Decision No. 70489 Application No. 47540 (Filed April 30, 1965)

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Brundidge & Hackler, by Daniel Feins, assisted by M.A. Walters, for IBEW Local Unions; California Water Service Company, by C.G. Ferguson; California Interstate Telephone Company, by Harlod E. Throp, interested parties.

N.R. Johnson, for the Commission staff.

OPINION

Applicant seeks amendment of General Order No. 95 in order to permit the use of "12/20.8 kV four wire wye common neutral overhead electric distribution lines." After due notice, public hearing in the matter was held before Examiner Emerson on August 26 and 27, 1965. The matter is submitted and is ready for decision.

While the specific rule changes proposed are somewhat complex because of their interrelationships, applicant's proposed changes basically involve four propositions, viz.:

a. Reductions of certain existing minimum conductor clearances,

b. Reductions in existing minimum strength and conductor conductivity requirements,

c. The use of a grounded neutral conductor common to high-voltage (12/20.8 kV) and low-voltage (120/240 volts) circuits, and

d. A pole configuration wherein a single high voltage conductor would be carried at the pole-top position with a transformer connected thereto and with its return conductor connected to a common neutral carried at low-voltage position on the pole.

Until 1932, the use of common-neutral systems in California was prohibited by this Commission's "Rules for Overhead Line Construction." In that year, following a number of years of study, the rules of the then General Order No. 94-A were modified to permit use of a common neutral for primary line voltages not exceeding 5,000 volts and common-neutral systems were constructed in a number of areas in the State. General Order No. 64-A was superseded by General Order No. 95 in 1942. This latter order, still effective, continues, in the several parts of Rule 59 thereof, the original provisions

governing the use of common-neutral systems, including the 5,000-volt limitation.

Primarily because of electric load growth and increased load densities, common-neutral systems have virtually disappeared in California; for it has become economically infeasible to meet such increased loads at the 5,000-volt limitation prescribed by the present rule. Other states do not appear to have such voltage limitations on common-neutral systems and common-neutral systems are commonly being used in various parts of the country at voltage as high as 20/34.5 kV.

Applicant undertook a study to determine the most economical distribution design for supplying suburban areas at high load densities. With much of its present distribution being three-wire 12kV, its study, among other things, revealed that some economic advantage would result if the existing 12 kV distribution were to be converted to 12/20.8 kV (four-wire wye). By such conversion, existing distribution circuits would gain greater capacity and applicant's existing 12 kV transformers could be retained in service for use on the higher voltage line lines. In addition, its present overhead distribution circuits, if converted to 12/20.8 kV could be more economically tied into, or extended to form, underground distribution circuits in suburban areas.

The rules embodied in General Order No. 95, while contributing materially to the high standard of electric service rendered to the public in California, have their greatest impact on the safety aspects of line construction and maintenance. TO a great degree they are designed to provide as much protection (to lineman and other workmen who must construct, repair, operate and generally maintain overhead lines) as is reasonably attainable, having in mind that the demands for continuity of electric service to the public require that literally hundreds of lineman daily perform their work on, or while exposed to the hazards of, energized conductors and equipment. Improvements in work methods, protective devices, materials of construction, tools, insulation, and pole-line hardware and appurtenances directly affect progress in this "state of the art" of electric distribution and generally tend to lessen the hazards to which workmen are exposed in their daily work.

Conductor separations, the prohibition or limitation of physical obstructions in climbing and working spaces, and the absence of grounded surfaces at the working levels on poles all contribute towards the safety of the workmen. All of these may be loosely classified as "clearances" and General Order No. 95 is replete with requirements for the same, generally specified as minimums. In nearly all instances, the rules of the General Order No. 95 is replete with requirements for the same, generally specified as minimums. In nearly all instances, the rules of the General Order specify irreducible minimums,

determined after many years of professional and expert analyses of construction practices, work methods and nonfatal accidents. In some instances, the utilities in California have established, by their own standards, construction practices which provide greater than the minimum "clearances" specified by this Commission has, over a period of many years, contributed immeasurably to the elimination of hazards and dangerous practices and has assured adherence to the rules of General Order No. 95; all to the ultimate advantage of the workman and to the public generally.

Three main safety problems are brought to the fore by applicant's proposal in this proceeding. They have to do with the hazards of the physical placement of the common-neutral conductor; the possible electrical elevation of the common-neutral conductor above ground potential and the work methods when connecting, disconnecting or replacing transformers and other equipment. These generate the real concern of workmen in this State and the fear that an increase in the present inherent hazards will result if applicant's proposals are authorized.

With respect to its physical placement, it is noted that elsewhere in the nation, the common-neutral line conductor may be carried in any one of a number of positions on the pole. It is not unusual to find it attached to the surface of pole between cross-arm quarter braces. It may also be carried at either or both secondary and primary levels without special identification. In many places it is uninsulated and uncovered throughout its length. In some places it is carried at reduced vertical separation from other primary conductors above. As we understand the testimony in this proceeding, workmen who object to common-neutral usage anticipate similar placement and treatment in California and fear its consequences. None of these conditions may prevail in California, however, because of our rules which generally provide that obstruction must be kept out of climbing and working spaces, that line conductors must be kept appropriate distances from center-line and surface of pole and that exposure of workmen to grounded objects on poles must be kept to an irreducible minimum. This Commission sees no reason to depart from its long-standing rules to such effect.

With respect to the "voltage" of a common-neutral conductor, existing rules in this State provide that such conductor may be considered as carrying the same voltage as any of its related system conductors. Thus, it either may be considered as carrying 20.8 kV or as carrying 240 volts in a common-neutral connected four-wire wye circuit of 12/20.8kV common to a 120/240 circuit. Like any neutral line conductor of any circuit, it is always considered by the workmen as carrying an electrical potential above that of earth to which it may be "grounded". Its "grounding" is only for purposes of circuit stabilization and circuit protection (such as fault relaying); thus it, and never the earth,

constitutes the circuit's return conductor. It is as much a part of an electrical circuit as any of its related phase conductors. If special precautions are not aken, therefore, the common-neutral conductor may in fact carry a dangerous potential with respect to earth or other "grounded" objects. Rule 59 of General Order No. 95 specifies these special precautions. Basically, this rule accomplishes three things. First, it ensures that the physical size and conductivity of the common-neutral conductor will be reasonably adequate to carry fault as well as normal full-load currents. Second, it ensures that of earth as it is practicable or feasible to obtain in the present state of the art. Third, it controls the location of and identifies the location of the common-neutral conductor.

In theory, at least, with the special practices specified in Rule 59 a common-neutral could be related to almost any primary distribution voltage without creating undue hazards to workmen or to the public. Practically, however, a fundamental limitation must be faced respecting the ability to obtain a "zero potential" common neutral. Because the relatively thin mantle of soil into which ground rods are driven is unconsolidated material, composed of variable and complex combinations of chemicals, minerals, sir, organic material, cellular structures and water content, it offers a widely varying resistance to flow of electric current. A "good" electrical ground is thus not only sometimes difficult to obtain but sometimes impossible. With identical electrical equipment, a "ground" of less than one ohm might be easily obtainable in marshy land, whereas in soil predominantly rocky or composed of desert sand the resistance might be several thousand ohms. Because of such conditions there are sparsely settled and there is little, if any, economic or aesthetic need therein for common-neutral distribution systems. Recognizing the variability of ground resistance and usually obtainable grounds, Rule 59 specifies special practices which, among other things, provide for a grid-work of neutral conductor return paths, multiplicity of ground connections and the use of water systems piping as a means of gaining greater area contact between grounding electrodes and earth. At the time Rule 59 was promulgated metallic-pipe water systems were universally used. In recent years, however, water systems have taken to the use of non-metallic mains to such an extent that today virtually no new water system uses metallic distribution mains. There has thus disappeared from the scene a once valued and oftentimes widespread system of grounding electrodes to which electric utilities could connect their neutral conductors. In view of the foregoing, it seems readily apparent that Rule 59 needs such revision as will bring it into the focus of present-day conditions and permit of its application to higher voltages of today's distribution systems. Applicant's proposal respecting grounding would lessen existing requirements by substituting grounds of undetermined resistance values for the 3 ½ ohm ground resistances specified in Rule 59.4-C. Such proposal is unacceptable. With the increased voltages proposed, the grounding requirements should be strengthened rather than weakened.

With respect to the third party safety problem, that of work methods to be followed in connecting or disconnecting transformers on common-neutral systems, it might suffice to point out that General Order No. 95 is basically a set of rules governing the design of overhead lines and is not intended to govern work methods[1]; yet the safety problem presented is one which will become more prevalent as common-neutral construction becomes more widespread and it thus deserves somewhat greater than ordinary emphasis. On a common-neutral system the least hazardous method of connecting a transformer to energized lines is similar to that which is followed on ordinary lines when transformers on different poles are interconnected through their secondaries (banked secondaries). Safety to the customer and to lineman demands in connecting a transformer: that first, the common-neutral be connected to the secondary neutral-tap terminal; that second, the jumper from the secondary neutral-tap terminal to the primary neutral terminal be connected; that third, the secondary hot legs be connected, and that lastly, the primary hot leg be connected. In disconnecting a transformer: first, disconnect the primary hot leg; second, disconnect the jumper from the primary neutral terminal to the secondary neutral-tap terminal; third, disconnect the secondary hot legs; lastly, disconnect the common-neutral from the secondary neutral-tap teminal. When two transformers have their secondaries banked, the least hazardous method of disconnecting one transformer is: first, disconnect the secondary hot legs; second, disconnect the primary hot legs; third, remove the jumper between the primary neutral terminal and the secondary neutral-tap terminal; lastly, disconnect the common-neutral from the secondary neutral-tap terminal. Utility operating and safety rules related to common-neutral systems should clearly and uniformly specify these procedures and lineman should be trained to follow them. No transformer shall have its primary and secondary windings interconnected internally.

Existing rules require that on a pole which carried neutrals at both primary and secondary levels, the connecting conductor between the two shall be equal in size to the larger of the two neutrals. Applicant proposes to reduce this conductor size to that of the smaller neutral. While applicant's desire for economy of construction may be laudable, this proposal borders on "penny-pinching" at the expense of safety. No such reduction will be authorized.

Existing rules provide (Rule 59.3-D) that on common-neutral systems there shall be two or more separate and continuous metallic return conductors from each grid section to the source of supply (the substation). They also provide that if only two return conductors are used, each shall have a minimum

[1] Work methods traditionally have been left to the "operating rules" or "safety rules" of the individual utility and oriented to that utility's particular construction standards and operating practices.

area of approximately 50 percent of the area of the primary phase conductor of the largest overhead feeder serving the area, and that if more than two return conductors are used, the current carrying capacity of the return system shall be such that a break in any one path shall leave two or more return paths which, combined, shall have a minimum area of approximately 50 percent of the area of the primary phase conductor of the largest overhead feeder serving the area, thus providing adequate current carrying capacity for full-load currents. Applicant proposes to eliminate these requirements. Applicant presented no evidence of sufficient weight to warrant any modification of these requirements.

Applicant proposes to use pole-top configuration, on new construction, consisting of a single conductor on a pole-top pin for single-phase primary and a single conductor on a pole-top pin plus two additional conductors installed on post-type insulators below the pole top with the two additional conductors installed on post-type insulators below the pole top with the two additional conductors in a vertical plane 18 inches from center line of pole for three-phase primaries. Its illustration of such configurations are shown on Exhibit F attached to applicant. In essence, applicant seeks approval of such illustration. Neither approval nor disapproval of this illustration will be given herein for it is fundamental that the written rules in every instance have precedence over any pictorial illustration thereof. It is noted, also that applicant's illustration depicts the use of a large metallic low-voltage rack which is peculiar to its system (having been authorized as a deviation from the low-voltage rack rules), is not authorized for general use in California, and is in fact viewed by Commission engineers as being a departure from accepted good practice. It should, therefore, be limited in its application.

In this proceeding, applicant's engineering witness referred to the "normal" voltage of the circuits under discussion. It seems necessary, therefore, to emphasize the point that by Rule 23.2, "Voltage" means the <u>highest effective voltage between any two conductors of the circuit concerned</u>. Thus, a circuit energized at a 12.1kV is not a 12.0 kV circuit, nor is one energized at 21.1 kV a 21.0 kV circuit. Further, Rule 14, respecting the limiting conditions of maximum and minimum values must be considered. In view of the prospective conversion of existing circuits to higher voltages, the provisions of Rule 52.7 (hardware separations) and Rule 53.4 pertaining to bond wire separations as means of preventing or mitigating radio interference problems which commonly accompany or follow such conversion should be well noted.

In view of the evidence and in light of the foregoing discussion of various of its elements, the Commission finds.

1. The public interest, including safety to workmen and the public generally, will not be adversely affected by the use of common-neutral systems up to but not above a circuit voltage of 21,000 volts.

2. It is reasonable to modify the existing rules of General Order No. 95 to provide for the construction and operation of such common-neutral systems in California.

The Commission concludes that the application herein should be granted to the extent set forth in the following order and that in all other respects said application should be denied.

ORDER

It is ordered that this Commissions 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 effective 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 twenty days after the date hereof.

Dated at San Francisco, California, this 29th day of March, 1966.

APPENDIX A

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

1. Rule 20.7

This rule is amended to read as follows:

"COMMON NEUTRAL SYSTEMS mean those electrical supply distribution systems wherein the same specially grounded conductor is utilized as a neutral conductor of primary circuits of less than 21,000 volts and secondary circuits of 0-750 volts supplied therefrom."

2. Rule 32.2-A

This rule is amended to read as follows:

"A Supply Circuits of 750-21,000 Volts

Supply circuits of 750-21,000 Volts should not be above supply circuits in excess of 21,000 volts."

3. Rule 32.4-A1

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

"(1) 750-7500 VOLTS AND MORE THAN 21,000 VOLTS: Supply circuits of 750-7500 volts shall not be carried on the same crossarm with circuits of more than 21,000 volts unless the higher voltage circuit is not energized when men are working at his level."

4. Rule 32.4-A2

This rule is amended to read as follows:

"(2) 0-750 VOLTS AND MORE THAN 7500 VOLTS: Supply circuits of 0-750 volts shall not be carried on the same crossarm with circuits of more than 7500 volts, except that, on transformer structures, bus conductors of 0-750 volts and bus conductors of 7500-21,000 volts may be supported on opposite ends of the same bus-supporting timbers provided the horizontal separation between conductors of different classifications supported on the same arm is not less than 36 inches, the bus conductors of 7500-21,000 volts are not extended longitudinally as line conductors, service drops are not supported on arms which support conductors of 7500-21,000 volts, and conductors on related buck arms are not less than 4 feet vertically from such bus timbers."

5. Rule 32.4-C1

This Rule is amended to read as follows:

"(1) 7,500 - 21,000 VOLTS, SAME OWNERSHIP**:** Supply circuits of 7,500 - 21,000 volts and private communication circuits owned (or leased) and operated and maintained by the same organization may be supported on the same crossarms as provided in Rule 89.2–A1."

6. Rule 33.1

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

"Neutral conductors of supply circuits, other than in distribution systems of 21,000 volts or less with common primary and secondary grounded neutrals, shall be considered as carrying the same voltage as the other conductors of the circuit."

7. Rule 37, Table 1.

The heading of Column E of the Table 1 is amended to read: "Supply conductors and supply cables, 750-21,000 volts."

The heading of Column F of the Table 1 is amended to read: "Supply conductors and supply cables more than 21,000 volts."

References to "20,000 volts" in footnotes n, p, and t are amended to read "21,000 volts".

8. Rule 38, Table 2

The heading of Column F of the Table 1 is amended to read: "7500-21,000 volts."

The heading of Column G of the Table 1 is amended to read: "21,000-35,000 volts."

References to to "20,000 volts" in footnotes "r" and "u" are amended to read "21,000 volts".

9. Rule 33.3-B

The first portion of this rule is amended to read as follows:

"Ground connections for equipment of any one of the types listed in Rule 33.3–A shall not be interconnected with ground connections for equipment of any other type listed therein, EXCEPT:

> In common neutral systems the neutral conductors of 0 - 750 volt supply circuits and of supply circuits of 750 – 21,000 volts may be interconnected and grounded in accordance with the provisions of Rule 59 ; and"

10. Rule 51.6-A

Beginning with the third paragraph of this rule, the rule is amended to read as follows:

"The provisions of this Rule, 51.6-A shall not apply to the marking of poles at the levels of supply circuits of more than 21,000 volts in rural districts.

