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PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

COMMISSION ADVISORY
AND COMPLIANCE DIVISION
Service and Safety Branch

RESOLUTION E-3076
March 9, 1988

R E S O L U T I O N

RESOLUTION E-3076, ORDER AUTHORIZING RULE CHANGES TO GENERAL ORDER NO. 95 (G.O.95), RULES FOR OVERHEAD ELECTRIC LINE CONSTRUCTION AND GENERAL ORDER NO. 128 (G.O.128), RULES FOR CONSTRUCTION OF UNDERGROUND ELECTRIC SUPPLY AND COMMUNICATIONS SYSTEMS

SUMMARY

1. The staff of the Division's Service and Safety Branch requests authorization for changes to G.O.95 and G.O.128 contained in the enclosed Appendix A, Identification and Purpose of Rules and Justification for Changes; and Appendix B, Changes in Text.

2. The changes are to rules concerning exemptions or modifications of G.O.95; clearances of wires over water surfaces, clearance between wires, crossarm and pin strength, and hardware separation from bond and ground wires. Also included are changes in climbing and working space location and obstructions; post insulator designation, messenger cable bonding, and riser covering. A rule on dead ended conductors in horizontal configuration will be deleted. Numerous typographical and punctuation errors are being corrected.

3. Changes to G.O.128 concern depths communication cables shall be buried and exceptions to those depths.

BACKGROUND

4. The proposed changes are the result of a number of informal proposals submitted by utilities or initiated by the Commission Advisory and Compliance Division (CACD) staff. The staff has reviewed the proposed changes.

5. The review of the utilities' proposals was conducted in a series of 15 workshop meetings for study and discussion at five regional locations. Participants were CACD staff members, representatives of 15 of the leading public and privately owned electric and communication utilities, the California Cable Television Association and related labor unions.

6. Rule change proposals found to be controversial or that could not be fully justified by the workshop participants were deleted from final consideration. Consensus has been reached by the workshop participants on the changes presented in the appendices.

PROTESTS

7. The proposed general order changes were mailed to all (400) public and privately owned electric and communication utilities operating overhead and underground lines in California. One protest was received from the Associated General Contractors of California. It has been resolved in meetings with the affected utilities.

DISCUSSION

8. The proposed rule changes are contained in the enclosed appendices as follows:

APPENDIX A - Each rule is identified by number, its general purpose explained, and proposed changes outlined and justified by supporting rationale.

APPENDIX B - The actual changes in text to be made in G.O.95 and G.O.128 are written out as they will be inserted in the general orders.

9. The staff believes the changes provide for safety to utility workers and the general public and encourages economical and improved construction and maintenance procedures. The CACD staff recommends authorization of the changes.

FINDINGS

1. We find that the changes to rules in G.O.95 and G.O.128 authorized in this resolution are just and reasonable.

THEREFORE, IT IS ORDERED THAT:

1. The changes in text shown in Appendix B shall be made in G.O.95 and G.O.128.

2. All rules changed shall be marked "Revised March 9, 1988, by Resolution E-3076."

3. This Resolution is effective today.

I certify that this Resolution was adopted by the Public Utilities Commission at its regular meeting on March 9, 1988. The following Commissioners approved it:

STANLEY W. HULETT
President
DONALD VIAL
FREDERICK R. DUDA
G. MITCHELL WILK
JOHN B. OHANIAN
Commissioners

Executive Director

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APPENDIX A

IDENTIFICATION AND PURPOSE OF RULES
AND JUSTIFICATION FOR CHANGES

Appendix A is a description of the rules to be changed in G.O. 95 and G.O. 128. The content of the rules, proposed changes and justification or rationale for the changes are given.

Item 1 - G.O. 95

Rule 15 - Exemptions or Modifications

Rule Purpose, Content

This rule authorizes exemption from the rules of the general order for a "particular case or special type of construction". Such exemption can be sought by application and must include appropriate justification.

Proposed Rule Change

Present Rule 15 is recommended to be expanded to include authorization for experimental installations. It is proposed that the language of Rule 15 of G.O. 128 be used and modified to apply to G.O. 95 as well.

The amended Rule 15 would then consist of:

15. EXEMPTIONS OR MODIFICATIONS

15.1. Changes and Special Installations

15.2. Experimental Installations

15.3. Notification

(See Appendix B, Item 1, for complete text.)

APPENDIX A

Justification for Change

The rules of G.O. 95 and G.O. 128 differ only in their area of application, that is, overhead and underground systems, respectively. Therefore, the more inclusive language of G.O. 128 allowing for experimental development of new equipment and new or alternate materials and processes should also be available in G.O. 95.

State-of-the-art advances in synthetic products, such as fiber optic communication circuits, nylon and other synthetic fiber cable and line products, and fiberglass poles and cross-arms, are examples of materials not now authorized or even addressed in either G.O. 95 or G.O. 128. Such products often present advantages of cost, ease of handling, strength, and increased resistance to age and weather. Controlled experimental use is a practical means of establishing the viability of alternate materials and construction methods.

APPENDIX A

Item 2 - G.O. 95

Rule-37 - Table 1 - Minimum Clearances of Wires Above Railroads, Thoroughfares, Buildings, Ground, Water Surfaces, Etc.

Rule Purpose, Content

This rule is a tabulation of the basic minimum clearances of wires above or near various surfaces. These clearances are often modified by special circumstances, identified by footnotes that refer to other rules of the general order.

Proposed Rule Change

It is recommended that the Table 1 conditions be expanded to include clearances between wires and water surfaces and contiguous areas. This would add Cases 11 and 12 to Table 1 along with footnotes (tt) through (xx). See Appendix B, Item 2. Clearances are not to be reduced because of temperature and loading.

Justification for Change

Table 1 presently applies to wires above railroad tracks, thoroughfares, and ground. However, water surface and shore areas are not addressed. Due to the expansion of power and sail boating, it has become necessary to define these clearance situations and establish minimum safe values.

Clearances have been developed which are comparable to those used by most other states where the National Electrical Safety Code (NESC) has been adopted. The proposed clearances meet and often exceed the NESC standards.

APPENDIX A

Item 3 - G.O. 95

Rule 38 - Table 2 - Minimum Clearances of Wires from Other Wires

Rule Purpose, Content

This rule is a tabulation of the various minimum clearances between wires, including vertical separation of circuits of different functions on the same pole.

