-D

55.3 Voltage Requirements

D Additional Insulation

Insulators used in territories where fog or lightning conditions prevail should be given more liberal factors of safety than those indicated in Table 12.

In partial underground distribution, the primary transformer bushings shall have ratings of not less than 95 kV BIL and a dry flashover of not less than 60 kV; line conductor insulators, either post clamp or dead-end type, shall have a dry flashover rating of not less than 80 kV.

Insulators used at crossings or conflicts shall conform to Rules 104 and 114."

Final Version
Rule 55.3-D

55.3 Voltage Requirements

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Insulators used at crossings or conflicts shall conform to Rules 104 and 114."

Original Rule
Rule 58.3-C3

58.3-C Grounding

3 Transformer Case Grounding or Bonding: Cases of transformers and metal parts in contact therewith shall not be grounded where supported on wood poles or wood structures.

The hanging or placing of transformers on metal poles or structures is not recommended, particularly with respect to transformers connected to circuits of less than 14,000 volts. Transformers shall not be supported on metal poles or metal supports in contact with the ground unless the cases are securely bonded to the metal poles or parts of structures in contact with the ground and such poles or structures are effectively grounded. No transformer case shall be in contact with a metal crossarm or a metal beam attached to a wood pole or a wood structure, excepting a metal heel arm or rest which does not extend beyond the sides of any transformer case.

The bonding of cases of transformers whose high voltage windings are connected to circuits of less than 20,000 volts is not recommended but where such cases are bonded the case bonding system shall not be electrically connected to any unassociated hardware or to other bonds.

Except from the provisions of this Rule 58.3-C3 applying to the grounding of transformer cases supported on wood poles or structures are the following:

Any transformer whose high-voltage winding is connected to a circuit of more than 14,000 volts, which may have its case grounded provided all such transformer installations on the system are so grounded, warning signs calling attention to the case grounding condition are posted on the structure so as to be readily legible from the climbing space or spaces, and no such grounded transformer case is less than 8 feet vertically or 4 feet horizontally from the unprotected conductors of any other supply-line

circuit than those to which the transformer windings are connected;

Any transformer whose high-voltage is connected to a circuit of 750-14,000 volts, which may have its case grounded provided no unprotected conductors (including lead wires) of 750-14,000 volts shall be less than 8 feet vertically or 4 feet horizontally from the nearest part of such grounded case; and

Any transformer the case of which is less than 8 feet above the ground.

Transformer cases which are grounded in accordance with any provision of this rule shall be effectively grounded (see Rule 33.3).

Strikeout and Underline Version
Rule 58.3-C3

58.3-C Grounding

3 Transformer Case Grounding or Bonding: Cases of transformers and metal parts in contact therewith shall not be grounded where supported on wood poles or wood structures.

~~T~~ Except in the case of partial underground distribution systems (see Rule 21.10),the hanging or placing of transformers on metal poles or structures is not recommended, particularly with respect to transformers connected to circuits of less than 14,000 volts. Transformers shall not be supported on metal poles or metal supports in contact with the ground unless the cases are securely bonded to the metal poles or parts of structures in contact with the ground and such poles or structures are effectively grounded. No transformer case shall be in contact with a metal crossarm or a metal beam attached to a wood pole or a wood structure, excepting a metal heel arm or rest which does not extend beyond the sides of any transformer case.

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Except from the provisions of this Rule 58.3-C3 applying to the grounding of transformer cases supported on wood poles or structures are the following:

Any transformer whose high-voltage winding is connected to a circuit of more than 14,000 volts, which may have its case grounded provided all such transformer installations on the system are so grounded, warning signs calling attention to the case grounding condition are posted on the structure so as to be readily legible from the climbing space or spaces, and no such grounded transformer case is

less than 8 feet vertically or 4 feet horizontally from the unprotected conductors of any other supply-line circuit than those to which the transformer windings are connected;

Any transformer whose high-voltage is connected to a circuit of 750-14,000 volts, which may have its case grounded provided no unprotected conductors (including lead wires) of 750-14,000 volts shall be less than 8 feet vertically or 4 feet horizontally from the nearest part of such grounded case; and

Any transformer the case of which is less than 8 feet above the ground.

Transformer cases which are grounded in accordance with any provision of this rule shall be effectively grounded (see Rule 33.3).

Final Version
Rule 58.3-C3

58.3-C Grounding

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Except from the provisions of this Rule 58.3-C3 applying to the grounding of transformer cases supported on wood poles or structures are the following:

Any transformer whose high-voltage winding is connected to a circuit of more than 14,000 volts, which may have its case grounded provided all such transformer installations on the system are so grounded, warning signs calling attention to the case grounding condition are posted on the structure so as to be readily legible from the climbing space or spaces, and no such grounded transformer case is less than 8 feet vertically or 4 feet horizontally from

the unprotected conductors of any other supply-line circuit than those to which the transformer windings are connected;

Any transformer whose high-voltage is connected to a circuit of 750-14,000 volts, which may have its case grounded provided no unprotected conductors (including lead wires) of 750-14,000 volts shall be less than 8 feet vertically or 4 feet horizontally from the nearest part of such grounded case; and

Any transformer the case of which is less than 8 feet above the ground.

Transformer cases which are grounded in accordance with any provision of this rule shall be effectively grounded (see Rule 33.3).