See Rule 65 for the marking of towers."

11. Rule 52.4-B2c

This rule is amended to read as follows:

"Supporting Conductors of 7500-21,000 Volts at certain Locations: At All crossings over public thoroughfares and at locations adjacent to structures such as water tanks, windmills and buildings, adjacent to wells, and at similar locations, crossarms supporting conductors of 7500-21,000 volts shall be marked as high voltage."

12. Rule 52.4B2e

This rule is amended to read as follows:

"Supporting Conductors of 7500-21,000 Volts on the Same Structure With Conductors of 750 Volts or Less: Where, on the same structures in rural districts, crossarms supporting conductors of 7500-21,000 volts are above conductors of 750 volts or less, the crossarm supporting conductors of 7500-21,000 next above the conductors of 750 volts or less shall be marked as high voltage. All crossarms supporting conductors of 7500-21,000 volts on the same structures shall be marked as high voltage."

13. Rule 52.4-B3

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

"(3) On Guarded Metal Poles: On Latticed metal Poles which are guarded with barriers as required in Rule 51.6-B, the following crossarms shall be marked as high voltage:

Crossarms supporting conductors of 750-7500 volts;

Crossarms supporting conductors of 7500-21,000 volts next above the level of conductors of 7500 volts or less;

Crossarms supporting conductors of 7500-21,000 volts below the level of conductors of 7500 or less;

Crossarms supporting any conductor of more than 7500 volts within 15 feet of walls, fire escapes, exits, windows and similar objects."

14. Rule 54.4-A1

The first sentence of this rule is amended to read:

"(1) Across Arid or Mountainous Areas: Across arid or mountainous areas supply circuits carrying 21,000-30,000 volts, inclusive, may have a clearance of less than 30 feet (Table 1, Case 4, Column F) but not less than 25 feet above ground subject to a reduction of not more than 10 per cent because of temperature and loading as specified in Rule 43."

15. Rule 54.4-A2

The title of this rule is amended to read:

"(2) IN RURAL DISTRICTS, CONDUCTORS OF 750-21,000 VOLTS"

16. Rule 54.4-C1b

The first sentence of this rule is amended to read:

"b) Conductors of 750-21,000 Volts: The 4 foot vertical clearance between conductors of 7500-21,000 volts, as specified in Table 2, Case 11, Column F, may be reduced to not less than 3 feet, provided all of the following conditions are met:"

17. Rule 54.4-C2a

The asterisked footnote of this rule is amended to read as follows:

"*Voltage Classification for this purpose are:
0-750 volts
750-7500 volts
7500-21,000 volts and
21,000 volts and above."

18. Rule 54.4-C4c

The figures "750-20,000 volts" in this rule are changed to read "750-21,000 volts".

19. Rule 54.4-C6

The tabular values set forth in this rule are amended to read as follows:

"Voltage of Lead wires	Minimum distance above other conductor level
0-750	12 inches
750-7500	18 inches
7500-21,000	24 inches
21,000-35,000	36 inches"

20. Rule 54.4-D2

The figures "7500-20,000 volts" in the second paragraph of this rule are amended to read "7500-21,000 volts".

21. Rule 54.4-D8b

The first paragraph of this rule is amended to read:

"b) More than 7500 Volts: A single conductor of a circuit of more than 7500 volts may be attached directly to the top of a pole or to a crossarm at the top of a pole at a distance less than as specified in Table 1, case 8, provided no apparatus carried on the pole is connected to the circuit so arranged except lighting arresters, pole-top switch, or a transformer. Where a transformer is connected to a circuit so arranged , a vertical clearance of not less than 30 inches shall be maintained between the primary conductor directly above and the unergized metal parts of the transformer, as specified in Rule 58.3-B3e."

22. Rule 54.4-H2

The first paragraph of this rule is amended to read:

"2) Attached Conductors: Unprotected conductors not exceeding 21,000 volts may be supported by attachments to buildings, bridges and other structures. To conductors of 0-750 volts so supported, the clearances of Table 1, case 7 columns B, C, and D shall apply. To conductors of 750-21,000 volts so supported a minimum horizontal clearance of 8 feet shall apply."

23. Rule 54.4-I

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

"Conductors of 0-21,000 volts, passing under or through bridges, viaducts or similar structures, may be attached thereto in accordance with the provision of Rule 54.4-H2."

24. Rule 54.6-A

The tabular values in this rule are amended to read as follows:

Highest voltage Classification Of conductors concerned	Minimum radial distance before conductors
0-5000 volts	11 ½ inches
5000-7500 volts	17 ½ inches
7500-21,000 volts	24 inches
21,000 volts and above	36 inches

25. Rule 54.6-F

The fourth paragraph of this rule is amended by replacing the phrase "750-20,000 volts in vertical configuration on non-climbable poles)." With the phrase "750-21,000 volts in vertical configuration on non-climbable poles)."

26. Rule 54.7-A4

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

"Pin-type insulators which support line conductors of 21,000 volts or less may extend not more than one-half of their diameter into the climbing space."

27. Rule 54.9-E1

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

"(1) WITH GUARD ARM BELOW CONDUCTORS OF 750-21,000 VOLTS: The vertical clearance between the top conductor in a rack group and conductors of 750-21,000 volts at the next conductor level above, may be less than 6 feet but shall be not less than 4 feet."

28. Rule 54.9-E4

The figures "7500-20,000 volts" in the second paragraph of this rule are amended to read "7500-21,000 volts".

29. Rule 56.4-E

This rule is amended to read as follows:

"Where passing guys are less than 15 inches from surface of pole and less than 8 feet below supply conductors of less than 21,000 volts supported on the same pole, such guys shall be sectionalized, in addition to the normal sectionalization required by Rule 56.6, by means of insulators in accordance with Rule 56.6-A as though attached to the pole or structure."

30. Rules 56.6-A, 56.6-B 56.6-D, 56.6-E

In these four rules, each time the figures "20,000" appear said figures are amended to read "21,000".

31 Rule 58.3-B3e (New Rule)

The general order is amended by adding thereto the following new section to Rule 58.3-B3.

"e) From 7500-21,000 volt conductor above: The clearance between Unenergized metal parts of transformers and 7500-21,000 volt conductors above shall be not less than 18 inches vertically or 18 horizontally except that the vertical clearance shall be not less than 30 inches from a conductor at the top of pole as in Rule 54.4-D8b."

32. Rule 58.3-B4b

The last limiting condition of this rule is amended to read as follows:

The vertical clearance of 0-750 volt conductors below the lowest point of the transformer primary leads is not less than

18 inches for primary leads of 750-7500 volts,
24 inches for primary leads of 7500-21,000 volts,
36 inches for primary leads of 21,000-35,000 volts.

33. Rule 58.3-E (New Rule)

The general order is amended by adding thereto the following new section to Rule 58.3:

"E. CONNECTIONS BETWEEN WINDINGS

Any metallic connection between the primary and secondary windings of a distribution transformer (as in common neutral systems) shall be made externally and not within the transformer case."

34. Rule 58.4-B3b

This rule is amended to read as follows:

"b) From Conductors in Excess of 750 Volts Below: The vertical clearance of capacitor and regulator cases and their hangers from the level of conductors in excess of 750 volts below shall be not less than

12 inches for conductors of 750-7500 volts,
18 inches for conductors of 7500-21,000 volts, and
24 inches for conductors of 21,000-35,000 volts."

35. Rule 59.2

This rule is amended to read as follows:

The following rules cover certain special details for common neutral systems where the neutral conductor is common to primary circuits of less than 21,000 volts and secondary circuits of 0-750 volts supplied therefrom. These rules are supplemental to the rules given for supply lines in general and to other detailed construction requirements for supply lines."

36. Rule 59.3-B, Table 14

Table 14 in Rule 59.3-B is amended by inserting therein a primary conductor size of 715,500 circular mils and a related neutral conductor size of 350,000 mils.

37. Rule 59.3-D

This Rule is amended to read as follows:

D Neutral Conductors

The arrangement and continuity of common neutral conductors shall conform to the following requirements:

Cross ties of the neutral conductor shall be made to form a continuous interconnected grid network and there shall be two or more separate and continuous metallic return conductors to the substation constituting the source of supply thereto.

If two return conductors only are used, each shall have a minimum conductivity of approximately 50 per cent of the conductivity of the primary phase conductor of the largest overhead feeder serving the area. (See Table No. 14 of Rule 59.3-B for minimum sizes.)

If more than two return conductors are used, the current-carrying capacity of the return system shall be such that a break in any one path shall leave two or more return paths which, combined, shall have a minimum conductivity of approximately 50 per cent of the conductivity of the primary phase conductor of the largest overhead feeder serving the area, thus providing adequate current-carrying capacity for full load current. (see Table No. 14 of Rule 59.3-B for minimum sizes.)

Primary neutral conductors or secondary neutral conductors, where continuous, may be used as a return loop from a common neutral provided they are of sufficient current-carrying capacity as specified in Rule 59.3-B and provided that they are grounded throughout in accordance with the requirements for common neutral line conductors as specified in Rule 59.4-B. Primary or secondary neutral line conductors so used shall be carried in their normal primary or secondary positions, respectively."

38. Rule 59.4-A2

This Rule is amended to read as follows, with sections a) and b), thereof thus being deleted:

"2) Grounding Electrodes: Ground electrodes on common neutral systems shall be one-piece corrosion-resisting metal rods or pipes (or equivalent in physical and electrical properties) not less than 5/8 inch in diameter by 8 feet in length and driven to a minimum depth of 8 feet below the surface of the ground. Pole-butt plates or wrappings shall not be used either in lieu of the aforesaid rods or pipes or as electrodes supplementary thereto.

The driven ground rod, pipe, or equivalent shall be located not less than 2 feet from the surface of the pole. Where two or more such rods are installed, they shall be located at not less than 6-foot centers and separation required from the surface of the pole shall not be held to apply to the connection between rods."

39. Rules 59.4-A2a and 59.4-A2b are deleted.

40. Rule 59.4-B1

This rule is amended to read as follows:

"1) Location: The common neutral grid system shall be grounded at intervals not greater than 1000 feet. On branch circuits extending from a grid, where return loop paths are not available, the common neutral line conductor shall be grounded at intervals not greater than 500 feet. Each transformer installation on a branch circuit without a loop return shall be so located that there will be one or more metallic water pipe system grounds, each of a resistance not greater than 3 ½ ohms, on each side of the transformer installation."

41. Rule 59.4-C

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

"On common neutral systems, each transformer installation on a branch circuit without a loop return shall be so located that there will be not less than one ground, of a resistance not greater than 3 ½ ohms on each side of the transformers installation."

42. Rule 86.4-E

The figure "20,000 volts" in this rule is amended to read "21,000 volts"

43. Rule 86.6-A
Rule 86.6-B
Rule 86.6-C
Rule 86.6-D

In each of these rules the figures "20,000" are amended to read "21,000"

43. Rule 86.7-A1
Rule 86.7-A2

In each of these rules the figures "20,000" are amended to read "21,000"

44. Rule 89.2-A

In each of these rules the figures "20,000" are amended to read "21,000"

45. Rule 89.2-A

In this rule, the figures "20,000" are amended to read "21,000".

46. Rule 89.3

In this rule the figures "20,000" are amended to read "21,000"

47. Rule 92.1-A

The last line of this rule is amended to read:

"Circuits of 0-21,000 Volts or communication circuits ----4 feet"

48. Appendix G

Wherever the figures "20,000" appear in the illustrations set forth in appendix G, said figures are amended to read "21,000".

Strikeout and Underline Added April 22, 2002 by Raymond G Fugere

Original Version
Rule 20.7

20.7 **Common Neutral Systems** mean those electrical supply distribution systems wherein the same specially grounded conductor is utilized as a neutral conductor of primary circuits of less than 5000 volts and secondary circuits of 0-750 volts supplied therefrom.

Strikeout and Underline Version
Rule 20.7

20.7 **Common Neutral Systems** mean those electrical supply distribution systems wherein the same specially grounded conductor is utilized as a neutral conductor of primary circuits of less than 21,000 ~~5000~~volts and secondary circuits of 0-750 volts supplied therefrom.

Final Version
Rule 20.7

20.7 **Common Neutral Systems** mean those electrical supply distribution systems wherein the same specially grounded conductor is utilized as a neutral conductor of primary circuits of less than 21,000 volts and secondary circuits of 0-750 volts supplied therefrom.

Original Version
Rule 32.2-A

32.2-A Supply Circuits of 750-20,000 Volts

Supply circuits of 750-20,000 volts should not be above supply circuits in excess of 20,000 volts.

Strikeout and Underline Version
Rule 32.2-A

32.2-A Supply Circuits of 750~~-20,000~~ 21,000 Volts

Supply circuits of 750~~-20,000~~ 21,000 volts should not be above supply circuits in excess of ~~20,000~~ 21,000 volts.

Final Version
Rule 32.2-A

32.2-A Supply Circuits of 750-21,000 Volts

Supply circuits of 750-21,000 volts should not be above supply circuits in excess of 21,000 volts.

Original Version

Rule 32.4-A1

32.4-A Supply Circuits

1 750-7500 Volts and More than 20,000 Volts: Supply circuits of 750-7500 volts shall not be carried on the same crossarm with circuits of more than 20,000 this level. Where construction is used, circuits of different classifications shall be carried on opposite ends of the crossarm with a horizontal separation of not less than pin spacings required for the highest voltage concerned, but not less than 36 inches between the nearest conductors of different classification.

Strikeout and Underline Version

Rule 32.4-A1

32.4-A Supply Circuits

1 750-7500 Volts and More than ~~20,000~~ 21,000 Volts: Supply circuits of 750-7500 volts shall not be carried on the same crossarm with circuits of more than ~~20,000~~ 21,000 this level. Where construction is used, circuits of different classifications shall be carried on opposite ends of the crossarm with a horizontal separation of not less than pin spacings required for the highest voltage concerned, but not less than 36 inches between the nearest conductors of different classification.

Final Version
Rule 32.4-A1

32.4-A Supply Circuits

1 750-7500 Volts and More than 21,000 Volts: Supply circuits of 750-7500 volts shall not be carried on the same crossarm with circuits of more than 21,000 this level. Where construction is used, circuits of different classifications shall be carried on opposite ends of the crossarm with a horizontal separation of not less than pin spacings required for the highest voltage concerned, but not less than 36 inches between the nearest conductors of different classification.

Original Version
Rule 32.4-A2

32.4A Supply Circuits

2 0-750 Volts and More Than 7500 Volts: Supply circuits of 0-750 volts shall not be carried on the same crossarm with circuits of more than 7500 volts, except that, on transformer structures, bus conductors of 0-750 volts and bus conductors of 7500-20,000 volts may be supported on opposite ends of the same bus-supporting timbers provided the horizontal separation between conductors of different classifications supported on the same arm is not less than 36 inches, the bus conductors of 7500-20,000 volts are not extended longitudinally as line conductors, service drops are not supported on arms which support conductors of 7500-20,000 volts, and conductors on related buck arms are not less than 4 feet vertically from such bus timbers.

Strikeout and Underline Version
Rule 32.4-A2

(2) 0-750 Volts And More Than 7500 Volts: Supply circuits of 0-750 volts shall not be carried on the same crossarm with circuits of more than 7500 volts, except that, on transformer structures, bus conductors of 0-750 volts and bus conductors of 7500-21,000 ~~20,000~~ volts may be supported on opposite ends of the same bus-supporting timbers provided the horizontal separation between conductors of different classifications supported on the same arm is not less than 36 inches, the bus conductors of 7500- 21,000 ~~20,000~~ volts are not extended longitudinally as line conductors, service drops are not supported on arms which support conductors of 7500-7500-21,000 ~~20,000~~ volts, and conductors on related buck arms are not less than 4 feet vertically from such bus timbers.

Final Version
Rule 32.4-A2

32.4A Supply Circuits

(2) 0-750 Volts And More Than 7500 Volts: Supply circuits of 0-750 volts shall not be carried on the same crossarm with circuits of more than 7500 volts, except that, on transformer structures, bus conductors of 0-750 volts and bus conductors of 7500-21,000 volts may be supported on opposite ends of the same bus-supporting timbers provided the horizontal separation between conductors of different classifications supported on the same arm is not less than 36 inches, the bus conductors of 7500- 21,000 volts are not extended longitudinally as line conductors, service drops are not supported on arms which support conductors of 7500-21,000 volts, and conductors on related buck arms are not less than 4 feet vertically from such bus timbers.