Proposed Rule Change

It is recommended that the Table 2 clearance situations be expanded to include vertical clearances between conductors in the adjoining midspans for circuits supported on the same pole. Vertical separation at midspan between communication conductors usually in a lower position and electric supply lines above will then equal clearances required at the pole.

This change will be accomplished by adding the phrase, "and in adjoining midspans" to the nature of clearance in Table 2 described as "Vertical separation between conductors ... on the same pole". The Table 2 title will also be revised accordingly. Footnote "(pp)" for Cases 8 and 9, Columns C and D, will also be added.

Finally, by footnote, the tabulated value of 48-inch separation between electric secondary voltage lines and the communication circuits below them will be allowed to be reduced

to 36 inches at midspan when the electric circuit consists of insulated, abrasion-resistant multiple conductor cable having a grounded metal sheath or supported by a bare neutral conductor. See Appendix B, Item 3, for text of changes.

Justification for Change

The rules presently are indefinite about vertical clearance between electric and communications lines at midspan, although vertical clearances are specified at the pole. Engineering standards adopted by most utility companies have included clearances between communication and electric circuits at midspan. These standards sometimes differ from company to company. Workers installing midspan service drops can be exposed to both an electrically charged conductor and a nearby grounded communication messenger. Accidental contact with both could result in electric shock and injury. Therefore, a clearance sufficient to make such contact less likely is necessary.

Over the years, the staff has recommended that the same separation required at the pole be carried along into the adjoining spans. The major utilities generally agree and include the provision in their construction standards. The rule change makes a uniform standard.

A slight modification was recommended by the workshop representatives. They request, and the staff supports, a reduction of the required 48-inch separation at midspan between

electric secondary conductors and the communication circuits below to 36 inches whenever the electric circuit consists of insulated, abrasion-resistant multiple conductor cable having a grounded metallic sheath or supported by a bare neutral conductor. When such electric cable is used the danger of electric shock is greatly reduced due to the insulating properties of the cable thus justifying the reduced separation.

APPENDIX A

Item 4 - G.O. 95

Rule 49.2 - C2, Crossarms - Strength and
Rule 49.3 - C2, Pins and Conductor Fastenings - Strength

Rule Purpose, Content

Rule 49.2 - C2 pertains to strength requirements for crossarms. It addresses methods for meeting vertical as well as longitudinal loading. For example, crossarms supporting electric supply lines "where longitudinal loads are normally balanced ... shall have sufficient strength to withstand a load, applied in the direction of the conductors at the outer pin position, of 700 pounds with a safety factor of not less than unity." A requirement for withstanding a load of 400 pounds is specified for communication lines.

For longitudinal loads normally unbalanced, crossarms must have sufficient strength to meet applied loads, generally utilizing a safety factor of 2. In addition, at unbalanced corners and at dead ends, the rule now requires double crossarms so that conductors can be attached to two insulators to prevent slipping.

Rule 49.3 - C2 concerns strength requirements for pins and conductor fastenings, and applies to balanced and unbalanced longitudinal loads. For unbalanced loads conductors are required to be tied to two insulators to prevent slipping of the conductor under the maximum working tension with a safety factor of 2.

APPENDIX A

Proposed Rule Change

Both of these rules need changes to allow use of a single crossarm for unbalanced loads only if steel insulator pins of sufficient strength are used and the conductors are secured with prefabricated ties. See Appendix B, Item 4, for text of rules.

Justification for Change

This change reflects state-of-the-art advances in pin strength (steel versus wood) and in conductor ties (prefabricated versus hand formed). Steel pins have greater cantilever strength than wood pins; prefabricated conductor ties have greater strength and conductor grip than hand-formed ties. The proposed changes will permit use of improved materials and simplified construction methods.

APPENDIX A

Item 5 - G.O. 95

Rule 52.7-C - Hardware - Separation from Bond Wires and Ground Wires

Rule Purpose, Content

This rule establishes a minimum clearance of 1-1/2 inches between bond wires and ground wires and metal pins, bolts and other hardware on wood crossarms except where the hardware is intended to be connected to the bond or ground wires.

Proposed Rule Change

It is proposed that the scope of this rule be extended to include attachments on the pole surface. Presently hardware clearance from bond and ground wires is specified only when mounted on crossarms. This change can be made by simply adding the words "and wood poles" after the word "crossarm" in the rule, see Appendix B, Item 5.

Justification for Change

Increasingly modern line construction utilizes an armless vertical or triangular conductor arrangement directly mounted on wood poles. The safety considerations inherent in the 1-1/2-inch clearance requirement are as relevant on the surface of wood poles as on wood crossarms.

APPENDIX A

Item 6 - G.O. 95

Rule 52.7-D - Hardware - Separation from Metal Pins and Dead-End Hardware
Rule 54.7-A4 - Climbing and Working Space - Allowable Climbing Space Obstructions
Rule 22.2-F - Protective Covering, Suitable - Bolt Covers

Rules Purpose, Content

Rule 52.7 addresses the general subject of hardware. Rule 52.7-D specifies a clearance of not less than 1-1/2 inches between a variety of pole or crossarm mounted hardware and metal pins and dead-end hardware. Certain exceptions to the clearance requirements are also specified, as are electrical interconnections of certain bolts and hardware to establish a common potential.

Rule 54.7 addresses the general subject of climbing and working space. Rule 54.7-A4 pertains to allowable climbing space obstructions. One allowable obstruction is bolts used for the attachment of dead-end hardware of a circuit located below a pole-top circuit, if these bolts are covered by non-conducting material when they project into the climbing space.

Proposed Rule Change

An exception to the hardware clearance requirements is made for bolts and dead-end hardware associated with a pole top circuit of more than 7,500 volts (second paragraph of Rule 52.7-D). There is also a requirement that such hardware within the climbing space be covered by non-conducting material.

However, these requirements also appear in Rule 54.7-A4 which relates to climbing space obstructions. Therefore, the second paragraph of Rule 52.7-D is redundant and should be deleted.

The fourth paragraph of Rule 54.7-A4 should be replaced with three new paragraphs as shown in Appendix B, Item 6.

Finally, it is proposed that a definition rule be added to Rule 22.2, Protective Covering, Suitable, see Appendix B, Item 6.

Justification for Changes

Paragraph 2 of Rule 52.7-D should be deleted because it is redundant and unrelated to separation between metal pins and dead-end hardware.