Original Version
Rule 58.3-D

58.3 Transformers

D Cutouts or Other Disconnecting Devices

Transformer cutouts, fuses, disconnects or switches shall be located so that they are readily accessible from climbing and working spaces. Such devices or their connecting leads shall not extend into the climbing space but may extend wholly or in part into the working space.

The vertical clearances of transformer cutouts, fuses, etc., above the levels of conductors of other circuits shall not less than the clearances required between conductors as specified in Table 2, Cases 8 to 13.

Strikeout and Underline Version
Rule 58.3-D

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The vertical clearances of transformer cutouts, fuses, etc., above the levels of conductors of other circuits shall not less than the clearances required between conductors as specified in Table 2, Cases 8 to 13.

<u>The provisions of this rule shall not apply to partial underground distribution systems.</u>

Final Version
Rule 58.3-D

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The provisions of this rule shall not apply to partial underground distribution systems.

Original Version
Rule 91.1

91.1 Joint Use

Joint use of poles shall be given consideration by all interested parties where construction or reconstruction is involved and where used it shall be subject to the appropriate grade of construction as specified in Section IV.

Nothing herein shall be constructed as requiring utilities to use poles jointly, or as granting authority for the use of any poles without the owner's consent.

Each utility should definitely designate its space requirements on joint poles, which space shall not occupied without consent, by equipment of any utility.

Strikeout and Underline Version
Rule 91.1

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Each utility should definitely designate its space requirements on joint poles, which space shall not occupied without consent, by equipment of any utility.

<u>Non-climbable metal poles in partial underground construction (see Rules 22;O-D and 21.10) shall not be jointly used.</u>

Final Version
Rule 91.1

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Joint use of poles shall be given consideration by all interested parties where construction or reconstruction is involved and where used it shall be subject to the appropriate grade of construction as specified in Section IV.

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Each utility should definitely designate its space requirements on joint poles, which space shall not occupied without consent, by equipment of any utility.

Non-climbable metal poles in partial underground construction (see Rules 22;O-D and 21.10) shall not be jointly used.

Figures 87 & 88 Added to Appendix G
Rules 21.10

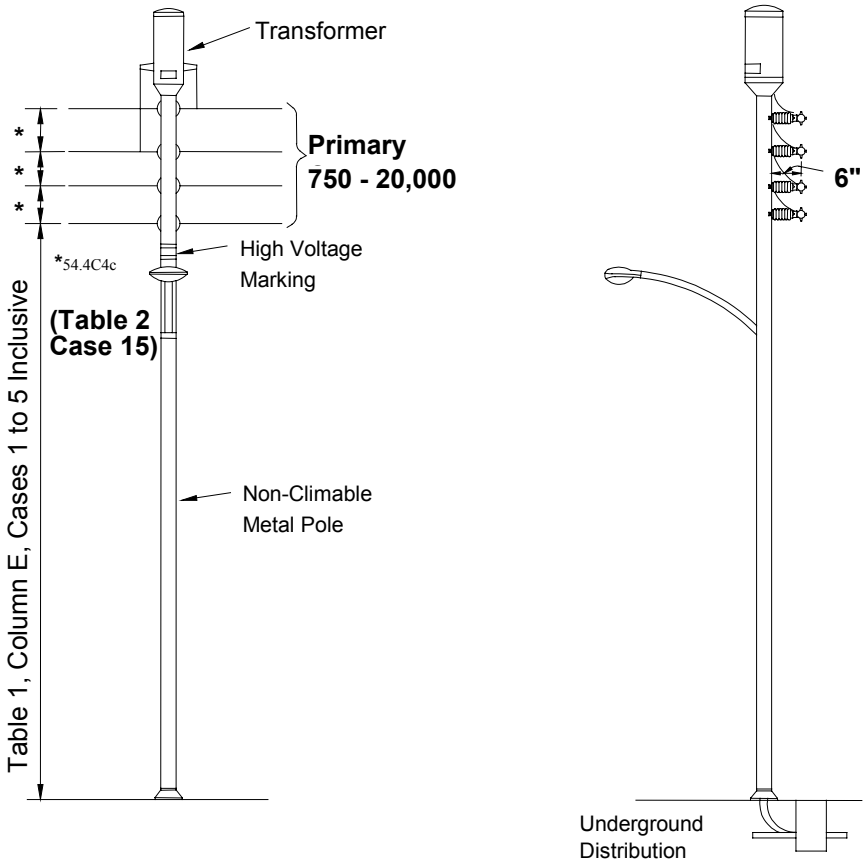

Figure 87
Partial underground

Conductor Clearance and
Partial Underground Rule 54.4-D2

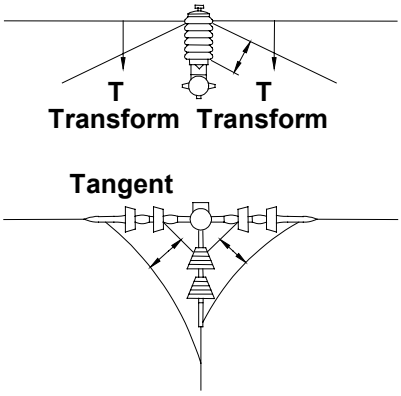

Figure 88
Deadend Construction