Original Version
Rule 32.4-C1

32.4C Supply Circuits and Private Communication Circuits

1 7500-20,000 Volts, Same Ownership: Supply circuits of 7500-20,000 volts and private communication circuits owned (or leased) and operated and maintained by the same organization may be supported on the same crossarms as provided in Rule 89.2-A1.

Strikeout and Underline Version
Rule 32.4-C1

32.4C Supply Circuits and Private Communication Circuits

1 7500-~~20,000~~ 21,000 Volts, Same Ownership: Supply circuits of 7500-~~20,000~~ 21,000 volts and private communication circuits owned (or leased) and operated and maintained by the same organization may be supported on the same crossarms as provided in Rule 89.2-A1.

Final Version
Rule 32.4-C1

32.4C Supply Circuits and Private Communication Circuits

1 7500-21,000 Volts, Same Ownership: Supply circuits of 7500-21,000 volts and private communication circuits owned (or leased) and operated and maintained by the same organization may be supported on the same crossarms as provided in Rule 89.2-A1.

Original Version
Rule 33.1

33.1 Neutral Conductors

Neutral conductors of supply circuits, other than in distribution systems of 5000 volts or less with common primary and secondary grounded neutrals, shall be considered as carrying the same voltage as the other conductors of the circuits. Insulators used to support neutral conductors shall meet the requirements of Rule 55, based on the nominal voltage of the circuit, but are not required to have the same insulating value as insulators actually used on the phase conductors. Where a common neutral system is installed, the neutral conductor may be considered as carrying the same voltage as any of its related systems conductors, compliance with special practices and construction requirements being necessary (see Rule 59).

Strikeout and Underline Version
Rule 33.1

33.1 Neutral Conductors

Neutral conductors of supply circuits, other than in distribution systems of ~~5000~~ 21,000 volts or less with common primary and secondary grounded neutrals, shall be considered as carrying the same voltage as the other conductors of the circuits. Insulators used to support neutral conductors shall meet the requirements of Rule 55, based on the nominal voltage of the circuit, but are not required to have the same insulating value as insulators actually used on the phase conductors. Where a common neutral system is installed, the neutral conductor may be considered as carrying the same voltage as any of its related systems conductors, compliance with special practices and construction requirements being necessary (see Rule 59).

Final Version

Rule 33.1

33.1 Neutral Conductors

Neutral conductors of supply circuits, other than in distribution systems of 21,000 volts or less with common primary and secondary grounded neutrals, shall be considered as carrying the same voltage as the other conductors of the circuits. Insulators used to support neutral conductors shall meet the requirements of Rule 55, based on the nominal voltage of the circuit, but are not required to have the same insulating value as insulators actually used on the phase conductors. Where a common neutral system is installed, the neutral conductor may be considered as carrying the same voltage as any of its related systems conductors, compliance with special practices and construction requirements being necessary (see Rule 59).

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

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~~ 21,000 volts	F Supply Conductors and supply cables more than ~~20,000~~ 21,000 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~~ 21,000 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~~ 21,000 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 2. Supply service drops on residential premises 3. Communication conductors 4. Increased for Communication service drops on industrial or commercial premises 5. Communication service drops on residential premises	 54.8-B3a 54.8-B3b 84.4-A3 84.8-C3a 84.8-C3b
(r)	May be reduced above roofs of buildings under special conditions 1. Supply overhead guys 2. Supply service drops 3. Communication overhead guys 4. Communication conductors and cables 5. Communication service drops	 56.4-G 54.8-B4 86.4-F 84.4-E 84.8-C4
(s)	Also applies at fire escapes, etc. 1. Supply Conductors 2. Supply service drops on industrial or commercial premises 3. Supply service drops on residential premises 4. Communication Conductor	 54.4-H1 54.8-B4a 54.8-B4b 84.4-E
(t)	Special Clearances where attached to buildings, bridges or other structures 1. Supply conductors of 750-~~20,000~~ 21,000 volts 2. Trolley Contact Conductors 3. Communication Conductors	 54.4-H2 74.4-E 84.4-F
(u)	Reduced clearances permitted under special conditions 1. Supply service drops on industrial or commercial premises 2. Supply cables, grounded 3. Communication cables beside buildings, etc. 4. Communication conductors under bridges, etc. 5. Communication service drops.	 54.8-B4a 57.4-G 84.4-E 84.4-F 84.8-C4
(v)	May be reduced under special conditions. 1. Supply conductors of 750-7500 volts 2. Supply transformer lead and bus wires where guarded	 54.4-H1 58.3-B2
(w)	May be reduced at angles in lines and transportation points 1. Supply conductors 2. Communication Conductors	 54.4-D1 84.4-D5
(x)	May be reduced for suitably protected lateral or vertical runs. 1. Supply bond wires 2. Supply ground wires 3. Supply lateral conductors 4. Supply vertical pins 5. Supply risers 6. Communication Ground Wires 7. Communication lateral conductors 8. Communication vertical runs 9. Communication risers	 53.4 54.6-B 54.6-C 54.6-D 54.6-E 84.6-B 84.6-C 84.6-D 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, 750-21,000 volts	F Supply Conductors and supply cables more than 21,000 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- 21,000 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 750- 21,000 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 750-750- 21,000 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, 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)	----------	----------	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
(ee)	May be decreased in partial underground distribution	54.4-C4c

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~~ 21,000 volts	G ~~20,000~~ 21,000 - 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)	----------	----------	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~~ 21,000 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~~ 21,000 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 7,500-21,000volts	G 21,000 - 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)	----------	----------	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 2. Supply service drops on clearance arms 3. Supply service drops on pole-top extensions 4. Supply service drops and communication service drops 5. Communication service drops and police, fire-alarm or supply line conductors 6. Communication service drops on clearance arms 7. Communication service drops on pole-top extensions 8. Communication service drops and supply service drops 9. Police or fire-alarm conductors	 54.8-C1b 54.8-C2 54.8-C3 54.8-C4 84.8-D1b 84.8-D2 84.8-D3 84.8-D4 92.2
(m)	May be reduced for lead wires 1. Supply lead wires above supply conductors 2. Supply drip loops above communication conductors	 54.4-C6 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 2. Dead-ended on pole in vertical configuration 3. Conductors of 0-7500 volts in triangular configuration at top of pole 4. Conductors of more than 7500 volts at top of pole	 54.4-C1c 54.4-C4 54.4-D8a 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 2. Supply conductors of 7500-21,000volts	 54.4-C1a 54.4-C1b
(s)	Does not apply where conductors do not cross. 1. Supply conductors of different phase polarity 2. Communication conductors	 54.4-C2a 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 7500-21,000 volts 2. Supply conductors of 0-750 volts and conductors of 750-7500 volts	 32.4-A2 32.4-A3
(v)	Not applicable to certain kinds of conductors. 1. Supply conductors of same phase or polarity 2. Insulated supply conductors in multiple-conductor cables 3. Communication insulated conductors or multiple-conductor cables	 54.4-C3c 57.4-C 87.4-C1
(w)	Shall apply radially to conductors on brackets attached to crossarms. 1. Supply conductors 2. Communication conductors	 54.4-C3b 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 33.3-B

33.3B Independent Ground Connections

Ground connections for equipment of any one of the types listed in Rule 33.3-A shall not be interconnected with ground connections for equipment of any other type listed therein, except:

In common neutral systems the neutral conductors of 0-750 volt supply circuits and of supply circuits of 750-5000 volts may be interconnected and grounded in accordance with the provisions of Rule 59; and

A ground connection for a set of lighting arresters may be interconnected with:

A ground connection for neutral conductor of the circuit protected by the set of lighting arresters ,

The cable sheath or body of the cable pothead where the cable conductors are connected to the circuit protected by set of lighting arresters,

Metallic conduit enclosing conductors of the circuit protected by the set of lighting arresters,

Transformer cases grounded in accordance with Rule 58.3-C3 where transformers are connected to the circuit protected by the set of lighting arresters, and

The ground connection of another set of lighting arresters, provided the circuits protected are of the same voltage classification.

Where more than two sets of lighting arresters on supply circuits of the same voltage classification are installed on a pole or structure, and their ground terminals are interconnected at the top of the ground connections, two complete and effective ground connections will be considered sufficient for the purpose of this rule. Connection to an effectively grounded cable sheath or conduit of a circuit protected by the lighting arresters will be considered as one of these two effective ground connections.

Strikeout and Underline Version
Rule 33.3-B

33.3B Independent Ground Connections

Ground connections for equipment of any one of the types listed in Rule 33.3-A shall not be interconnected with ground connections for equipment of any other type listed therein, except:

In common neutral systems the neutral conductors of 0-750 volt supply circuits and of supply circuits of 750-~~5000~~ 21,000 volts may be interconnected and grounded in accordance with the provisions of Rule 59; and

A ground connection for a set of lighting arresters may be interconnected with:

A ground connection for neutral conductor of the circuit protected by the set of lighting arresters ,

The cable sheath or body of the cable pothead where the cable conductors are connected to the circuit protected by set of lighting arresters,

Metallic conduit enclosing conductors of the circuit protected by the set of lighting arresters,

Transformer cases grounded in accordance with Rule 58.3-C3 where transformers are connected to the circuit protected by the set of lighting arresters, and

The ground connection of another set of lighting arresters, provided the circuits protected are of the same voltage classification.

Where more than two sets of lighting arresters on supply circuits of the same voltage classification are installed on a pole or structure, and their ground terminals are interconnected at the top of the ground connections, two complete and effective ground connections will be considered sufficient for the purpose of this rule. Connection to an effectively grounded cable sheath or conduit of a circuit protected by the lighting arresters will be considered as one of these two effective ground connections.

Final Version
Rule 33.3-B

33.3B Independent Ground Connections

Ground connections for equipment of any one of the types listed in Rule 33.3-A shall not be interconnected with ground connections for equipment of any other type listed therein, except:

In common neutral systems the neutral conductors of 0-750 volt supply circuits and of supply circuits of 750-21,000 volts may be interconnected and grounded in accordance with the provisions of Rule 59; and

A ground connection for a set of lighting arresters may be interconnected with:

A ground connection for neutral conductor of the circuit protected by the set of lighting arresters ,

The cable sheath or body of the cable pothead where the cable conductors are connected to the circuit protected by set of lighting arresters,

Metallic conduit enclosing conductors of the circuit protected by the set of lighting arresters,

Transformer cases grounded in accordance with Rule 58.3-C3 where transformers are connected to the circuit protected by the set of lighting arresters, and

The ground connection of another set of lighting arresters, provided the circuits protected are of the same voltage classification.

Where more than two sets of lighting arresters on supply circuits of the same voltage classification are installed on a pole or structure, and their ground terminals are interconnected at the top of the ground connections, two complete and effective ground connections will be considered sufficient for the purpose of this rule. Connection to an effectively grounded cable sheath or conduit of a circuit protected by the lighting arresters will be considered as one of these two effective ground connections.

Original Version
Rule 51.6-A

51.6A Marking of Poles where conductors are not on Crossarms

Wood or Metal poles which support conductors of more than 750 volts in vertical configuration and not on crossarms shall have bands of bright yellow color not less than one foot in width painted around them. The top of such a band shall be neither less than 2 ½ feet nor more than 3 feet below the lowest conductor of each circuit of more than 750 volts so supported.

In lieu of the paint required by this rule, similarly located signs, showing the words "High Voltage" in letters not less than 3 inches in height, shall be used. The letters on such signs shall be white on a green or black background, or such signs shall be of corrosion-resisting metal with the letters cut out therefrom and clearly legible.

The provisions of this rule, 51.6-A shall not apply to the marking of poles at the levels of supply circuits of more than 20,000 volts in rural districts.

See Rule 65 for marking of Towers

Strikeout and Underline Version
Rule 51.6-A

51.6A Marking of Poles where conductors are not on Crossarms

Wood or Metal poles which support conductors of more than 750 volts in vertical configuration and not on crossarms shall have bands of bright yellow color not less than one foot in width painted around them. The top of such a band shall be neither less than 2 ½ feet nor more than 3 feet below the lowest conductor of each circuit of more than 750 volts so supported.

In lieu of the paint required by this rule, similarly located signs, showing the words "High Voltage" in letters not less than 3 inches in height, shall be used. The letters on such signs shall be white on a green or black background, or such signs shall be of corrosion-resisting metal with the letters cut out therefrom and clearly legible.

The provisions of this rule, 51.6-A shall not apply to the marking of poles at the levels of supply circuits of more than 21,000 ~~20,000~~ volts in rural districts.

See Rule 65 for marking of Towers

Final Version
Rule 51.6-A

51.6A Marking of Poles where conductors are not on Crossarms

Wood or Metal poles which support conductors of more than 750 volts in vertical configuration and not on crossarms shall have bands of bright yellow color not less than one foot in width painted around them. The top of such a band shall be neither less than 2 ½ feet nor more than 3 feet below the lowest conductor of each circuit of more than 750 volts so supported.

In lieu of the paint required by this rule, similarly located signs, showing the words "High Voltage" in letters not less than 3 inches in height, shall be used. The letters on such signs shall be white on a green or black background, or such signs shall be of corrosion-resisting metal with the letters cut out therefrom and clearly legible.

The provisions of this rule, 51.6-A shall not apply to the marking of poles at the levels of supply circuits of more than 21,000 volts in rural districts.

See Rule 65 for marking of Towers.

Original Version
Rule 52.4-B2c

52.4-B2 Marking

c) Supporting Conductors of 7500-20,000 Volts at certain Locations: At All crossings over public thoroughfares and at locations adjacent to structures such as water tanks, windmills and buildings, adjacent to wells, and at similar locations, crossarms supporting conductors of 7500-20,000 volts shall be marked as high voltage.

Strikeout and Underline Version
Rule 52.4-B2c

52.4-B2 Marking

c) Supporting Conductors of 7500-~~20,000~~ 21,000 Volts at certain Locations: At All crossings over public thoroughfares and at locations adjacent to structures such as water tanks, windmills and buildings, adjacent to wells, and at similar locations, crossarms supporting conductors of 7500-~~20,000~~ 21,000 volts shall be marked as high voltage.

Final Version
Rule 52.4-B2c

52.4-B2 Marking

c) Supporting Conductors of 7500-21,000 Volts at certain Locations: At All crossings over public thoroughfares and at locations adjacent to structures such as water tanks, windmills and buildings, adjacent to wells, and at similar locations, crossarms supporting conductors of 7500-21,000 volts shall be marked as high voltage.

Original Version

Rule 52.4-B2e

52.4-B2 Marking

e) Supporting Conductors of 7500-20,000 Volts on the Same Structure With Conductors of 750 Volts or Less: Where, on the same structures in rural districts, crossarms supporting conductors of 7500-20,000 volts are above conductors of 750 volts or less, the crossarm supporting conductors of 7500-20,000 next above the conductors of 750 volts or less shall be marked as high voltage. All crossarms supporting conductors of 7500-20,000 volts on the same structures shall be marked as high voltage.

Strikeout and Underline Version

Rule 52.4-B2e

52.4-B2 Marking

e) Supporting Conductors of 7500-~~20,000~~ 21,000 Volts on the Same Structure With Conductors of 750 Volts or Less: Where, on the same structures in rural districts, crossarms supporting conductors of 7500-~~20,000~~ 21,000 volts are above conductors of 750 volts or less, the crossarm supporting conductors of 7500-~~20,000~~ 21,000 next above the conductors of 750 volts or less shall be marked as high voltage. All crossarms supporting conductors of 7500-~~20,000~~ 21,000 volts on the same structures shall be marked as high voltage.

Final Version
Rule 52.4-B2e

52.4-B2 Marking

e) Supporting Conductors of 7500-21,000 Volts on the Same Structure With Conductors of 750 Volts or Less: Where, on the same structures in rural districts, crossarms supporting conductors of 7500-21,000 volts are above conductors of 750 volts or less, the crossarm supporting conductors of 7500-21,000 next above the conductors of 750 volts or less shall be marked as high voltage. All crossarms supporting conductors of 7500-21,000 volts on the same structures shall be marked as high voltage.