The deleted material is contained in the revised paragraphs 4, 5 and 6 of Rule 54.7-A4. Also, the exceptions to the need for covering such bolts in the climbing space when they are on dead-end circuits of 0-750 volts or pole top circuits of more than 7,500 volts are included in the revised Rule 54.7-A4.

APPENDIX A

Item 7 - G.O. 95

Rule 54.7-A4 - Climbing and Working Space - Allowable Climbing Space Obstructions

Rule Purpose, Content

Rule 54.7A4 identifies certain obstructions that may be allowed within any 4-foot vertical section of the climbing space for electric supply lines. These obstructions include vertical conductors, ground wires, guys, etc. Certain restrictions limit such obstructions either by number or by combination.

A comparable Rule 84.7-E contains similar provisions for communication lines. Other rules, 54.10-F3 applicable to low voltage multiconductor cable with bare neutral, 0-750 volts, and 54.11-G, applicable to insulators in vertical and horizontal position without crossarms, more than 750 volts, allow similar climbing space obstructions. Finally, Decision 82-03-020, dated March 2, 1982, which granted PG&E a deviation to Rule 54.9-F regarding climbing space where extended rack construction is utilized, lists allowable climbing space obstructions.

Proposed Rule Change

It is proposed that the text of Rules 54.7-A4, 84.7-E, 54.10-F3, 54.11-G of G.O. 95, and PG&E's deviation to Rule 54.9-F be amended to include two guys as obstructions allowed within a 4-foot section of the climbing space. These rules now restrict

obstructions to one guy plus one other allowed obstruction. To limit the physical obstruction presented by two guys, a restriction is proposed: Two guys are allowed in the climbing space, "provided they are separated at the pole by a vertical distance of not more than 18 inches." See Appendix B, Item 7, for text changes.

Justification for Change

Electric and communication utilities often need to expand the capacity of their lines to accommodate increased loads. The added conductors and cables add weight and lateral loading and require added anchor or head guys, particularly at corners or dead-end poles.

Under present rules, an added guy, if located in the climbing space, would have to be at least 4 feet vertically from a guy already in place. It is often difficult to find space to place a second guy under that restriction. Also, to balance an added load the best location for a second guy might be less than 4 feet from the first. The added flexibility will reduce costs and facilitate good design.

APPENDIX A

Item 8 - G.O. 95

Rule 54.11 - Post Insulators in Vertical and Horizontal Position without Crossarms, More than 750 Volts
Rule 20.10 - Post Insulator (Definition)

Rule Purpose, Content

Rule 54.11 provides construction details, restrictions and exceptions regarding "armless" construction.

Proposed Rule Change

The practice of attaching insulators directly to the pole in a variety of arrangements is being utilized due to its simplicity and efficiency.

Certain minor revisions are recommended to clarify the intent of the rule. Presently it refers mostly to "post type" insulators with a recent (1978) addition, Section H, that refers to "pin type" insulators. That Rule 54.11-H, Triangular Configuration With Pin Type Insulators, should be deleted because the distinction as to type of insulator is not needed in Rule 54.11.

A confusing distinction exists in Rule 54.11. Horizontal insulators are often attached to the pole on metal brackets. Some operators interpret that to be illegal because such opposing brackets, or a continuous bracket, they believe, should be defined as a crossarm and be prohibited.

It is therefore proposed that all references to "post" insulators in the rule be deleted. In the title of Rule 54.11, it is proposed to substitute "Without the Use of Wood Crossarms" for "Without Crossarms," and delete "Post."

It is proposed that Rule 20.10 - Post Insulator be deleted. Appropriate corrections in other rules will need to be made as shown in Appendix B, Item 8.

Justification for Change

The purpose of this change is to clarify the rule regarding insulators used in armless construction. The rule presently refers to "post" insulators although other types of insulators are also in use in similar construction. Pin type insulators are also referred to in the rule.

"Pin" type insulators are frequently used for armless construction because they are less costly, lighter, and adaptable to performing hot-line techniques. "Post" type insulators are primarily utilized to support large conductors, and to support uneven forces where lines form angles. Other types of insulators are also used with armless construction depending upon design factors required by terrain and other special needs.

The designations "post" and "pin" should be removed from the rule because they are often interchangeable.

APPENDIX A

Item 9 - G.O. 95

Rule 54.10-F2 - Low Voltage Multiconductor Cable With Bare Neutral, 0-750 Volts - Climbing Space - Dimensions

Rule Purpose, Content

Rule 54.10-F2 provides a climbing space location for low voltage multiconductor cable with bare neutral, 0-750 volts. When a transformer is mounted in line with primary conductors the climbing space location changes.

Proposed Rule Change

It is recommended that the second sentence of this rule be amended by adding "or similar apparatus" after "transformers". Also, it is recommended that a final phrase "or on one side of the pole" be added. See Appendix B, Item 9.

Justification for Change

All of Rule 54.10 provides requirements for low voltage multiconductor cable with a bare neutral. Generally, rules for such cable are less stringent than for regular separated conductors since the conductors are covered by an abrasion resistant insulation. It is thus less hazardous and can be treated more leniently.

The proposed changes will allow apparatus other than transformers to be mounted on poles utilizing multiconductor

cable. Equipment such as regulators, line boosters, reclosers and capacitors are examples.

Also, there is no reason to restrict the climbing space to one quadrant, thus the provision that it can be on one side of the pole is added.

APPENDIX A

Item 10 - G.O. 95

Rule 83.4 - Bonding (Proposed New Rule)

Rule Purpose, Content

Although it has not been a requirement of G.O. 95, the bonding together of separate communication messengers has been a common practice by most telephone utilities and, recently, cable TV companies. This proposed new rule describes the method for bonding messengers together even if of the same ownership.

Proposed Rule

Where separate communication messengers, or guys, or both, of the same or different ownership, are attached to the same pole, and they are in proximity to electric supply circuits of various kinds they shall be bonded together at frequent intervals. See Appendix B, Item 10, for the text of the proposed rule.

Justification for Rule

Bonding of separate communication messenger or guy systems can provide another path to ground if either becomes accidentally electrically charged. Bonding also equalizes differences of static electric potential which might accumulate on the separate systems.

APPENDIX A

Until recent years, joint pole line systems typically included only one communication utility, a telephone company, along with the electric utility. However, with the advent of cable TV, mutual bonding between it and the telephone system has become somewhat difficult. Where the telephone company controls the cable TV's presence on the pole (e.g., rental agreement for cable TV's pole attachment), the telephone utility's contract usually, but not always, includes a requirement for mutual bonding.