Original Version

Rule 52.4-B3

52.4-B3 On Guarded Metal Poles: On Latticed metal Poles which are guarded with barriers as required in Rule 51.6-B, the following crossarms shall be marked as high voltage:

Crossarms supporting conductors of 750-7500 volts;

Crossarms supporting conductors of 7500-20,000 volts next above the level of conductors of 7500 volts or less;

Crossarms supporting conductors of 7500-20,000 volts below the level of conductors of 7500 or less;

Crossarms supporting any conductor of more than 7500 volts within 15 feet of walls, fire escapes, exits, windows and similar objects.

Where all conductors on a latticed metal pole which is guarded carry more than 7500 volts and the lowest crossarm supporting them is not required to be marked in accordance with the foregoing provisions of this rule , the entire pole shall be marked as high voltage by means of signs placed on any two opposite sides of the pole at a point above the barrier and below the lowest conductor level.

Strikeout and Underline Version

Rule 52.4-B3

52.4-B3 On Guarded Metal Poles: On Latticed metal Poles which are guarded with barriers as required in Rule 51.6-B, the following crossarms shall be marked as high voltage:

Crossarms supporting conductors of 750-7500 volts;

Crossarms supporting conductors of 7500-~~20,000~~ 21,000 volts next above the level of conductors of 7500 volts or less;

Crossarms supporting conductors of 7500-~~20,000~~ 21,000 volts below the level of conductors of 7500 or less;

Crossarms supporting any conductor of more than 7500 volts within 15 feet of walls, fire escapes, exits, windows and similar objects.

Where all conductors on a latticed metal pole which is guarded carry more than 7500 volts and the lowest crossarm supporting them is not required to be marked in accordance with the foregoing provisions of this rule , the entire pole shall be marked as high voltage by means of signs placed on any two opposite sides of the pole at a point above the barrier and below the lowest conductor level.

Final Version

Rule 52.4-B3

52.4-B3 On Guarded Metal Poles: On Latticed metal Poles which are guarded with barriers as required in Rule 51.6-B, the following crossarms shall be marked as high voltage:

Crossarms supporting conductors of 750-7500 volts;

Crossarms supporting conductors of 7500-21,000 volts next above the level of conductors of 7500 volts or less;

Crossarms supporting conductors of 7500-21,000 volts below the level of conductors of 7500 or less;

Crossarms supporting any conductor of more than 7500 volts within 15 feet of walls, fire escapes, exits, windows and similar objects.

Where all conductors on a latticed metal pole which is guarded carry more than 7500 volts and the lowest crossarm supporting them is not required to be marked in accordance with the foregoing provisions of this rule , the entire pole shall be marked as high voltage by means of signs placed on any two opposite sides of the pole at a point above the barrier and below the lowest conductor level.

Original Version
Rule 54.4-A1

54.4A Clearances, Above Ground

1) Across Arid or Mountainous Areas: Across arid or mountainous areas supply circuits carrying 20,000-30,000 volts, inclusive, may have a clearance of less than 30 feet (Table 1, Case 4, Column F) but not less than 25 feet above ground subject to a reduction of not more than 10 per cent because of temperature and loading as specified in Rule 43. Upon special permission from the Rail Road Commission, a minimum clearance of 25 feet above ground may be applied in similar areas to circuits in excess of 30,000 volts, in which case no reduction of the 25 feet will be permitted for conditions less than maximum loadings or temperature specified in Rules 43.1 and 43.2.

Strikeout and Underline Version
Rule 54.4-A1

54.4A Clearances, Above Ground

1) Across Arid or Mountainous Areas: Across arid or mountainous areas supply circuits carrying ~~20,000~~21,000-30,000 volts, inclusive, may have a clearance of less than 30 feet (Table 1, Case 4, Column F) but not less than 25 feet above ground subject to a reduction of not more than 10 per cent because of temperature and loading as specified in Rule 43. Upon special permission from the Rail Road Commission, a minimum clearance of 25 feet above ground may be applied in similar areas to circuits in excess of 30,000 volts, in which case no reduction of the 25 feet will be permitted for conditions less than maximum loadings or temperature specified in Rules 43.1 and 43.2.

Final Version
Rule 54.4-A1

54.4A Clearances, Above Ground

1) Across Arid or Mountainous Areas: Across arid or mountainous areas supply circuits carrying 21,000-30,000 volts, inclusive, may have a clearance of less than 30 feet (Table 1, Case 4, Column F) but not less than 25 feet above ground subject to a reduction of not more than 10 per cent because of temperature and loading as specified in Rule 43. Upon special permission from the Rail Road Commission, a minimum clearance of 25 feet above ground may be applied in similar areas to circuits in excess of 30,000 volts, in which case no reduction of the 25 feet will be permitted for conditions less than maximum loadings or temperature specified in Rules 43.1 and 43.2.

Original Version
Rule 54.4-A2

54.4A Clearances, Above Ground

2 In Rural Districts, Conductors of 750-20,000 Volts:

Strikeout and Underline Version
Rule 54.4-A2

54.4A Clearances, Above Ground

2 In Rural Districts, Conductors of 750-~~20,000~~ 21,000 Volts:

Final Version
Rule 54.4-A2

54.4A Clearances, Above Ground

2 In Rural Districts, Conductors of 750-21,000 Volts:

Original Version

Rule 54.4-C1b

54.4-C1 Between Conductors, On Different Crossarms on the Same Pole

b) Conductors of 750-20,000 Volts: The 4 foot vertical clearance between conductors of 7500-20,000 volts, as specified in Table 2, Case 11, Column F, may be reduced to not less than 3 feet, provided all of the following conditions are met:

The conductors involved are of one ownership and the circuits are operated and maintained by the same crews of workmen;

Under no conditions is the reduced clearance to be applied in new construction involving new poles;

Buck arm construction, transformers, or capacitors are not involved;

More than one reduced clearance of 3 feet shall not be used on any pole; and

It is not practicable to obtain the normally required 4-foot clearance.

Strikeout and Underline Version
Rule 54.4-C1b

54.4-C1 Between Conductors, On Different Crossarms on the Same Pole

b) Conductors of 750-~~20,000~~ 21,000 Volts: The 4 foot vertical clearance between conductors of 7500-~~20,000~~ 21,000 volts, as specified in Table 2, Case 11, Column F, may be reduced to not less than 3 feet, provided all of the following conditions are met:

The conductors involved are of one ownership and the circuits are operated and maintained by the same crews of workmen;

Under no conditions is the reduced clearance to be applied in new construction involving new poles;

Buck arm construction, transformers, or capacitors are not involved;

More than one reduced clearance of 3 feet shall not be used on any pole; and

It is not practicable to obtain the normally required 4-foot clearance.

Final Version
Rule 54.4-C1b

54.4-C1 Between Conductors, On Different Crossarms on the Same Pole

b) Conductors of 750-21,000 Volts: The 4 foot vertical clearance between conductors of 7500-21,000 volts, as specified in Table 2, Case 11, Column F, may be reduced to not less than 3 feet, provided all of the following conditions are met:

The conductors involved are of one ownership and the circuits are operated and maintained by the same crews of workmen;

Under no conditions is the reduced clearance to be applied in new construction involving new poles;

Buck arm construction, transformers, or capacitors are not involved;

More than one reduced clearance of 3 feet shall not be used on any pole; and

It is not practicable to obtain the normally required 4-foot clearance.

Original Version
Rule 54.4-C2a

54.4-C2 Between Conductors On Related Line and Buck Arms:

2) One Voltage Classification*: The clearance of Table 2, Case 14 (and clearances less than as specified in cases 9 to 13) shall not be applied consecutively both above and below the same conductor. The foregoing provisions of this rule do not apply to conductors in triangular or vertical configuration, the clearances of Table 2, Case 14 being directly applicable.

Where Conductors of one voltage classification only are supported on the same crossarms, the vertical clearances specified in Table 2, Case 14 are not required between conductors on line arm and conductors on related buck arm provided no conductors on the line arm cross conductors of different phase or polarity on the buck arms.

*Voltage Classification for this purpose are:
0-750 volts
750-7500 volts
7500-20,000 volts and
20,000 volts and above.

Strikeout and Underline Version

Rule 54.4-C2a

54.4-C2 Between Conductors On Related Line and Buck Arms:

2) One Voltage Classification*: The clearance of Table 2, Case 14 (and clearances less than as specified in cases 9 to 13) shall not be applied consecutively both above and below the same conductor. The foregoing provisions of this rule do not apply to conductors in triangular or vertical configuration, the clearances of Table 2, Case 14 being directly applicable.

Where Conductors of one voltage classification only are supported on the same crossarms, the vertical clearances specified in Table 2, Case 14 are not required between conductors on line arm and conductors on related buck arm provided no conductors on the line arm cross conductors of different phase or polarity on the buck arms.

*Voltage Classification for this purpose are:

0-750 volts
750-7500 volts
7500-~~20,000~~ 21,000 volts and
~~20,000~~ 21,000 volts and above.

Final Version
Rule 54.4-C2a

54.4-C2 Between Conductors On Related Line and Buck Arms:

2) One Voltage Classification*: The clearance of Table 2, Case 14 (and clearances less than as specified in cases 9 to 13) shall not be applied consecutively both above and below the same conductor. The foregoing provisions of this rule do not apply to conductors in triangular or vertical configuration, the clearances of Table 2, Case 14 being directly applicable.

Where Conductors of one voltage classification only are supported on the same crossarms, the vertical clearances specified in Table 2, Case 14 are not required between conductors on line arm and conductors on related buck arm provided no conductors on the line arm cross conductors of different phase or polarity on the buck arms.

*Voltage Classification for this purpose are:
0-750 volts
750-7500 volts
7500-21,000 volts and
21,000 volts and above.

Original Version
Rule 54.4-C4c

54.4-C4 Between Conductors 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.

Strikeout and Underline Version
Rule 54.4-C4c

54.4-C4 Between Conductors 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~~ 21,000 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

54.4-C4 Between Conductors 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 750-21,000 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-C6

54.4-C Between Conductors

6 From Lead Wires and Drip Loops to Other Conductors: The vertical clearances between clearances between the lowest point of lead wires (to conduit runs, transformers or other equipment), excepting drop wires to street lights, and the next supply conductor level below such lead wires may be less than the clearances specified in Table 2, Cases 9 to 12, Columns D, E, F, and G provided the vertical separation is maintained as great as practicable and in no case less than the following:

Voltage of Lead wires	Minimum distance above other conductor level
0-750	12 inches
750-7500	18 inches
7500-20,000	24 inches
20,000-35,000	36 inches

Strikeout and Underline Version
Rule 54.4-C6

54.4-C Between Conductors

6 From Lead Wires and Drip Loops to Other Conductors: The vertical clearances between clearances between the lowest point of lead wires (to conduit runs, transformers or other equipment), excepting drop wires to street lights, and the next supply conductor level below such lead wires may be less than the clearances specified in Table 2, Cases 9 to 12, Columns D, E, F, and G provided the vertical separation is maintained as great as practicable and in no case less than the following:

Voltage of Lead wires	Minimum distance above other conductor level
0-750	12 inches
750-7500	18 inches
7500-~~20,000~~ 21,000	24 inches
~~20,000~~ 21,000-35,000	36 inches

Final Version
Rule 54.4-C6

54.4-C Between Conductors

6 From Lead Wires and Drip Loops to Other Conductors: The vertical clearances between clearances between the lowest point of lead wires (to conduit runs, transformers or other equipment), excepting drop wires to street lights, and the next supply conductor level below such lead wires may be less than the clearances specified in Table 2, Cases 9 to 12, Columns D, E, F, and G provided the vertical separation is maintained as great as practicable and in no case less than the following:

Voltage of Lead wires	Minimum distance above other conductor level
0-750	12 inches
750-7500	18 inches
7500-21,000	24 inches
21,000-35,000	36 inches

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

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).

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

These clearances from center line of pole need not apply to conductors of 750-7500 volts and 7500-~~20,000~~ 21,000 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).

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 7500-21,000 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-D8b

54.4-D8 At Top of Pole

b) More than 7500 Volts: A single conductor of a circuit of more than 7500 volts may be attached directly to the top of a pole or to a crossarm at the top of a pole at a distance less than as specified in Table 1, case 8, provided no transformer or other apparatus (excepting pole-top switches or lighting arresters) carried on the pole is connected to the circuit so arranged.

Where this construction is used, all conductors of other circuits on the pole shall be not less than 6 feet below the pole-top conductor except that in rural districts the conductors of a 0-750 volt secondary circuit may be not less than 4 feet below the conductor level of such a primary circuit by means of which the secondary is supplied.

Dead ending of a conductor at top of pole under these provisions is optional with dead ending under the requirements of Rule 54.4-D7b.

Strikeout and Underline Version
Rule 54.4-D8b

54.4-D8 At Top of Pole

b) More than 7500 Volts: A single conductor of a circuit of more than 7500 volts may be attached directly to the top of a pole or to a crossarm at the top of a pole at a distance less than as specified in Table 1, case 8, provided no ~~transformer or other~~ apparatus ~~(excepting pole-top switches or lighting arresters)~~ carried on the pole is connected to the circuit so arranged~~.~~ Except lighting arresters, a pole-top switch, or a transformer. Where a transformer is connected to a circuit so arranged, a vertical clearance of not less than 30 inches shall be maintained between the primary conductor directly above and the Unenergized metal parts of the transformer, as specified in Rule 58.3-B3e.

Where this construction is used, all conductors of other circuits on the pole shall be not less than 6 feet below the pole-top conductor except that in rural districts the conductors of a 0-750 volt secondary circuit may be not less than 4 feet below the conductor level of such a primary circuit by means of which the secondary is supplied.

Dead ending of a conductor at top of pole under these provisions is optional with dead ending under the requirements of Rule 54.4-D7b.

Final Version
Rule 54.4-D8b

54.4-D8 At Top of Pole

b) More than 7500 Volts: A single conductor of a circuit of more than 7500 volts may be attached directly to the top of a pole or to a crossarm at the top of a pole at a distance less than as specified in Table 1, case 8, provided no apparatus carried on the pole is connected to the circuit so arranged except lighting arresters, a pole-top switch, or a transformer. Where a transformer is connected to a circuit so arranged, a vertical clearance of not less than 30 inches shall be maintained between the primary conductor directly above and the Unenergized metal parts of the transformer, as specified in Rule 58.3-B3e.

Where this construction is used, all conductors of other circuits on the pole shall be not less than 6 feet below the pole-top conductor except that in rural districts the conductors of a 0-750 volt secondary circuit may be not less than 4 feet below the conductor level of such a primary circuit by means of which the secondary is supplied.

Dead ending of a conductor at top of pole under these provisions is optional with dead ending under the requirements of Rule 54.4-D7b.

Original Version

Rule 54.4-H2

54.4-H Above or Along the Sides of Buildings, Bridges and Other Structures

2 Attached Conductors: Unprotected conductors not exceeding 20,000 volts may be supported by attachments to buildings, bridges and other structures. To conductors of 0-750 volts so supported, the clearances of Table 1, case 7 columns B, C, and D shall apply. To conductors of 750-20,000 volts so supported a minimum horizontal clearance of 8 feet shall apply.

In lieu of theses requirements for unprotected conductors, supply conductors may installed on the surface of buildings, bridges and other structures in grounded metal conduit or other grounded sheath or grounded shield suitably protected from mechanical injury.

Strikeout and Underline Version

Rule 54.4-H2

54.4-H Above or Along the Sides of Buildings, Bridges and Other Structures

2 Attached Conductors: Unprotected conductors not exceeding ~~20,000~~ 21,000 volts may be supported by attachments to buildings, bridges and other structures. To conductors of 0-750 volts so supported, the clearances of Table 1, case 7 columns B, C, and D shall apply. To conductors of 750-~~20,000~~ 21,000 volts so supported a minimum horizontal clearance of 8 feet shall apply.

In lieu of theses requirements for unprotected conductors, supply conductors may installed on the surface of buildings, bridges and other structures in grounded metal conduit or other grounded sheath or grounded shield suitably protected from mechanical injury.

Final Version
Rule 54.4-H2

54.4-H Above or Along the Sides of Buildings, Bridges and Other Structures

2 Attached Conductors: Unprotected conductors not exceeding 21,000 volts may be supported by attachments to buildings, bridges and other structures. To conductors of 0-750 volts so supported, the clearances of Table 1, case 7 columns B, C, and D shall apply. To conductors of 750-21,000 volts so supported a minimum horizontal clearance of 8 feet shall apply.

In lieu of theses requirements for unprotected conductors, supply conductors may installed on the surface of buildings, bridges and other structures in grounded metal conduit or other grounded sheath or grounded shield suitably protected from mechanical injury.

Original Version
Rule 54.4I

54.4I Under or Through Bridges, Viaducts or Similar Structures

Unprotected supply conductors which pass unattached under bridges, viaducts or other structures shall be maintained at clearances above ground and walkways as specified in Table 1, Cases 1 to 6 incl.; at clearances from walls and underneath parts of such structures as specified in Table 1, Case 7; and at clearances from conductors of other classifications as specified in Table 2, Case 3.

Conductors of 0-20,000 volts, passing under or through bridges, viaducts or similar structures, may be attached thereto in accordance with the provision of Rule 54.4-H2. Warning signs of a substantial character with letters not less than 3 inches in height reading "High Voltage" for voltages in excess of 750 volts shall be placed conspicuously on each crossarm or structural member supporting the conductors.

In lieu of these requirements for unprotected conductors, supply conductors which cross under bridges, viaducts or other structures shall be enclosed in grounded metal conduit or in other effectively grounded sheath or grounded shield suitably protected from mechanical injury.

Strikeout and Underline Version
Rule 54.4I

54.4I Under or Through Bridges, Viaducts or Similar Structures

Unprotected supply conductors which pass unattached under bridges, viaducts or other structures shall be maintained at clearances above ground and walkways as specified in Table 1, Cases 1 to 6 incl.; at clearances from walls and underneath parts of such structures as specified in Table 1, Case 7; and at clearances from conductors of other classifications as specified in Table 2, Case 3.

Conductors of 0-~~20,000~~ 21,000 volts, passing under or through bridges, viaducts or similar structures, may be attached thereto in accordance with the provision of Rule 54.4-H2. Warning signs of a substantial character with letters not less than 3 inches in height reading "High Voltage" for voltages in excess of 750 volts shall be placed conspicuously on each crossarm or structural member supporting the conductors.

In lieu of these requirements for unprotected conductors, supply conductors which cross under bridges, viaducts or other structures shall be enclosed in grounded metal conduit or in other effectively grounded sheath or grounded shield suitably protected from mechanical injury.

Final Version
Rule 54.4I

54.4I Under or Through Bridges, Viaducts or Similar Structures

Unprotected supply conductors which pass unattached under bridges, viaducts or other structures shall be maintained at clearances above ground and walkways as specified in Table 1, Cases 1 to 6 incl.; at clearances from walls and underneath parts of such structures as specified in Table 1, Case 7; and at clearances from conductors of other classifications as specified in Table 2, Case 3.

Conductors of 0-21,000 volts, passing under or through bridges, viaducts or similar structures, may be attached thereto in accordance with the provision of Rule 54.4-H2. Warning signs of a substantial character with letters not less than 3 inches in height reading "High Voltage" for voltages in excess of 750 volts shall be placed conspicuously on each crossarm or structural member supporting the conductors.

In lieu of these requirements for unprotected conductors, supply conductors which cross under bridges, viaducts or other structures shall be enclosed in grounded metal conduit or in other effectively grounded sheath or grounded shield suitably protected from mechanical injury.

Original Version

Rule 54.6A

54.6A Unprotected Conductors (see Rule 20.8-D for definition)

Unprotected conductors from one level on a pole or structure to another level shall not pass within the climbing space; shall not pass within the working space, except as permitted by Rule 54.7-B2; shall not pass between the conductors of any other circuit, except between pole pin conductor positions; and shall clear the conductors of other circuits by distances not less than the following:

Highest voltage Classification Of conductors concerned	Minimum radial distance before conductors
0-5000 volts	11 ½ inches
5000-7500 volts	17 ½ inches
7500-20,000 volts	24 inches
20,000 volts and above	36 inches

Where the distance between levels is in excess of 12 feet and unprotected conductors pass between the pole-pin conductor positions of any other circuit, additional supports shall be installed so that the maximum length of conductor between supports is not more than 12 feet.

The clearances in the above tabulations do not apply between taps in buckram construction, the clearances specified in Table 2, Case 16 being directly applicable.

For clearances between street light drop wires and cables, other conductors and metal boxes, See Rules 58.2-B3 and 92.1-F5

Strikeout and Underline Version
Rule 54.6A

54.6A Unprotected Conductors (see Rule 20.8-D for definition)

Unprotected conductors from one level on a pole or structure to another level shall not pass within the climbing space; shall not pass within the working space, except as permitted by Rule 54.7-B2; shall not pass between the conductors of any other circuit, except between pole pin conductor positions; and shall clear the conductors of other circuits by distances not less than the following:

Highest voltage Classification Of conductors concerned	Minimum radial distance before conductors
0-5000 volts	11 ½ inches
5000-7500 volts	17 ½ inches
7500-21,000 ~~20,000~~ volts	24 inches
21,000 ~~20,000~~ volts and above	36 inches

Where the distance between levels is in excess of 12 feet and unprotected conductors pass between the pole-pin conductor positions of any other circuit, additional supports shall be installed so that the maximum length of conductor between supports is not more than 12 feet.

The clearances in the above tabulations do not apply between taps in buckram construction, the clearances specified in Table 2, Case 16 being directly applicable.

For clearances between street light drop wires and cables, other conductors and metal boxes, See Rules 58.2-B3 and 92.1-F5

Final Version
Rule 54.6A

54.6A Unprotected Conductors (see Rule 20.8-D for definition)

Unprotected conductors from one level on a pole or structure to another level shall not pass within the climbing space; shall not pass within the working space, except as permitted by Rule 54.7-B2; shall not pass between the conductors of any other circuit, except between pole pin conductor positions; and shall clear the conductors of other circuits by distances not less than the following:

Highest voltage Classification Of conductors concerned	Minimum radial distance before conductors
0-5000 volts	11 ½ inches
5000-7500 volts	17 ½ inches
7500-21,000 volts	24 inches
21,000 volts and above	36 inches

Where the distance between levels is in excess of 12 feet and unprotected conductors pass between the pole-pin conductor positions of any other circuit, additional supports shall be installed so that the maximum length of conductor between supports is not more than 12 feet.

The clearances in the above tabulations do not apply between taps in buckram construction, the clearances specified in Table 2, Case 16 being directly applicable.

For clearances between street light drop wires and cables, other conductors and metal boxes, See Rules 58.2-B3 and 92.1-F5

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 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

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~~ 21,000 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 (750-21,000 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 54.7A-4

54.7A Climbing Space

4 Allowable Climbing Space Obstructions: Crossarms and their supporting members are allowed in climbing spaces provided that, where buck arms are involved, any arms within climbing spaces are treated as double arms.

Suitably protected vertical conductors attached tot eh surfaces of poles, and guys, (except those guys contacting metal pins or dead-end hardware as specified in Rule 52.7-D) are allowed in climbing spaces provided that not more than one guy and one vertical riser, run, or ground wire are installed in any 4-foot vertical section of climbing space. The terminals or terminal fittings of risers or runs shall not be installed within climbing spaces.

Pin-type insulators which support line conductors of 20,000 volts or less may extend not more than one-half of their diameter into the climbing space. Dead-end or strain type insulators which support line conductors of 0-750 volts may extend not more than one-half of their diameter into the climbing space.

Modifications of these requirements for rack construction are specified in Rule 54.9-F.

Strikeout and Underline Version
Rule 54.7A-4

54.7A Climbing Space

4 Allowable Climbing Space Obstructions: Crossarms and their supporting members are allowed in climbing spaces provided that, where buck arms are involved, any arms within climbing spaces are treated as double arms.

Suitably protected vertical conductors attached tot eh surfaces of poles, and guys, (except those guys contacting metal pins or dead-end hardware as specified in Rule 52.7-D) are allowed in climbing spaces provided that not more than one guy and one vertical riser, run, or ground wire are installed in any 4-foot vertical section of climbing space. The terminals or terminal fittings of risers or runs shall not be installed within climbing spaces.

Pin-type insulators which support line conductors of ~~20,000~~ 21,000 volts or less may extend not more than one-half of their diameter into the climbing space. Dead-end or strain type insulators which support line conductors of 0-750 volts may extend not more than one-half of their diameter into the climbing space.

Modifications of these requirements for rack construction are specified in Rule 54.9-F.

Final Version
Rule 54.7A-4

54.7A Climbing Space

4 Allowable Climbing Space Obstructions: Crossarms and their supporting members are allowed in climbing spaces provided that, where buck arms are involved, any arms within climbing spaces are treated as double arms.

Suitably protected vertical conductors attached tot eh surfaces of poles, and guys, (except those guys contacting metal pins or dead-end hardware as specified in Rule 52.7-D) are allowed in climbing spaces provided that not more than one guy and one vertical riser, run, or ground wire are installed in any 4-foot vertical section of climbing space. The terminals or terminal fittings of risers or runs shall not be installed within climbing spaces.

Pin-type insulators which support line conductors of 21,000 volts or less may extend not more than one-half of their diameter into the climbing space. Dead-end or strain type insulators which support line conductors of 0-750 volts may extend not more than one-half of their diameter into the climbing space.

Modifications of these requirements for rack construction are specified in Rule 54.9-F.

Original Version
Rule 54.9-E1

54.9E Vertical Clearance Between Conductor Levels

1 With Guard Arm Below Conductors of 750-20,000 Volts: The vertical clearance between the top conductor in a rack group and conductors of 750-20,000 volts at the next conductor level above, may be less than 6 feet but shall be not less than 4 feet. If a clearance of less than 6 feet is used, all of the following requirements:

A wood guard arm not less than 48 inches long shall be installed directly above and parallel to the top line conductor of such a rack group;

Conductors in such a rack group, which are so guarded, shall not be attached to more than one side (there being four sides) of any pole; and

No service drop conductors supported on such rack shall pass between the surface of pole and the vertical plane of the line conductors. Any service drop conductors attached to and supported by the line conductors shall have a clearance of not less than 15 inches from surface of pole. (See App. G, Fig 43.)

Each guard arm and its pole attachments are required by Rule 46 to withstand a vertical load of 200 pounds at either end.

Strikeout and Underline Version
Rule 54.9-E1

54.9E Vertical Clearance Between Conductor Levels

1 With Guard Arm Below Conductors of 750~~-20,000~~ 21,000 Volts: The vertical clearance between the top conductor in a rack group and conductors of 750~~-20,000~~ 21,000 volts at the next conductor level above, may be less than 6 feet but shall be not less than 4 feet. If a clearance of less than 6 feet is used, all of the following requirements:

A wood guard arm not less than 48 inches long shall be installed directly above and parallel to the top line conductor of such a rack group;

Conductors in such a rack group, which are so guarded, shall not be attached to more than one side (there being four sides) of any pole; and

No service drop conductors supported on such rack shall pass between the surface of pole and the vertical plane of the line conductors. Any service drop conductors attached to and supported by the line conductors shall have a clearance of not less than 15 inches from surface of pole. (See App. G, Fig 43.)

Each guard arm and its pole attachments are required by Rule 46 to withstand a vertical load of 200 pounds at either end.

Final Version
Rule 54.9-E1

54.9E Vertical Clearance Between Conductor Levels

1 With Guard Arm Below Conductors of 750-21,000 Volts: The vertical clearance between the top conductor in a rack group and conductors of 750-21,000 volts at the next conductor level above, may be less than 6 feet but shall be not less than 4 feet. If a clearance of less than 6 feet is used, all of the following requirements:

A wood guard arm not less than 48 inches long shall be installed directly above and parallel to the top line conductor of such a rack group;

Conductors in such a rack group, which are so guarded, shall not be attached to more than one side (there being four sides) of any pole; and

No service drop conductors supported on such rack shall pass between the surface of pole and the vertical plane of the line conductors. Any service drop conductors attached to and supported by the line conductors shall have a clearance of not less than 15 inches from surface of pole. (See App. G, Fig 43.)

Each guard arm and its pole attachments are required by Rule 46 to withstand a vertical load of 200 pounds at either end.

Original Version
Rule 54.9-E4

54.9E Vertical Clearance Between Conductor Levels

4 In Rural Districts: In rural districts (see definition, Rule 21.0-B) where one circuit only of 7500-20,000 volts is supported on the poles above conductors in rack construction, the vertical clearance between the top conductor in rack construction and the nearest 7500-20,000 volt conductor level may be less than 6 feet but not less than 4 feet and no guard arm is required.

Strikeout and Underline Version
Rule 54.9-E4

54.9E Vertical Clearance Between Conductor Levels

4 In Rural Districts: In rural districts (see definition, Rule 21.0-B) where one circuit only of 7500-~~20,000~~ 21,000 volts is supported on the poles above conductors in rack construction, the vertical clearance between the top conductor in rack construction and the nearest 7500-~~20,000~~ 21,000 volt conductor level may be less than 6 feet but not less than 4 feet and no guard arm is required.

Final Version
Rule 54.9-E4

54.9E Vertical Clearance Between Conductor Levels

4 In Rural Districts: In rural districts (see definition, Rule 21.0-B) where one circuit only of 7500-21,000 volts is supported on the poles above conductors in rack construction, the vertical clearance between the top conductor in rack construction and the nearest 7500-21,000 volt conductor level may be less than 6 feet but not less than 4 feet and no guard arm is required.

Original Version
Rule 56.4-E

56.4E From Poles

Where passing guys are less than 15 inches from surface of pole and less than 8 feet below supply conductors of less than 20,000 volts supported on the same pole, such guys shall be sectionalized, in addition to the normal sectionalization required by Rule 56.6, by means of insulators in accordance with Rule 56.6-A as though attached to the pole or structure.

Strikeout and Underline Version
Rule 56.4-E

56.4E From Poles

Where passing guys are less than 15 inches from surface of pole and less than 8 feet below supply conductors of less than ~~20,000~~ 21,000 volts supported on the same pole, such guys shall be sectionalized, in addition to the normal sectionalization required by Rule 56.6, by means of insulators in accordance with Rule 56.6-A as though attached to the pole or structure.

Final Version
Rule 56.4-E

56.4E From Poles

Where passing guys are less than 15 inches from surface of pole and less than 8 feet below supply conductors of less than 21,000 volts supported on the same pole, such guys shall be sectionalized, in addition to the normal sectionalization required by Rule 56.6, by means of insulators in accordance with Rule 56.6-A as though attached to the pole or structure.

Original Version
Rule 56.6

56.6 Requirements for sectionalizing with Insulators

A Guys in Proximity to Supply Conductors of Less Than 20,000 Volts (See Rule 21.3-D for definition of proximity and Fig 45 of App. G)

All portions of guys within both a vertical distance of 8 feet from the level of supply conductors of less than 20,000 volts and a radial distance of 6 feet from the surface of wood poles or structures shall not be grounded, through anchors or otherwise. Where necessary to avoid the grounding of such portions, guys shall be sectionalized by means of insulators installed at locations as specified in Rule 56.7.

B Guys To Arms Supporting Conductors of Less Than 20,000 Volts

All portions of arm guys within 6 feet of points of attachment to wood crossarms, or metal crossarms on wood poles, shall not be grounded if the crossarms support supply conductors of less than 20,000 volts. Where necessary to avoid the grounding of such portions, arm guys shall be sectionalized by means of insulators at locations as specified in Rule 56.7.

C Underground Overhead Guys

All overhead guys which are not grounded (by means of ground wires, grounded anchor guys, attachment to grounded metal poles, or otherwise) shall be sectionalized at the locations measured from each attachment to poles or structures, as specified in Rule 56.7-A (6 feet to 9 feet from attachments).

D Guys Exposed to 20,000 Volts or More

Guys exposed to conductors of 20,000 volts or more (see App. G, Fig. 52) shall not be sectionalized and shall have their lower ends securely grounded (by means of ground wires, anchor guys, or attachments to securely grounded metal poles or structures). Excepted from the above requirements are:

Guys which are required to be sectionalized in accordance with Rule 56.6-A because of proximity of wood poles and supply conductors of less than 20,000 volts or in accordance with Rule 56.6-B; and

Guys which are sectionalized by wood strain insulators equipped with arcing horns and designed to provide impulse insulation for lighting conditions.