Where the pole system is solely owned by the electric utility, there has also been difficulty. There the electric company rents space to other operators as needed. It has been reluctant, or has refused to set and enforce standards on mutual bonding between cable TV and telephone systems. This new rule will solve problems related to mutual bonding.

APPENDIX A

Item 11 - G.O. 95

Rules 54.6-E and 84.6-E - Risers

Rule Purpose, Content

These rules specify the protective covering on poles for encasing risers of wires or underground cables.

Proposed Rule Change

The rules presently require that riser covering shall be of securely grounded iron or steel pipe, or plastic U-shaped moulding or plastic pipe. Such plastic pipe is required to be of the material specified in Rule 22.2-C, designated as EPC-80-PVC, with a minimum nominal pipe size of 2-1/2 inches.

The change proposed is to allow a minimum nominal pipe size of 1 inch, instead of the 2-1/2 inches now required, contingent upon retaining the equivalent impact strength of the larger size pipe. Thus, the second sentence of the second paragraph of Rule 54.6-E and the last sentence of the first paragraph of Rule 84.6-E should be replaced by the following:

> "Such plastic pipe shall be of material as specified in Rule 22.2-C with a minimum nominal pipe size of 1 inch and with a minimum impact strength equal to 2-1/2" nominal EPC-80-PVC plastic pipe."

APPENDIX A

Justification for Change, Modification

The proposed change allows smaller sizes in plastic pipe used to cover risers provided the smaller pipe shall have the minimum impact strength of 2-1/2-inch nominal EPC-80-PVC pipe.

APPENDIX A

Item 12 - G.O. 95

Rule 54.4-D7 - Dead Ended in Horizontal Configuration

Rule Purpose, Content

Lines dead ended in horizontal configuration at voltages 0-7,500 and more than 7,500 are covered in Rules 54.4-D7a and b, respectively.

The rules require special treatment of the center conductor of a 3-wire circuit. If a transformer or other apparatus is to be installed with lines dead ended in horizontal configuration, the center conductor must be set over from the pole center line by as much as 18" and the dead-end insulator support must be extended to keep the conductor away from the pole by as much as 36".

Dead ending in two directions with no buck arm present or corner construction with a buck arm under the present rules is restricted and requires the extended dead ends and offset center conductors.

With present day construction equipment and techniques, Rules 54.4-D7a and b are considered by utility experts to be excessively restrictive and archaic. The staff concurs.

Proposed Rule Change

Rules 54.4-D7a and b are recommended to be deleted from the general order. Also Figures 13 and 14 of Appendix G of

G.O. 95 should be deleted. Rules 54.4-D8a and b contain cross references to 54.4-D7 that should be removed. See Appendix B, Item 12.

Justification for Change

The installation of a transformer on a pole with dead end in horizontal configuration can, under the present rules, require setting the center conductor out onto the arm and installing a head guy to balance the stress on the arm. If service is to be maintained during these changes the work must be by hot line techniques, exposing workers to risks associated with that.

If a buck arm is present the transformer may have to be located at least a span away. A pole might have to be interset under hot line techniques to carry the transformer.

The added work involved for any of that should not be necessary because with state-of-the-art techniques transformers can safely be set without most of the requirements of Rule 54.4-D7. Truck-mounted booms are used instead of the manual hoist and frame rigging once used. Even in off-road areas and with a buck arm present, an insulated gin pole can be mounted on the line or corner pole and the transformer hoisted safely into place without deenergizing the line.

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If the provisions of Rule 54.7, Climbing and Working Space, are observed in other aspects of dead ends in horizontal configuration safety to workers is assured. Overall safety is enhanced by simplified construction without the present restrictions.

APPENDIX A

Item 13 - G.O. 128

Rule 43.3 - Clearances and Depths
(Buried Communication Cables and Conductors)

Rule Purpose, Content

This rule applies to buried communication cables and conductors. New subrules are proposed to be added that will allow communication cables and conductors to be treated similarly to electric supply cables and conductors (Rules 33.4C & D) as to specific depths and also exceptions to those depths.

Proposed Rule Change

It is recommended that this rule be changed so that certain depth requirements will not be in all cases the same as those for duct systems but instead as specified by new subrules 43.3-C and 43.3-D which will be entitled DEPTHS, and EXCEPTIONS, respectively. These two new subrules will only address as separate DEPTH situations the installation of underground communication cables under these surface situations, (1) sidewalks, parkways and private property, and (2) thoroughfares. Also, the EXCEPTIONS will allow lesser depths for these cables when "suitable mechanical protection is employed". The several authorized methods, or their equivalents, by which such mechanical protection can be obtained are furnished within the proposed new subrules.

APPENDIX A

Justification for Change, Modification

These proposed changes will correct an inconsistency present in G.O. 128, by enabling the same modification of certain depth requirements for communication cables when mechanically protected that currently exists for underground electric supply cables. It can also be argued that rules for communication lines can be provided more liberal treatment than supply lines because the hazard of electric shock is not involved. Even so, these rules still must provide adequate protection for communication circuitry so that a proper level of service reliability can be realized.

APPENDIX A

Item 14 - G.O. 128

Rule 41.4-C2, DEPTHS

Rule Purpose, Content

This rule presently allows reduced depths of cover for ducts provided additional top protection is installed, and it has sufficient strength to protect the system from traffic.

Proposed Rule Change

It is proposed to define "sufficient strength" by adding, "The sufficient strength requirement shall be deemed to have been met in paved thoroughfares where the width of the trench is 6 inches or less and a concrete slurry backfill provided of a thickness at least equal to the thickness of the pavement."

Justification for Change

The intent of this revision is to permit less than 18 inches cover utilizing the earth saw or rock wheel method. This method is widely used in the rehabilitation of distribution systems and reduces construction time resulting in cost savings and better public relations. A depth of less than 18 inches should significantly reduce damage to existing substructures. The rock wheel/earth saw method with slurry backfill results in a trench less than 6 inches in width which is the key factor in protecting the system from injury by traffic.

APPENDIX A

Item 15 - G.O. 95

Various Rules, Other References in G.O. 95

Rule Purpose, Content

Various rules, tables and figures.

Proposed Rule Change

Various corrections as shown in Appendix B, Item 15.

Justification for Change

Typographical, punctuation and minor editing errors identified in March 1981 Edition of G.O. 95 should be corrected. They have been picked up by the utilities and by the staff in the past six years.