E Guys Attached To Grounded Poles or Structures

Guys attached to securely grounded metal poles or structures are not required to be sectionalized except as required by Rule 56.6-A because of proximity to supply conductors of less than 20,000 volts supported on wood poles, or by Rule 56.6-B.

Strikeout and Underline Version
Rule 56.6

56.6 Requirements for sectionalizing with Insulators

A Guys in Proximity to Supply Conductors of Less Than ~~20,000~~ 21,000 Volts (See Rule 21.3-D for definition of proximity and Fig 45 of App. G)

All portions of guys within both a vertical distance of 8 feet from the level of supply conductors of less than ~~20,000~~ 21,000 volts and a radial distance of 6 feet from the surface of wood poles or structures shall not be grounded, through anchors or otherwise. Where necessary to avoid the grounding of such portions, guys shall be sectionalized by means of insulators installed at locations as specified in Rule 56.7.

B Guys To Arms Supporting Conductors of Less Than ~~20,000~~ 21,000 Volts

All portions of arm guys within 6 feet of points of attachment to wood crossarms, or metal crossarms on wood poles, shall not be grounded if the crossarms support supply conductors of less than ~~20,000~~ 21,000 volts. Where necessary to avoid the grounding of such portions, arm guys shall be sectionalized by means of insulators at locations as specified in Rule 56.7.

C Underground Overhead Guys

All overhead guys which are not grounded (by means of ground wires, grounded anchor guys, attachment to grounded metal poles, or otherwise) shall be sectionalized at the locations measured from each attachment to poles or structures, as specified in Rule 56.7-A (6 feet to 9 feet from attachments).

D Guys Exposed to ~~20,000~~ 21,000 Volts or More

Guys exposed to conductors of ~~20,000~~ 21,000 volts or more (see App. G, Fig. 52) shall not be sectionalized and shall have their lower ends securely grounded (by means of ground wires, anchor guys, or attachments to securely grounded metal poles or structures). Excepted from the above requirements are:

Guys which are required to be sectionalized in accordance with Rule 56.6-A because of proximity of wood poles and supply conductors of less than ~~20,000~~ 21,000 volts or in accordance with Rule 56.6-B; and

Guys which are sectionalized by wood strain insulators equipped with arcing horns and designed to provide impulse insulation for lighting conditions.

E Guys Attached To Grounded Poles or Structures

Guys attached to securely grounded metal poles or structures are not required to be sectionalized except as required by Rule 56.6-A because of proximity to supply conductors of less than ~~20,000~~ 21,000 volts supported on wood poles, or by Rule 56.6-B.

Final Version
Rule 56.6

56.6 Requirements for sectionalizing with Insulators

A Guys in Proximity to Supply Conductors of Less Than 21,000 Volts (See Rule 21.3-D for definition of proximity and Fig 45 of App. G)

All portions of guys within both a vertical distance of 8 feet from the level of supply conductors of less than 21,000 volts and a radial distance of 6 feet from the surface of wood poles or structures shall not be grounded, through anchors or otherwise. Where necessary to avoid the grounding of such portions, guys shall be sectionalized by means of insulators installed at locations as specified in Rule 56.7.

B Guys To Arms Supporting Conductors of Less Than 21,000 Volts

All portions of arm guys within 6 feet of points of attachment to wood crossarms, or metal crossarms on wood poles, shall not be grounded if the crossarms support supply conductors of less than 21,000 volts. Where necessary to avoid the grounding of such portions, arm guys shall be sectionalized by means of insulators at locations as specified in Rule 56.7.

C Underground Overhead Guys

All overhead guys which are not grounded (by means of ground wires, grounded anchor guys, attachment to grounded metal poles, or otherwise) shall be sectionalized at the locations measured from each attachment to poles or structures, as specified in Rule 56.7-A (6 feet to 9 feet from attachments).

D Guys Exposed to 21,000 Volts or More

Guys exposed to conductors of 21,000 volts or more (see App. G, Fig. 52) shall not be sectionalized and shall have their lower ends securely grounded (by means of ground wires, anchor guys, or attachments to securely grounded metal poles or structures). Excepted from the above requirements are:

Guys which are required to be sectionalized in accordance with Rule 56.6-A because of proximity of wood poles and

supply conductors of less than 21,000 volts or in accordance with Rule 56.6-B; and

Guys which are sectionalized by wood strain insulators equipped with arcing horns and designed to provide impulse insulation for lighting conditions.

E Guys Attached To Grounded Poles or Structures

Guys attached to securely grounded metal poles or structures are not required to be sectionalized except as required by Rule 56.6-A because of proximity to supply conductors of less than 21,000 volts supported on wood poles, or by Rule 56.6-B.

Original Rule
Rule 58.3-B3e

58.3-B3 Above Ground

New Rule

Strikeout and Underline Rule
Rule 58.3-B3e

58.3-B3 Above Ground

e From 7500-21,000 Volt conductor Above: The clearance between unergized metal parts of transformers and 7500-21,000 volt conductors above shall be not less than 18 inches vertically or 18 inches horizontally except that the vertical clearance shall be not less than 30 inches from a conductor at the top of pole as in Rule 54.4-Db8.

Final Rule
Rule 58.3-B3e

58.3-B3 Above Ground

e From 7500-21,000 Volt conductor Above: The clearance between unergized metal parts of transformers and 7500-21,000 volt conductors above shall be not less than 18 inches vertically or 18 inches horizontally except that the vertical clearance shall be not less than 30 inches from a conductor at the top of pole as in Rule 54.4-Db8.

Original Rule
Rule 58.3-B4b

58.3-B4 Transformer Cases from Certain Conductors Less than 10 inches below the cases

b) Line conductors less than 10 inches below cases: Where a transformer case is unusually long, a crossarm supporting line conductors of 0-750 volts may be used as a heel arm or such conductors on an arm may be less than 10 inches below the transformer case or the hangers) provided all of the following conditions are met:

No more than a single transformer with lower voltage of 0-750 volts is supported on the pole at the same level;

The vertical clearances between conductors on the hanger arm and such line arm below shall not be less than as specified in Table 2, Cases 9 to 13;

It is not practicable to obtain the clearance of at least 10 inches specified in Rule 58.3-B3;

Such 0-750 volt conductors clear the transformer case by not less than 15 inches horizontally;

Service drops are not run from the crossarm supporting 0-750 volts conductors at that location; and

The vertical clearance of 0-750 volt conductors below the lowest point of the transformer primary leads is not less than

18 inches for primary leads of 750-7500 volts,
24 inches for primary leads of 7500-20,000 volts,
36 inches for primary leads of 20,000-35,000 volts.

Strikeout and Underline Rule
Rule 58.3-B4b

58.3-B4 Transformer Cases from Certain Conductors Less than 10 inches below the cases

b) Line conductors less than 10 inches below cases: Where a transformer case is unusually long, a crossarm supporting line conductors of 0-750 volts may be used as a heel arm or such conductors on an arm may be less than 10 inches below the transformer case or the hangers) provided all of the following conditions are met:

No more than a single transformer with lower voltage of 0-750 volts is supported on the pole at the same level;

The vertical clearances between conductors on the hanger arm and such line arm below shall not be less than as specified in Table 2, Cases 9 to 13;

It is not practicable to obtain the clearance of at least 10 inches specified in Rule 58.3-B3;

Such 0-750 volt conductors clear the transformer case by not less than 15 inches horizontally;

Service drops are not run from the crossarm supporting 0-750 volts conductors at that location; and

The vertical clearance of 0-750 volt conductors below the lowest point of the transformer primary leads is not less than

18 inches for primary leads of 750-7500 volts,
24 inches for primary leads of 7500-~~20,000~~ 21,000 volts,
36 inches for primary leads of ~~20,000~~ 21,000-35,000 volts.

Final Rule
Rule 58.3-B4b

58.3-B4 Transformer Cases from Certain Conductors Less than 10 inches below the cases

b) Line conductors less than 10 inches below cases: Where a transformer case is unusually long, a crossarm supporting line conductors of 0-750 volts may be used as a heel arm or such conductors on an arm may be less than 10 inches below the transformer case or the hangers) provided all of the following conditions are met:

No more than a single transformer with lower voltage of 0-750 volts is supported on the pole at the same level;

The vertical clearances between conductors on the hanger arm and such line arm below shall not be less than as specified in Table 2, Cases 9 to 13;

It is not practicable to obtain the clearance of at least 10 inches specified in Rule 58.3-B3;

Such 0-750 volt conductors clear the transformer case by not less than 15 inches horizontally;

Service drops are not run from the crossarm supporting 0-750 volts conductors at that location; and

The vertical clearance of 0-750 volt conductors below the lowest point of the transformer primary leads is not less than

18 inches for primary leads of 750-7500 volts,
24 inches for primary leads of 7500-21,000 volts,
36 inches for primary leads of-21,000-35,000 volts.

Original Rule
Rule 58.3-E

58.3 Transformers

E New Rule

Strikeout and Underline Rule
Rule 58.3-E

58.3 Transformers

E Connections Between Windings

Any metallic connection between the primary and secondary windings of a distribution transformer (as in common neutral systems) shall be made externally and not within the transformer case.

Final Rule
Rule 58.3-E

58.3 Transformers

E Connections Between Windings

Any metallic connection between the primary and secondary windings of a distribution transformer (as in common neutral systems) shall be made externally and not within the transformer case.

Original Version

Rule 58.4-B3b

58.4-B3 Cases From Conductor levels below

b) From Conductors in Excess of 750 Volts Below: The vertical clearance of capacitor and regulator cases and their hangers from the level of conductors in excess of 750 volts below shall be not less than

12 inches for conductors of 750-7500 volts,
18 inches for conductors of 7500-20,000 and
24 inches for conductors of 20,000 -35,000 volts.

Strikeout and Underline Version

Rule 58.4-B3b

58.4-B3 Cases From Conductor levels below

b) From Conductors in Excess of 750 Volts Below: The vertical clearance of capacitor and regulator cases and their hangers from the level of conductors in excess of 750 volts below shall be not less than

12 inches for conductors of 750-7500 volts,
18 inches for conductors of 7500-~~20,000~~ 21,000 and
24 inches for conductors of ~~20,000~~ 21,000-35,000 volts.

Final Version

Rule 58.4-B3b

58.4-B3 Cases From Conductor levels below

b) From Conductors in Excess of 750 Volts Below: The vertical clearance of capacitor and regulator cases and their hangers from the level of conductors in excess of 750 volts below shall be not less than

12 inches for conductors of 750-7500 volts,
18 inches for conductors of 7500-21,000 and
24 inches for conductors of21,000-35,000 volts.

Original Version
Rule 59.2

59.2 Applicability

The following rules cover certain special details for common neutral systems where the neutral conductor is common to primary circuits of less than 5,000 volts and secondary circuits of 0-750 volts supplied therefrom. These rules are supplemental to the rules given for supply lines in general and to other detailed construction requirements for supply lines.

Strikeout and Underline Version
Rule 59.2

59.2 Applicability

The following rules cover certain special details for common neutral systems where the neutral conductor is common to primary circuits of less than ~~5,000~~ 21,000 volts and secondary circuits of 0-750 volts supplied therefrom. These rules are supplemental to the rules given for supply lines in general and to other detailed construction requirements for supply lines.

Final Version
Rule 59.2

59.2 Applicability

The following rules cover certain special details for common neutral systems where the neutral conductor is common to primary circuits of less than 21,000 volts and secondary circuits of 0-750 volts supplied therefrom. These rules are supplemental to the rules given for supply lines in general and to other detailed construction requirements for supply lines.

Original Version
Rule 59.3B

59.3 B Size

In common neutral systems the common neutral line conductor shall have a cross-sectional area approximately 50 percent or more of the area of the largest related primary phase conductor, as set forth in Table No. 14 and in no case shall have less conductivity or mechanical strength than No. 6 AWG medium-hard-drawn copper wire.

Table 14
Relative Sizes of Common Neutral System Line Conductors

Size of Primary phase conductor (cir mils or AWG)	Minimum size of neutral conductor (AWG)
500,000	4/0
350,000	3/0
250,000	2/0
4/0	1/0
3/0	1
2/0	2
1/0	3
1	3
2	6
4	6
5	6

This Table is based on the requirement that the common neutral line conductor shall have a minimum area of approximately 50 per cent of the area of the largest related primary phase conductor and that the phase and neutral conductors are of the same material. Where these are not of the same material, the copper conductance equivalents of the table will be considered as meeting the requirements.

Strikeout and Underline Version
Rule 59.3B

59.3 B Size

In common neutral systems the common neutral line conductor shall have a cross-sectional area approximately 50 percent or more of the area of the largest related primary phase conductor, as set forth in Table No. 14 and in no case shall have less conductivity or mechanical strength than No. 6 AWG medium-hard-drawn copper wire.

Table 14
Relative Sizes of Common Neutral System Line Conductors

Size of Primary phase conductor (cir mils or AWG)	Minimum size of neutral conductor (AWG)
715,500	350,000
500,000	4/0
350,000	3/0
250,000	2/0
4/0	1/0
3/0	1
2/0	2
1/0	3
1	3
2	6
4	6
5	6

This Table is based on the requirement that the common neutral line conductor shall have a minimum area of approximately 50 per cent of the area of the largest related primary phase conductor and that the phase and neutral conductors are of the same material. Where these are not of the same material, the copper conductance equivalents of the table will be considered as meeting the requirements.

Final Version
Rule 59.3B

59.3 B Size

In common neutral systems the common neutral line conductor shall have a cross-sectional area approximately 50 percent or more of the area of the largest related primary phase conductor, as set forth in Table No. 14 and in no case shall have less conductivity or mechanical strength than No. 6 AWG medium-hard-drawn copper wire.

Table 14
Relative Sizes of Common Neutral System Line Conductors

Size of Primary phase conductor (cir mils or AWG)	Minimum size of neutral conductor (AWG)
715,000	350,000
500,000	4/0
350,000	3/0
250,000	2/0
4/0	1/0
3/0	1
2/0	2
1/0	3
1	3
2	6
4	6
5	6

This Table is based on the requirement that the common neutral line conductor shall have a minimum area of approximately 50 per cent of the area of the largest related primary phase conductor and that the phase and neutral conductors are of the same material. Where these are not of the same material, the copper conductance equivalents of the table will be considered as meeting the requirements.

Original Version
Rule 59.3-D

59.3-D Neutral Conductors

The arrangement and continuity of common neutral conductors shall conform to the following requirements:

Wherever existing plant permits, cross ties of the neutral conductor shall be made to form a continuous interconnected grid network. From each grid section there shall be two or more separate and continuous metallic return conductors to the source of supply.

If two return conductors only are used, each shall have a minimum area of approximately 50 per cent of the area of the primary phase conductor of the largest overhead feeder serving the area. (See Table No. 14 of Rule 59.3-B for minimum sizes.)

If more than two return conductors are used, the current-carrying capacity of the return system shall be such that a break in any one path shall leave two or more return paths which, combined, shall have a minimum area of approximately 50 per cent of the area of the primary phase conductor of the largest overhead feeder serving the area, thus providing adequate current-carrying capacity for full load current. (see Table No. 14 of Rule 59.3-B for minimum sizes.)

Primary neutral conductors or secondary neutral conductors, where continuous, may be used as a return loop from a common neutral provided they are of sufficient current-carrying capacity as specified in Rule 59.3-B and provided that they are grounded throughout in accordance with the requirements for common neutral line conductors as specified in Rule 59.4-B. Primary or secondary neutral line conductors so used shall be carried in their normal primary or secondary positions respectively.

Strikeout and Underline Version
Rule 59.3-D

59.3-D Neutral Conductors

The arrangement and continuity of common neutral conductors shall conform to the following requirements:

~~Wherever existing plant permits, c~~Cross ties of the neutral conductor shall be made to form a continuous interconnected grid network~~.~~ and ~~From each grid section~~ there shall be two or more separate and continuous metallic return conductors from the grid network to the substation constituting ~~to~~ the source of supply thereto.

If two return conductors only are used, each shall have a minimum area of approximately 50 per cent of the area of the primary phase conductor of the largest overhead feeder serving the area. (See Table No. 14 of Rule 59.3-B for minimum sizes.)

If more than two return conductors are used, the current-carrying capacity of the return system shall be such that a break in any one path shall leave two or more return paths which, combined, shall have a minimum area of approximately 50 per cent of the area of the primary phase conductor of the largest overhead feeder serving the area, thus providing adequate current-carrying capacity for full load current. (see Table No. 14 of Rule 59.3-B for minimum sizes.)