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March 9, 1988

APPENDIX B

CHANGES IN TEXT

Appendix B contains the changes in text to be made in G.O. 95 and G.O. 128 as indicated.

Item 1 - G.O. 95

Rule 15. EXEMPTIONS OR MODIFICATIONS

Delete text of present rule and substitute the following:

"15.1 Changes and Special Installations

If, in a particular case or a special type of construction, exemption from or modification of any of the requirements herein is desired, the Commission will consider an application for such exemption or modification when accompanied by a full statement of conditions existing and the reasons why such exemption or modification is asked and is believed to be justifiable. It is to be understood that, unless otherwise ordered, any exemption or modification so granted shall be limited to the particular case or special type of construction covered by the application.

15.2 Experimental Installations

It is the intent of this rule to assist in advancements or changes in the art without mitigation of safety. For this purpose, experimental

installations which deviate from one or more of these rules may be made provided: Precautions are taken to secure safety to property and to persons engaged in the construction, maintenance, and operation of overhead systems, and to the public in general; and a full statement of the conditions involved in such experimental installation is filed with the Commission not less than 15 days prior to experimental modification of facilities or construction of any experimental facilities. Where such experimental modification or construction would result in clearances or protection other than provided by these rules, a copy of such statement shall concurrently be mailed to all utilities, local agencies or persons likely to be affected by such installation.

15.3 Notification

For the purpose of keeping these rules up to date and reflecting the latest state of the art, the Commission shall, at appropriate times, advise interested parties of exemptions or modifications granted and notifications received under the provisions of Rules 15.1 and 15.2."

APPENDIX B

Item 2 - G.O. 95

Rule 37

Add the following paragraph after paragraph 3:

"The clearances specified in Table 1, Cases 11 and 12, shall in no case be reduced below the tabular values because of temperature and loading as specified in Rule 43."

Item 2 - O.O. 95, APPENDIX B

TABLE 1

In title delete "and"; after "Ground", add "or Water Surfaces".

CASE	A Span Wires (etc.)	B Comm. Conductors (etc.)	C Trolley (etc.)	D Supply Conductors of 0-750 volts (etc.)	E Supply Conductors 750-22,500 volts (etc.)	F Supply Conductors 22.5-300 kV (etc.)	G Supply Conductors 300-550 kV (etc.)
11. Water areas not suitable for sailboating (tt)(uu)(vv)(ww)(xx)	15'	15'	---	15'	17'	25'	25' (kk)
12. Water areas suitable for sailboating, surface area of: (tt)(vv)(ww)(xx)							
(a) Less than 20 acres	18'	18'	---	18'	20'	27'	27' (kk)
(b) 20 to 200 acres	26'	26'	---	26'	28'	35'	35' (kk)
(c) Over 200 to 2,000 acres	32'	32'	---	32'	34'	41'	41' (kk)
(d) Over 2,000 acres	38'	38'	---	38'	40'	47'	47' (kk)

(tt) Where a Federal agency or surrogate thereof has issued a crossing permit, clearances of that permit shall govern.

(uu) Or where sailboating is prohibited and where other boating activities are allowed.

(vv) Clearance above contiguous ground shall be 5 ft. greater than in Cases 11 or 12 for the type of water area served for boat launch facilities and for areas contiguous thereto, that are posted, designated or specifically prepared for the rigging of sailboats or other watercraft.

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

(xx) Water areas are lakes, ponds, reservoirs, tidal waters, rivers, streams and canals without surface obstructions.

TABLE 2

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

Case No.	Nature of clearance and class and voltage of wire, cable or conductor concerned	Other wire, cable or conductor concerned										
					Supply conductors (including supply cables)							
		A	B	C	D	E	F	G	H	I	J	K(kk)
		Span wires, guys and messengers	Trolley contact conductors, 0-750 volts	Communication conductors (including open wire, cables and service drops)	0-750 volts (including service drops), and trolley feeders (a)	750-7,500 volts	7,500-20,000 volts	20,000-35,000 volts	35,000-75,000 volts	75,000-150,000 volts	150,000-300,000 volts	300,000-550,000 volts
	Clearance between wires, cables and conductors not supported on the same poles, vertically at crossings in spans, and radially where colinear or approaching crossings											
1	Span wires, guys and messengers (b)	18 (c)	48 (d,e)	24 (e)	24 (e)	36 (f)	36	72	72	78	78 (gg)	138 (hh)
2	Trolley contact conductors, 0-750 volts	48 (d,e)		48 (d)	48 (d,h)	48	72	96	96	96	96 (gg)	156 (hh)
3	Communication conductors	24 (e)	48 (d)	24	48 (i)	48 (dd)	72	96	96	96	96 (gg)	156 (hh)
4	Supply conductors, service drops and trolley feeders, 0-750 volts	24 (e)	48 (d,h)	48 (i)	24	48	48	96 (oo)	96	96	96 (gg)	156 (hh)
5	Supply conductors, 750-7,500 volts	36 (f)	48	48 (dd)	48	48 (h)	72	96 (oo)	96	96	96 (gg)	156 (hh)
6	Supply conductors, 7,500-20,000 volts	36	72	72	48	72	72	96 (oo)	96	96	96 (gg)	156 (hh)
7	Supply conductors, more than 20,000 volts	72 (g)	96 (g)	96 (g)	96 (g,oo)	96 (g,oo)	96 (g,oo)	96 (g,oo)	96 (g)	96	96 (gg)	156 (hh)
	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, and in adjoining midspans;											

Note to printer: Changes to Table 2 are underlined for identification.

APPENDIX B
(TABLE 2 (Cont.))

		A	B	C	D	E	F	G	H	I	J	K
8	Communication conductors and service drops			12 (j)	40 (j,m,pp)	40 (k)	72 (m,n)	72 (m)	72	78	87 (gg)	147 (hh)
9	Supply conductors, service drops and trolley feeders, 0-750 volts			40 (k,m,n,pp)	24 (h,k,m,p)	40 (k,m,p)	40 (k,m,q)	72 (m,nn)	72	78	87 (gg)	147 (hh)
10	Supply conductors, 750-7,500 volts			40 (k)	40 (k,m,p)	40 (m,o,r,ee)	40 (m,q)	40 (m,q)	40 (q)	60 (ff)	90 (gg)	150 (hh)
11	Supply conductors, 7,500-20,000 volts			72 (m,n)	40 (k,m,n)	40 (m,q)	40 (m,o,q,r,ee)	40 (h,q)	40 (q)	60 (ff)	90 (gg)	150 (hh)
12	Supply conductors, 20,000-75,000 volts			72 (m)	72 (m)	40 (m,q)	40 (m,q)	40 (o,q)	40 (o,q)	60 (ff)	90 (gg)	150 (hh)
13	Supply conductors, more than 75,000 volts			72	72	60 (q)	60 (q)	60 (q)	60 (q)	60 (ff)	90 (gg)	150 (hh)
	Vertical clearance between 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	48	60 (ff)	90 (gg)	150 (hh)
	Horizontal separation of conductors on same crossarm											
15	Pin spacing of longitudinal conductors, vertical conductors and service drops (v,w)			3 (s)	11½ (h,s)	11½ (s)	11½ (s)	24 (s)	48	60 (ff)	90 (gg)	150 (hh)
	Radial separation of conductors on same crossarm, pole or structure—Incidental pole wiring											
16	Conductors, taps, or lead wires of different circuits (v,y,s)			3 (s)	11½ (h,s)	11½ (s)	17½ (s)	24 (s)	48	60 (ff)	90 (gg)	150 (hh)
17	Conductors, taps, or lead wires of the same circuit (v,y,ss)			3	3	6	6	12	24	60 (ff)	90 (gg)	150 (hh)
	Radial separation between guys and conductors											
18	Guys passing conductors supported on other poles (excluding poles of same circuit), and guys approximately parallel to conductors supported on the same poles			3 (bb)	12	18	18	30	36	36 (ff)	78 (gg)	138 (hh)
19	Guys and span wires passing conductors supported on the same poles	(cc)		3	3	6	9	12	18	24	48 (ii)	86 (jj)
	Post insulators—Vertical clearance between conductors											
20	Vertical clearance between conductors of the same circuit on horizontal post insulators					24	24	24	36 or 48 (ll,mm)	48 (mm)	48 (mm)	48 (mm)

Note to printer: Changes to Table 2 are underlined for identification.

Item 3 - G.O. 95

APPENDIX B

References to Rules Modifying Minimum Clearance in Table 2—Continued

(u) Shall be increased where conductors of different classification are supported on the same crossarms.		
1. Supply conductors of 0-750 volts and conductors of 750-22,500 volts	32.4-A2	43
2. Supply conductors of 0-750 volts and conductors of 750-7,500 volts	32.4-A3	43
(v) Not applicable to certain kinds of conductors.		
1. Supply conductors of same phase or polarity	54.4-C3c	118
2. Insulated supply conductors in multiple-conductor cables	87.4-C	162
3. Communication insulated conductors or multiple-conductor cables	87.4-C1	245
(w) Shall apply radially to conductors on brackets attached to crossarms.		
1. Supply conductors	54.4-C3b	118
2. Communication conductors	84.4-C1b	226
(x) Shall be increased between conductor of different classification supported on the same crossarm.		
1. Supply conductors of different voltage classifications	32.4-A	43
2. Supply circuits of 0-750 volts and communication circuits	32.4-B	44
3. Supply circuits and private communication circuits	89.2-A	253
(y) Special clearances for unprotected supply conductors from one level to another level	54.6-A	120
	58.2-B3	167
	92.1-F3	261
(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	54.6-C	122
3. Supply vertical runs, suitably protected	54.6-D	123
4. Supply risers, suitably protected	54.6-E	124
5. Communication conductors	87.4-C1	245

Note to printer: Changes to Table 2 are underlined for identification.

(aa) Not applicable between cables and their supporting messengers.		
1. Supply	87.4-D	168
2. Communication	87.4-F	250
(bb) May be reduced for guys and communication conductors supported on the same pole:		
1. Supply	56.4-C	134
2. Communication	86.4-C	240
(cc) Clearance required between guys.		
1. Supply guys, crossing	56.4-D2	135
2. Supply guys, approximately parallel	56.4-D3	135
3. Communication guys, crossing	86.4-D2	241
4. Communication guys, approximately parallel	86.4-D3	242
(dd) Shall be increased where within 6 feet of a pole	101.5	256
(ee) May be decreased in partial underground distribution	54.4-C4c	119
(ff) Shall be increased by 0.40 inches per KV in excess of 15 KV.		
(gg) Shall be increased by 0.40 inches per KV in excess of 150 KV.		
(hh) Shall be increased by 0.40 inches per KV in excess of 300 KV.		
(ii) Shall be increased by 0.25 inches per KV in excess of 150 KV.		
(jj) Shall be increased by 0.25 inches per KV in excess of 300 KV.		
(kk) Proposed clearances to be submitted to the CPUC prior to construction for circuits in excess of 550 kv.		
(ll) 36 inch clearance applies 35 kv to 68 kv. 43 inch clearance applies over 68 kv.		
(mm) Vertical clearances shall be increased by ½ inch for each kilovolt over 68 kv.		
(nn) The vertical separation between supply conductors and service drops of 0-750 volts and supply conductors of 20,000-22,500 volts may be reduced to 48 inches.		
(oo) May be reduced to 72 inches for conductors of 20,000-22,500 volts.		

(pp) May be reduced to 36 inches vertically at midspan only when the supply conductors consist of abrasion-resistant cable with a grounded metallic sheath or neutral-supported cable as specified in Rules 57 and 54.10.

NOTE: Revised February 7, 1964 by Decision No. 66707; September 18, 1967 by Decision No. 72984; March 30, 1968 by Decision No. 73813; July 22, 1968 by Decision No. 74342; and September 11, 1974 by Decision No. 83420.

APPENDIX B

Item 4 - G.O. 95

Rule 49.2 - C2, delete (2) and substitute the following:

(2) Longitudinal Loads Normally Unbalanced: Crossarms subjected to unbalanced longitudinal loads shall have sufficient strength to meet the strength requirements with safety factors at least equal to those specified in Rule 44.

At unbalanced corners and dead ends in Grades "A", "B" or "C" construction, where conductor tension is held by cantilever strength of pin-type insulators and pins, double crossarms shall be used to permit conductor fastenings at two insulators to prevent slipping. In lieu of double crossarms and double insulators, single crossarms may be used with single insulators and steel pins and prefabricated conductor ties.

For conductor tensions up to 2,000 pounds per conductor, double wood crossarms fitted with spacing devices at each end will be considered as meeting the strength requirements of Rules 47.4 and 47.5.