Primary neutral conductors or secondary neutral conductors, where continuous, may be used as a return loop from a common neutral provided they are of sufficient current-carrying capacity as specified in Rule 59.3-B and provided that they are grounded throughout in accordance with the requirements for common neutral line conductors as specified in Rule 59.4-B. Primary or secondary neutral line conductors so used shall be carried in their normal primary or secondary positions respectively.

Final Version
Rule 59.3-D

59.3-D Neutral Conductors

The arrangement and continuity of common neutral conductors shall conform to the following requirements:

Cross ties of the neutral conductor shall be made to form a continuous interconnected grid network and there shall be two or more separate and continuous metallic return conductors from the grid network to the substation constituting the source of supply thereto.

If two return conductors only are used, each shall have a minimum area of approximately 50 per cent of the area of the primary phase conductor of the largest overhead feeder serving the area. (See Table No. 14 of Rule 59.3-B for minimum sizes.)

If more than two return conductors are used, the current-carrying capacity of the return system shall be such that a break in any one path shall leave two or more return paths which, combined, shall have a minimum area of approximately 50 per cent of the area of the primary phase conductor of the largest overhead feeder serving the area, thus providing adequate current-carrying capacity for full load current. (see Table No. 14 of Rule 59.3-B for minimum sizes.)

Primary neutral conductors or secondary neutral conductors, where continuous, may be used as a return loop from a common neutral provided they are of sufficient current-carrying capacity as specified in Rule 59.3-B and provided that they are grounded throughout in accordance with the requirements for common neutral line conductors as specified in Rule 59.4-B. Primary or secondary neutral line conductors so used shall be carried in their normal primary or secondary positions respectively.

Original Version
Rule 59.4-A2

59.4-A Material and Size

2 Grounding Electrodes: Ground electrodes on common neutral systems shall conform to the following specifications as a minimum:

a) Not part of a water system; Ground electrodes which are not part of a water system shall be one-piece corrosion-resisting metal rods or pipes (or equivalent in physical and electrical qualities) 5/8 inch in diameter by 8 feet in length and driven to a minimum depth of 8 feet below the surface of the ground.

The driven ground rod, pipe, or equivalent shall be located not less than 2 feet from the surface of the pole. Where two or more such rods are installed, they shall be located at not less than 6-foot centers and separation required from the surface of the pole shall not be held to apply to the connection between rods.

b) Part of a water system: Where ground conductors are attached directly to a water pipe system, they shall be connected on the main line side of any water metering equipment.

Strikeout and Underline Version
Rule 59.4-A2

59.4-A Material and Size

2 Grounding Electrodes: Ground electrodes on common neutral systems shall ~~conform to the following specifications as a minimum:~~

~~a) Not part of a water system; Ground electrodes which are not part of a water system shall~~ be one-piece corrosion-resisting metal rods or pipes (or equivalent in physical and electrical ~~qualities~~ properties) not less than 5/8 inch in diameter by 8 feet in length and driven to a minimum depth of 8 feet below the surface of the ground. Pole-butt plates or wrappings shall not be used either in lieu of the aforesaid rods or pipes or as electrodes supplementary thereto.

The driven ground rod, pipe, or equivalent shall be located not less than 2 feet from the surface of the pole. Where two or more such rods are installed, they shall be located at not less than 6-foot centers and separation required from the surface of the pole shall not be held to apply to the connection between rods.

~~b) Part of a water system: Where ground conductors are attached directly to a water pipe system, they shall be connected on the main line side of any water metering equipment.~~

Final Version
Rule 59.4-A2

59.4-A Material and Size

2 Grounding Electrodes: Ground electrodes on common neutral systems shall be one-piece corrosion-resisting metal rods or pipes (or equivalent in physical and electrical properties) not less than 5/8 inch in diameter by 8 feet in length and driven to a minimum depth of 8 feet below the surface of the ground. Pole-butt plates or wrappings shall not be used either in lieu of the aforesaid rods or pipes or as electrodes supplementary thereto.

The driven ground rod, pipe, or equivalent shall be located not less than 2 feet from the surface of the pole. Where two or more such rods are installed, they shall be located at not less than 6-foot centers and separation required from the surface of the pole shall not be held to apply to the connection between rods.

Original Version

Rule 59.4-B1

59.4 B Neutral Conductors

1 Location: The common neutral grid system shall be grounded at intervals not greater than 1500 feet. On branch circuits extending from a grid, where return loop paths are not available, the common neutral line conductor shall be grounded at intervals not greater than 800 feet. Each transformer installation on a branch circuit without a loop return shall be so located that there will be one or more metallic water pipe system grounds, each of a resistance not greater than 3 ½ ohms, on each side of the transformer installation.

Strikeout and Underline Version

Rule 59.4-B1

59.4 B Neutral Conductors

1 Location: The common neutral grid system shall be grounded at intervals not greater than ~~1500~~ 1000 feet. On branch circuits extending from a grid, where return loop paths are not available, the common neutral line conductor shall be grounded at intervals not greater than ~~800~~ 500 feet. Each transformer installation on a branch circuit without a loop return shall be so located that there will be not less than one ~~or more metallic water pipe system~~ ground~~s~~, each of a resistance not greater than 3 ½ ohms, on each side of the transformer installation.

Final Version
Rule 59.4-B1

59.4 B Neutral Conductors

1 Location: The common neutral grid system shall be grounded at intervals not greater than 1000 feet. On branch circuits extending from a grid, where return loop paths are not available, the common neutral line conductor shall be grounded at intervals not greater than 500 feet. Each transformer installation on a branch circuit without a loop return shall be so located that there will be not less than one grounds, each of a resistance not greater than 3 ½ ohms, on each side of the transformer installation.

Original Version
Rule 59.4-C

59.4 Grounding

C Transformers

Ground conductors of Transformers on common neutral systems shall conform to the requirements of Rule 59.4-A1.

On common neutral systems, each transformer installation on a branch circuit without a loop return shall be so located that there will be one or more metallic water pipe systems grounds of a resistance not greater than 3 ½ ohms on each side of the transformers installation.

A transformer installation located on a grid section of a common neutral system requires no independent ground provided that there is a ground connection, having a resistance not in excess of 3 ½ ohms, to the common neutral line conductor either at the transformer pole or at an adjacent pole.

Strikeout and Underline Version
Rule 59.4-C

59.4 Grounding

C Transformers

Ground conductors of Transformers on common neutral systems shall conform to the requirements of Rule 59.4-A1.

On common neutral systems, each transformer installation on a branch circuit without a loop return shall be so located that there will be not less than one ~~or more metallic water pipe systems grounds~~ ground of a resistance not greater than 3 ½ ohms on each side of the transformers installation.

A transformer installation located on a grid section of a common neutral system requires no independent ground provided that there is a ground connection, having a resistance not in excess of 3 ½ ohms, to the common neutral line conductor either at the transformer pole or at an adjacent pole.

Final version
Rule 59.4-C

59.4 Grounding

C Transformers

Ground conductors of Transformers on common neutral systems shall conform to the requirements of Rule 59.4-A1.

On common neutral systems, each transformer installation on a branch circuit without a loop return shall be so located that there will be not less than one ground of a resistance not greater than 3 ½ ohms on each side of the transformers installation.

A transformer installation located on a grid section of a common neutral system requires no independent ground provided that there is a ground connection, having a resistance not in excess of 3 ½ ohms, to the common neutral line conductor either at the transformer pole or at an adjacent pole.

Original Version
Rule 86.4-E

86.4-E From Poles

Where guys passing poles supporting supply conductors are less than 15 inches from surface of pole and less than 8 feet below supply conductors of less than 20,000 volts supported on such pole, the guys shall be sectionalized, in addition to the normal sectionalization required by Rule 86.6, by means of insulators in accordance with Rule 86.6-B2 as though attached to the pole or structure.

Strikeout and Underline Version
Rule 86.4-E

86.4-E From Poles

Where guys passing poles supporting supply conductors are less than 15 inches from surface of pole and less than 8 feet below supply conductors of less than ~~20,000~~ 21,000 volts supported on such pole, the guys shall be sectionalized, in addition to the normal sectionalization required by Rule 86.6, by means of insulators in accordance with Rule 86.6-B2 as though attached to the pole or structure.

Final Version
Rule 86.4-E

86.4-E From Poles

Where guys passing poles supporting supply conductors are less than 15 inches from surface of pole and less than 8 feet below supply conductors of less than 21,000 volts supported on such pole, the guys shall be sectionalized, in addition to the normal sectionalization required by Rule 86.6, by means of insulators in accordance with Rule 86.6-B2 as though attached to the pole or structure.

Original Version
Rule 86.6

86.6 Sectionalizing and Grounding Requirements

The general requirements governing the sectionalizing of guys by means of insulators are based upon the exposure or proximity of the guys to supply conductors. For definitions of guys exposed and guys in proximity to supply conductors see Rules 21.3-C and D respectively (see also App. G, Figs. 44 and 45). The following requirements shall apply to the treatment and sectionalizing of guys.

A Where Not Exposed To Supply Conductors

Guys attached to or passing poles or structures supporting only communication conductors need not be sectionalized or grounded provided such guys are not exposed to sup- ply conductors of 250-20,000 volts and are not in proximity to supply conductors of 0-20,000 volts.

B Sectionalized Because Of Exposure Or Proximity To Supply Conductors:

(1) Overhead Guys Exposed To Supply Conductors Of 250-20,000 Volts: Ungrounded overhead guys which are exposed to supply conductors of 250-20,000 volts, and which are not in proximity to supply conductors of 0-20,000 volts shall be sectionalized by means of insulators located as specified in Rule 86.7-A1 (see App. G, Fig. 44).

(2) Guys In Proximity: Every overhead or anchor guy, any portion of which is in proximity to a wood pole and supply conductors of 0-20,000 volts (see App. G, Figs 45, 48 and 49) shall be sectionalized by means of insulators as specified in Rule 86.7-A2 or Rule 86.7-B and no portion in proximity to such supply conductors shall be grounded. Excepted from this requirement are anchor guys, and grounded overhead guys, which are attached to poles at a level less than 8 feet but not less than 6 feet below the level of supply conductors provided the level of the guy attachment is at or below the level of communication cable messenger attached to the same pole (see App. G, Figs 48a and 49f). Also excepted from this requirement are anchor guys, and grounded over-

head guys, which are attached to poles at a level less than 6 feet but not less than 4 feet below the level of supply conductors of 0-750 volts provided such guys are extensions of or attached to a cable messenger, are in the same vertical plane (or extension thereof) as the messenger, and are below the guard arms required by Rule 87.7-B for such a messenger (see App. G, Fig. 48a).

C Exposed To Supply Conductors Of More Than 20,000 Volts

Portions of guys exposed to supply conductors of more than 20,000 volts shall be securely grounded and such guys need not be sectionalized, unless sectionalization is required by Rule 86.6-B2 because of proximity to supply conductors of 0-20,000 volts. (See App. G, Fig. 52c.)

D Guys Attached To Grounded Poles Or Structures

Guys attached to securely grounded metal poles or structures are not required to be sectionalized except as required by Rule 86.6-B2 because of proximity to supply conductors of less than 20,000 volts supported on wood poles.

E Anchor Guys Through Supply Conductor Levels

An anchor guy which passes through the level of supply conductors at positions other than between pole pin positions or outside of the outer pin positions shall have insulators above and below the level of supply conductors at locations as specified in Rule 86.7-B. (See App. G, Fig. 49d.)

Strikeout and Underline Version
Rule 86.6

86.6 Sectionalizing and Grounding Requirements

The general requirements governing the sectionalizing of guys by means of insulators are based upon the exposure or proximity of the guys to supply conductors. For definitions of guys exposed and guys in proximity to supply conductors see Rules 21.3-C and D respectively (see also App. G, Figs. 44 and 45). The following requirements shall apply to the treatment and sectionalizing of guys.

A Where Not Exposed To Supply Conductors

Guys attached to or passing poles or structures supporting only communication conductors need not be sectionalized or grounded provided such guys are not exposed to sup- ply conductors of 250-~~20,000~~ 21,000 volts and are not in proximity to supply conductors of 0-~~20,000~~ 21,000 volts.

B Sectionalized Because Of Exposure Or Proximity To Supply Conductors:

(1) Overhead Guys Exposed To Supply Conductors Of 250-~~20,000~~ 21,000 Volts: Ungrounded overhead guys which are exposed to supply conductors of 250-~~20,000~~ 21,000 volts, and which are not in proximity to supply conductors of 0-~~20,000~~ 21,000 volts shall be sectionalized by means of insulators located as specified in Rule 86.7-A1 (see App. G, Fig. 44).

(2) Guys In Proximity: Every overhead or anchor guy, any portion of which is in proximity to a wood pole and supply conductors of 0-~~20,000~~ 21,000 volts (see App. G, Figs 45, 48 and 49) shall be sectionalized by means of insulators as specified in Rule 86.7-A2 or Rule 86.7-B and no portion in proximity to such supply conductors shall be grounded. Excepted from this requirement are anchor guys, and grounded overhead guys, which are attached to poles at a level less than 8 feet but not less than 6 feet below the level of supply conductors provided the level of the guy attachment is at or below the level of communication cable messenger attached to the same pole (see App. G, Figs 48a

and 49f). Also excepted from this requirement are anchor guys, and grounded over- head guys, which are attached to poles at a level less than 6 feet but not less than 4 feet below the level of supply conductors of 0-750 volts provided such guys are extensions of or attached to a cable messenger, are in the same vertical plane (or extension thereof) as the messenger, and are below the guard arms required by Rule 87.7-B for such a messenger (see App. G, Fig. 48a).

C Exposed To Supply Conductors Of More Than ~~20,000~~ 21,000 Volts

Portions of guys exposed to supply conductors of more than ~~20,000~~ 21,000 volts shall be securely grounded and such guys need not be sectionalized, unless sectionalization is required by Rule 86.6-B2 because of proximity to supply conductors of 0-~~20,000~~ 21,000 volts. (See App. G, Fig. 52c.)

D Guys Attached To Grounded Poles Or Structures

Guys attached to securely grounded metal poles or structures are not required to be sectionalized except as required by Rule 86.6-B2 because of proximity to supply conductors of less than ~~20,000~~ 21,000 volts supported on wood poles.

E Anchor Guys Through Supply Conductor Levels

An anchor guy which passes through the level of supply conductors at positions other than between pole pin positions or outside of the outer pin positions shall have insulators above and below the level of supply conductors at locations as specified in Rule 86.7-B. (See App. G, Fig. 49d.)

86.6 Sectionalizing and Grounding Requirements

The general requirements governing the sectionalizing of guys by means of insulators are based upon the exposure or proximity of the guys to supply conductors. For definitions of guys exposed and guys in proximity to supply conductors see Rules 21.3-C and D respectively (see also App. G, Figs. 44 and 45). The following requirements shall apply to the treatment and sectionalizing of guys.

A Where Not Exposed To Supply Conductors

Guys attached to or passing poles or structures supporting only communication conductors need not be sectionalized or grounded provided such guys are not exposed to sup- ply conductors of 250-21,000 volts and are not in proximity to supply conductors of 0-21,000 volts.

B Sectionalized Because Of Exposure Or Proximity To Supply Conductors:

(1) Overhead Guys Exposed To Supply Conductors Of 250-21,000 Volts: Ungrounded overhead guys which are exposed to supply conductors of 250-21,000 volts, and which are not in proximity to supply conductors of 0-21,000 volts shall be sectionalized by means of insulators located as specified in Rule 86.7-A1 (see App. G, Fig. 44).

(2) Guys In Proximity: Every overhead or anchor guy, any portion of which is in proximity to a wood pole and supply conductors of 0-21,000 volts (see App. G, Figs 45, 48 and 49) shall be sectionalized by means of insulators as specified in Rule 86.7-A2 or Rule 86.7-B and no portion in proximity to such supply conductors shall be grounded. Excepted from this requirement are anchor guys, and grounded overhead guys, which are attached to poles at a level less than 8 feet but not less than 6 feet below the level of supply conductors provided the level of the guy attachment is at or below the level of communication cable messenger attached to the same pole (see App. G, Figs 48a and 49f). Also excepted from this requirement are anchor guys, and grounded over-

head guys, which are attached to poles at a level less than 6 feet but not less than 4 feet below the level of supply conductors of 0-750 volts provided such guys are extensions of or attached to a cable messenger, are in the same vertical plane (or extension thereof) as the messenger, and are below the guard arms required by Rule 87.7-B for such a messenger (see App. G, Fig. 48a).