Rule 49.3 - C2, delete (2)and substitute the following:

(2) Longitudinal Loads Normally Unbalanced: At unbalanced corners and dead ends in Grades "A", "B" or "C" construction, where conductor tension is held by cantilever strength of pin-type insulators and pins, double insulators and wood pins or

single insulators and steel pins shall be used. Each line conductor shall be tied or fastened to both insulators, or the single insulator, to prevent slipping of the conductor under maximum working tension with a safety factor of 2 for the temperature and loading conditions specified in Rule 43.

At changes in grade of construction and at end supports in Grades "A" or "B" construction where the conductors are not dead-ended and are supported on pin-type insulators, double insulators and pins with tie wires, or equivalent fastenings, will be considered as meeting the strength requirements of Rules 47.4 and 47.5 for conductor tensions up to 2,000 pounds per conductor.

APPENDIX B

Item 5 - G.O. 95

Rule 52.7-C

After "crossarms" add "and wood poles".

APPENDIX B

Item 6 - G.O. 95

Rule 52.7-D, delete second paragraph.

Rule 54.7-A4, delete forth paragraph and insert after the third paragraph the following three paragraphs:

"Bolts bonded to or used for the attachment of dead-end hardware of a circuit of any voltage in horizontal (wood crossarm) configuration may project into the climbing space provided they are covered with a suitable non-conducting material as specified in Rule 22.2-F. If such bolts are bonded, a positive electrical contact shall be made.

"The covering of bolts, required by this rule, shall not apply to:

(1) Bolts associated with circuits of 0 to 750 volts at any level on a pole or structure.

(2) Bolts associated with circuits of more than 7,500 volts when located at the top level of a pole.

"No part of any guy, contacting or connected to a metal pin or part of dead-end hardware, shall be located in the climbing space."

Add Rule 22.2-F.

"F. BOLT COVERS made of a non-conducting shield or covering having the insulating efficiency and mechanical strength of impregnated fiber not less than 5/16 of an inch thick."

APPENDIX B

Item 7 - G.O. 95

Rule 54.7 - A4, paragraph 2, line 4, delete "one guy" and add "two guys (provided they are separated at the pole by a vertical distance of not more than 18 inches)"

Rule 84.7-E, paragraph 1, line 5, delete "one guy" and add "two guys (provided they are separated at the pole by a vertical distance of not more than 18 inches)"

Rule 54.10-F3, line 6, delete "one guy" and add "two guys (provided they are separated at the pole by a vertical distance of not more than 18 inches)"

Rule 54.11-G, paragraph 2, line 4, delete "one guy" and add "two guys (provided they are separated at the poleby a vertical distance of not more than 18 inches)"

PG&E Deviation, Decision 82-03-020, dated March 2, 1982, Rule 54.9-F, paragraph (c), line 6, delete "one guy" and add "two guys (provided they are separated at the pole by a vertical distance of not more than 18 inches)"

APPENDIX B

Item 8 - G.O. 95

Rule 20.10, delete entire rule.

Rule 38, Table 2, Case 20, heading, delete "Post" and substitute "Vertical and Horizontal." Case 20, delete "post."

Rule 54.7-A, second sentence, delete "post" and "utilized" and add "used without wood crossarms" after "are."

Rule 54.11, in the title delete "Post" and add "the Use of Wood" between "Without" and "Crossarms."

Rule 54.11-A, first paragraph, delete "Post." First and second subparagraphs change "A" to "An" and delete "post." Second subparagraph add "a" ahead of "vertical."

Rule 54.11-B1, line 3, change "54.5-D2" to "54.4-D2"; line 4 delete "post".

Rule 54.11-B2, line 2, delete "on post insulators"; lines 4 and 5, delete "on post insulators." Lines 5 and 6, delete "by post insulators." Paragraph 2, delete "on post insulator."

Rule 54.11-C, delete "on post insulators."

Rule 54.11-D, delete "on post insulators."

Rule 54.11-E, delete "supported on post insulator."

APPENDIX B

Rule 54.11-G, delete "Post-type"; delete "their attaching brackets" and substitute "attachments".

Rule 54.11-H, delete entire rule.

APPENDIX B

Item 9 - G.O. 95

Rule 54.10-F2, second sentence, after "transformers" add "or similar apparatus" and after "quadrant" add "or on one side of the pole."

APPENDIX B

Item 10 - G.O. 95

Add after Rule 83.3:

"Rule 83.4 - Bonding

Where separate communication messengers, or guys, or both, of the same or different ownership, are attached to the same pole, and they are in proximity to electric supply circuits (see Rule 21.3-D), railway signal circuits or Class T electric railway or trolley circuits, such messengers, or guys, or both, shall be bonded together at frequent intervals (see Rule 83.4-A). For purposes of this rule, communication messengers and guys are those which support Major Class C Circuits (see Rule 20.5) and those Minor Class C Circuits which are used for television transmission.

"Where bonding is required, the bond wire or bond strap shall have a conductivity of not less than No. 6 AWG copper wire, and shall be securely attached to the messenger or guy. Such a bond wire or bond strap may be attached to the surface of a pole or to the underside of a crossarm using metal staples, but shall in no case be attached to the top surface of any crossarm. Bond wires or bond straps placed in the climbing space shall be covered by a suitable protective covering (see Rule 22.2).

"Communication systems owned by electric utilities are exempt from these requirements."

"A. MESSENGERS ON THE SAME POLE

(1) Bonds are required between separate communication messengers or guys, attached above or below electric supply circuits, railway signal circuits or Class T electric railroad or trolley circuits on the same pole line system, at all dead-end poles and at intervals not to exceed 1,500 feet.

(2) Bonds between separate communication messengers on the same pole line system are required at the first pole on either side of the location where such messengers cross over or under electric supply circuits, railway signal circuits or Class T electric railway or trolley circuits.

(3) Bonds are not required between communication messengers or guys which are attached to the same pole by a common bolt.

B. MESSENGERS OF DIFFERENT POLE LINE SYSTEMS

Bonding is required between communication messengers or guys, or both, where the pole line systems intersect at a common pole."

APPENDIX B

Item 11 - G.O. 95

Rule 54.6-E, second paragraph, delete second sentence and add "Such plastic pipe shall be of material as specified in Rule 22.2-C with a minimum nominal pipe size of 1 inch and with a minimum impact strength equal to 2-1/2" nominal EPC-80-PVC plastic pipe."