C Exposed To Supply Conductors Of More Than 21,000 Volts

Portions of guys exposed to supply conductors of more than 21,000 volts shall be securely grounded and such guys need not be sectionalized, unless sectionalization is required by Rule 86.6-B2 because of proximity to supply conductors of 0-21,000 volts. (See App. G, Fig. 52c.)

D Guys Attached To Grounded Poles Or Structures

Guys attached to securely grounded metal poles or structures are not required to be sectionalized except as required by Rule 86.6-B2 because of proximity to supply conductors of less than 21,000 volts supported on wood poles.

E Anchor Guys Through Supply Conductor Levels

An anchor guy which passes through the level of supply conductors at positions other than between pole pin positions or outside of the outer pin positions shall have insulators above and below the level of supply conductors at locations as specified in Rule 86.7-B. (See App. G, Fig. 49d.)

Original Version
Rule 86.7-A

86.7 Location of Sectionalizing Insulators

A Overhead Guys All insulators in overhead guys shall be not less than 8 feet above the ground.

(1) Exposed: Ungrounded overhead guys which are required by Rule 86.6-B1 to be sectionalized because of exposure to supply conductors of 250-20,000 volts shall have an insulator not less than 6 feet and not more than 9 feet (measured along the guy) from each point of attachment to wood poles or structures which support conductors. One insulator will suffice where such an overhead guy is less than 17 feet in length between wood poles or structures.

(2) In Proximity: Overhead guys which are required to be sectionalized by Rule 86.6-B2 shall have an insulator not less than 6 feet and not more than 9 feet (measured along the guy) from each point of attachment to poles, crossarms or structures (see App. G, Figs. 47 and 48).

Excepted from this requirement are guys to poles which support no conductors provided such guys are not in proximity to supply conductors of 0-20,000 volts on any poles other than the poles to which they are attached. Such guys, if required to be sectionalized by Rule 86.6-B2, shall have an insulator 6 to 9 feet from the point of attachment to the pole which supports conductors (see App. G, Figs. 44b and 44e).

Strikeout and Underline Version
Rule 86.7-A

86.7 Location of Sectionalizing Insulators

A Overhead Guys All insulators in overhead guys shall be not less than 8 feet above the ground.

(1) Exposed: Ungrounded overhead guys which are required by Rule 86.6-B1 to be sectionalized because of exposure to supply conductors of 250~~-20,000~~ 21,000 volts shall have an insulator not less than 6 feet and not more than 9 feet (measured along the guy) from each point of attachment to wood poles or structures which support conductors. One insulator will suffice where such an overhead guy is less than 17 feet in length between wood poles or structures.

(2) In Proximity: Overhead guys which are required to be sectionalized by Rule 86.6-B2 shall have an insulator not less than 6 feet and not more than 9 feet (measured along the guy) from each point of attachment to poles, crossarms or structures (see App. G, Figs. 47 and 48).

Excepted from this requirement are guys to poles which support no conductors provided such guys are not in proximity to supply conductors of 0~~-20,000~~ 21,000 volts on any poles other than the poles to which they are attached. Such guys, if required to be sectionalized by Rule 86.6-B2, shall have an insulator 6 to 9 feet from the point of attachment to the pole which supports conductors (see App. G, Figs. 44b and 44e).

Final Version
Rule 86.7-A

86.7 Location of Sectionalizing Insulators

A Overhead Guys All insulators in overhead guys shall be not less than 8 feet above the ground.

(1) Exposed: Ungrounded overhead guys which are required by Rule 86.6-B1 to be sectionalized because of exposure to supply conductors of 250-21,000 volts shall have an insulator not less than 6 feet and not more than 9 feet (measured along the guy) from each point of attachment to wood poles or structures which support conductors. One insulator will suffice where such an overhead guy is less than 17 feet in length between wood poles or structures.

(2) In Proximity: Overhead guys which are required to be sectionalized by Rule 86.6-B2 shall have an insulator not less than 6 feet and not more than 9 feet (measured along the guy) from each point of attachment to poles, crossarms or structures (see App. G, Figs. 47 and 48).

Excepted from this requirement are guys to poles which support no conductors provided such guys are not in proximity to supply conductors of 0-21,000 volts on any poles other than the poles to which they are attached. Such guys, if required to be sectionalized by Rule 86.6-B2, shall have an insulator 6 to 9 feet from the point of attachment to the pole which supports conductors (see App. G, Figs. 44b and 44e).

Original Version
Rule 89.2-A

89.2 Construction and Operation

A Private Communication Circuits And Supply Circuits On The Same Crossarms (see Rule 32.4-C)

(1) Supply Conductors Of 7500-20,000 Volts, Same Ownership: Where private communication conductors are supported on the same crossarms with supply conductors of 7500-20,000 volts, the private communication circuits shall have the strengths and clearances required for Class L circuits of 750-5000 volts. The private communication conductors shall be on opposite ends of the arms from the supply conductors and shall be separated a horizontal distance of not less than 36 inches from the nearest supply conductor. Where buck arms are used in connection with such circuit arrangement, the minimum vertical separation between related line and buck arms shall be 4 feet and the horizontal separation between the nearest conductors of the two classes of circuits on the same arm shall be not less than 36 inches plus any horizontal space provided by vacant pin positions which are required by climbing space rules.

(2) Supply Conductors Of 750-7500 Volts, Same Ownership: Where private communication conductors are supported on the same crossarms with supply conductors of 750-7500 volts, the private communication circuits shall have the strengths and clearances required for Class L circuits of 0-750 volts. The private communication conductors shall be on opposite ends of the arms from the supply conductors with conductor clearances and the spacing between related line and buck arms in conformity with the requirements for combination arm construction. (See Rules 32.4-A3, 54.4-C2b, and 54.7-A.)

(3) Supply Conductors Of 0-750 Volts, Same Ownership: Where private communication conductors are supported on the same crossarms with supply conductors of 0-750 volts, the private communication circuits shall have strengths and clearances as required for Class C conductors except that the clearances from supply conductors of the same

ownership shall conform to the requirements for Class L circuits of 0-750 volts. The communication conductors shall preferably be located in the outer pin positions.

(4) Supply Conductors Of 0-750 Volts, Different Ownership: Supply circuits of 0-750 volts and private communication circuits of different ownership may be supported on the same crossarm, provided the two classifications of circuits are installed on opposite ends of the arm and the nearest conductor of the two classifications are separated a horizontal distance of not less than 36 inches. Services direct from such a crossarm are not permitted to cross conductors of other classification supported on the same crossarm.

(5) Change In Location With Respect To Supply Conductors: At both ends of any section of private communication circuits supported on the same crossarms with supply conductors in accordance with Rules 89.2-Al or 89.2-A2, suitable equipment shall be provided to pre- vent effectively the transmission, from one section of the line to another, of voltages exceeding 400 volts to ground or 750 volts between any two points of the circuit, including voltages caused under transient or fault conditions, by induction from or contact with the supply conductors supported on the same arms with the private communication conductors.

Strikeout and Underline Version
Rule 89.2-A

89.2 Construction and Operation

A Private Communication Circuits And Supply Circuits On The Same Crossarms (see Rule 32.4-C)

(1) Supply Conductors Of 7500~~-20,000~~ 21,000 Volts, Same Ownership: Where private communication conductors are supported on the same crossarms with supply conductors of 7500~~-20,000~~ 21,000 volts, the private communication circuits shall have the strengths and clearances required for Class L circuits of 750-5000 volts. The private communication conductors shall be on opposite ends of the arms from the supply conductors and shall be separated a horizontal distance of not less than 36 inches from the nearest supply conductor. Where buck arms are used in connection with such circuit arrangement, the minimum vertical separation between related line and buck arms shall be 4 feet and the horizontal separation between the nearest conductors of the two classes of circuits on the same arm shall be not less than 36 inches plus any horizontal space provided by vacant pin positions which are required by climbing space rules.

(2) Supply Conductors Of 750-7500 Volts, Same Ownership: Where private communication conductors are supported on the same crossarms with supply conductors of 750-7500 volts, the private communication circuits shall have the strengths and clearances required for Class L circuits of 0-750 volts. The private communication conductors shall be on opposite ends of the arms from the supply conductors with conductor clearances and the spacing between related line and buck arms in conformity with the requirements for combination arm construction. (See Rules 32.4-A3, 54.4-C2b, and 54.7-A.)

(3) Supply Conductors Of 0-750 Volts, Same Ownership: Where private communication conductors are supported on the same crossarms with supply conductors of 0-750 volts, the private communication circuits shall have strengths and clearances as required for Class C conductors except that

the clearances from supply conductors of the same ownership shall conform to the requirements for Class L circuits of 0-750 volts. The communication conductors shall preferably be located in the outer pin positions.

(4) Supply Conductors Of 0-750 Volts, Different Ownership: Supply circuits of 0-750 volts and private communication circuits of different ownership may be supported on the same crossarm, provided the two classifications of circuits are installed on opposite ends of the arm and the nearest conductor of the two classifications are separated a horizontal distance of not less than 36 inches. Services direct from such a crossarm are not permitted to cross conductors of other classification supported on the same crossarm.

(5) Change In Location With Respect To Supply Conductors: At both ends of any section of private communication circuits supported on the same crossarms with supply conductors in accordance with Rules 89.2-Al or 89.2-A2, suitable equipment shall be provided to pre- vent effectively the transmission, from one section of the line to another, of voltages exceeding 400 volts to ground or 750 volts between any two points of the circuit, including voltages caused under transient or fault conditions, by induction from or contact with the supply conductors supported on the same arms with the private communication conductors.

Final Version
Rule 89.2-A

89.2 Construction and Operation

A Private Communication Circuits And Supply Circuits On The Same Crossarms (see Rule 32.4-C)

(1) Supply Conductors Of 7500-21,000 Volts, Same Ownership: Where private communication conductors are supported on the same crossarms with supply conductors of 7500-21,000 volts, the private communication circuits shall have the strengths and clearances required for Class L circuits of 750-5000 volts. The private communication conductors shall be on opposite ends of the arms from the supply conductors and shall be separated a horizontal distance of not less than 36 inches from the nearest supply conductor. Where buck arms are used in connection with such circuit arrangement, the minimum vertical separation between related line and buck arms shall be 4 feet and the horizontal separation between the nearest conductors of the two classes of circuits on the same arm shall be not less than 36 inches plus any horizontal space provided by vacant pin positions which are required by climbing space rules.

(2) Supply Conductors Of 750-7500 Volts, Same Ownership: Where private communication conductors are supported on the same crossarms with supply conductors of 750-7500 volts, the private communication circuits shall have the strengths and clearances required for Class L circuits of 0-750 volts. The private communication conductors shall be on opposite ends of the arms from the supply conductors with conductor clearances and the spacing between related line and buck arms in conformity with the requirements for combination arm construction. (See Rules 32.4-A3, 54.4-C2b, and 54.7-A.)

(3) Supply Conductors Of 0-750 Volts, Same Ownership: Where private communication conductors are supported on the same crossarms with supply conductors of 0-750 volts, the private communication circuits shall have strengths and clearances as required for Class C conductors except that the clearances from supply conductors of the same

ownership shall conform to the requirements for Class L circuits of 0-750 volts. The communication conductors shall preferably be located in the outer pin positions.

(4) Supply Conductors Of 0-750 Volts, Different Ownership: Supply circuits of 0-750 volts and private communication circuits of different ownership may be supported on the same crossarm, provided the two classifications of circuits are installed on opposite ends of the arm and the nearest conductor of the two classifications are separated a horizontal distance of not less than 36 inches. Services direct from such a crossarm are not permitted to cross conductors of other classification supported on the same crossarm.

(5) Change In Location With Respect To Supply Conductors: At both ends of any section of private communication circuits supported on the same crossarms with supply conductors in accordance with Rules 89.2-Al or 89.2-A2, suitable equipment shall be provided to pre- vent effectively the transmission, from one section of the line to another, of voltages exceeding 400 volts to ground or 750 volts between any two points of the circuit, including voltages caused under transient or fault conditions, by induction from or contact with the supply conductors supported on the same arms with the private communication conductors.

Original Version
Rule 89.3

89.3 Telephone Instruments on Poles or Structures

Where a telephone instrument is attached to the surface of a pole or structure at less than 8 feet vertically above the ground (or at any elevation on a grounded metal pole or structure) and is connected to a private communication circuit constructed on the same pole line with, or colinear with, a Class H supply circuit, or is connected to a private communication circuit carried on crossarms with supply conductors of 750-20,000 volts, such instrument shall be enclosed in a suitable box of wood or equivalent insulating material, which shall be locked to prevent access by unauthorized persons. Where such a telephone instrument is so attached, connected, and enclosed, unless isolated from the communication circuit by an adequate insulating transformer, a suitably insulated stool or platform, on which a person can stand while using the instrument, shall be provided.

Strikeout and Underline Version
Rule 89.3

89.3 Telephone Instruments on Poles or Structures

Where a telephone instrument is attached to the surface of a pole or structure at less than 8 feet vertically above the ground (or at any elevation on a grounded metal pole or structure) and is connected to a private communication circuit constructed on the same pole line with, or colinear with, a Class H supply circuit, or is connected to a private communication circuit carried on crossarms with supply conductors of 750-~~20,000~~ 21,000 volts, such instrument shall be enclosed in a suitable box of wood or equivalent insulating material, which shall be locked to prevent access by unauthorized persons. Where such a telephone instrument is so attached, connected, and enclosed, unless isolated from the communication circuit by an adequate insulating transformer, a suitably insulated stool or platform, on which a person can stand while using the instrument, shall be provided.

Final Version
Rule 89.3

89.3 Telephone Instruments on Poles or Structures

Where a telephone instrument is attached to the surface of a pole or structure at less than 8 feet vertically above the ground (or at any elevation on a grounded metal pole or structure) and is connected to a private communication circuit constructed on the same pole line with, or colinear with, a Class H supply circuit, or is connected to a private communication circuit carried on crossarms with supply conductors of 750-21,000 volts, such instrument shall be enclosed in a suitable box of wood or equivalent insulating material, which shall be locked to prevent access by unauthorized persons. Where such a telephone instrument is so attached, connected, and enclosed, unless isolated from the communication circuit by an adequate insulating transformer, a suitably insulated stool or platform, on which a person can stand while using the instrument, shall be provided.

Original Version
Rule 92.1-A

92.1-A Between Low Voltage Rack Conductors and Other Conductors

On jointly used poles, the following minimum vertical clearances shall apply between 0-750 volt supply conductors in rack construction and other conductors (see App. G, Fig 9):

Racks above	
Conductors or cables 15" or more from center line of pole	4 feet
Unguarded cables, messengers or racks attached to poles	6 feet
Guarded cables, messengers, or racks attached to poles	4 feet
Unguarded racks below	
All circuits	6 feet
Guarded rack below	
Circuits of 0-20,000 volts or communication circuits	4 feet

Strikeout and Underline Version
Rule 92.1-A

92.1-A Between Low Voltage Rack Conductors and Other Conductors

On jointly used poles, the following minimum vertical clearances shall apply between 0-750 volt supply conductors in rack construction and other conductors (see App. G, Fig 9):

Racks above	
Conductors or cables 15" or more from center line of pole	4 feet
Unguarded cables, messengers or racks attached to poles	6 feet
Guarded cables, messengers, or racks attached to poles	4 feet
Unguarded racks below	
All circuits	6 feet
Guarded rack below	
Circuits of 0-~~20,000~~ 21,000 volts or communication circuits	4 feet

Final Version
Rule 92.1-A

92.1-A Between Low Voltage Rack Conductors and Other Conductors

On jointly used poles, the following minimum vertical clearances shall apply between 0-750 volt supply conductors in rack construction and other conductors (see App. G, Fig 9):

Racks above	
Conductors or cables 15" or more from center line of pole	4 feet
Unguarded cables, messengers or racks attached to poles	6 feet
Guarded cables, messengers, or racks attached to poles	4 feet
Unguarded racks below	
All circuits	6 feet
Guarded rack below	
Circuits of 0-21,000 volts or communication circuits	4 feet