Rule 84.6-E, first paragraph, delete last sentence and add "Such plastic pipe shall be of material as specified in Rule 22.2-C with a minimum nominal pipe size of 1 inch and with a minimum impact strength equal to 2-1/2" nominal EPC-80-PVC plastic pipe."

APPENDIX B

Item 12 - G.O. 95

Rule 54.4-D7, delete entire rule. Add the following on page 116 of G.O. 95:

"(7) Note: Rule 54.4-D7 was deleted March 9, 1988 by Resolution No. E-3076. Subsequent Rules 54.4-D8 and 9 are not renumbered. This space is intentionally left blank."

Add the following on page 117 of G.O. 95:

"This space is intentionally left blank."

Rule 54.4-D8a, first paragraph, next to last line, delete all after "conductors."

Rule 54.4-D8b, next to last line, delete all after "optional."

Appendix G of G.O. 95, delete Figures 13 and 14, and add, "This page intentionally left blank."

Index (page 392) Dead Ending Supply Conductors, delete 4th line, "Horizontal Configuration --- 54.4-D7 --- 116"

Table 1, (page 50), note dd, special clearance --- delete 3rd line, "2. Conductors dead-ended in horizontal configuration --- 54.4-D7 --- 116."

Renumber "3." to "2. Conductors in pole top construction --- 54.4-D8 --- 117"

APPENDIX B

Item 13 - G.O. 128

Rule 43.3 - Clearances and Depths

Add the following subrules:

C. DEPTHS

Communication cables shall be installed at a minimum depth below the surface under which they are located as follows except as provided in Rule 43.3D:

(1) Sidewalks, Parkways and Private Property:
12 inches

(2) Thoroughfares: 18 inches

D. EXCEPTIONS

(1) Mechanical Protection: Lesser depth than those listed in Rule 43.3C may be used where suitable mechanical protection is employed. Suitable mechanical protection shall consist of the following or their equivalents:

(a) Steel conduit or plastic pipe made of unplasticised polyvinyl chloride having the properties and dimensions specified in Type II, High Impact, Normal Chemical Resistance in United States Commercial Standard No. CS 207-60 with a minimum wall thickness of 0.15 inches, or

(b) A layer of concrete at least 3 inches in thickness above the cable.

(2) Terminations, Splices or Other Points of Access: Lesser depths than those listed in Rule 43.3C are permitted where cables and conductors rise for terminations or splices or where access is otherwise required.

APPENDIX B

Item 14 - G.O. 128

Rule 41.4-C2

Revise text to read as follows:

"(2) Thoroughfares: Communication duct systems in thoroughfares shall be installed with not less than 18 inches of cover. Where it is not practicable to obtain such cover, it may be reduced provided the duct material itself or additional top protection installed has sufficient strength to protect the system from injury by traffic. The sufficient strength requirement shall be deemed to have been met in paved thoroughfares where the width of the trench is 6 inches or less and a concrete slurry backfill provided of a thickness at least equal to the thickness of the pavement."

APPENDIX B

Item 15 - G.O. 95

G.O. 95 - Typographical, Editing Corrections

	Page	Error or Problem
(1)	1 (top of title page)	Date March 1980" under title should be "March 1981."
(2)	32	Rule 22.2-E. Reference to "Figure 81-A", correct to"Figure 82."
(3)	49, 50	Footnotes to Table 1, Rule 37.
		(j) 2. Correct Rule 56.4-A page number from 153 to 152.
		(k) 1. Correct Rule 56.4-A1 page number from 153 to 152.
		(q) 4. Correct Rule 84.8-C3a page number, from 235 to 234.
		(q) 5 Correct Rule 84.8-C3b page number, from 235 to 234.
		(r) 3. Correct Rule 86.4-F page number, from 243 to 242.

APPENDIX B

G.O. 95 - Typographical, Editing Corrections
(Continued)

Page	Error or Problem
	(u) 6. Add to Rules reference, 87.4-D5 - at page 249.
	(aa) 2. Correct Rule 54.8-F page number, from 140 to 139.
(4) 55	"Footnote" to Table 2, Rule 38.
	(x) 3. Correct Rule 89.2-A page number, from 252 to 251.
	(y) 2. Correct Rule 58.2-B3, page number from 167 to 166.
(5) 67	Table 5, footnote (b). Correct 05.1-1963 to 05.1 - 1979.
(6) 73	Table 6, Depths in Rock Correct: "Total Pole Length (feet)" 30 - change 5 to 3 80 - change 6-1/2 to 6
(7) 115	Last sentence of Rule 54.4-D2, correct reference "App. G, Figure 88" to App. G, Figure 89

APPENDIX B

G.O. 95 - Typographical, Editing Corrections
(Continued)

	Page	Error or Problem
(8)	228	Rule 84.6-D, second paragraph; correct reference from "App. G, Figure 86" to app. G, Figure 87
(9)	244	Title of Rule 86.6-C. Change to: "Guys Exposed to Supply Conductors of 22,500 Volts or More."
(10)	257	Rule 91.3-B, last sentence; correct spelling "interefere" to interfere
(11)	259	Rule 92.1-A. Add colon after each of 3 categories: Racks above : Unguarded racks below : Guarded racks below :
(12)	259	Rule 92.1-B. Add colon after each of 3 categories: Cables or messengers above : Unguarded cables or messengers below : Guarded cables or messengers below :

APPENDIX B

G.O. 95 - Typographical, Editing Corrections
(Continued)

	Page	Error or Problem
(13)	259	Rule 92.1-B: add word "grounded" between "Unguarded" and "cables" in second heading.
(14)	Insert facing page 318	Correct publishing date, from "January, 1969" to March 1981.
(15)	350	Figure 39, add Rule 84.8 B2b, under title.
(16)	234	Rule 84.8-B2b, add "See Appendix G, Fig. 39."
(17)	377	Figure 84. Delete upper dimension "V" shown between bottom of drip loop and 0-750v conductor level above.
(18)	157	Rule 56.6-D, first subparagraph, third line, change "22,500" to "35,500".
(19)	45	Rule 33.3-A, change "Lightning arrestors" to "lightning arresters".

APPENDIX B

G.O. 95 - Typographical, Editing Corrections
(Continued)

Page	Error or Problem
(20) 174	Rule 58.3-C3, fifth paragraph, second subparagraph, first line, change "windings" to "winding".
(21) 32	Rule 22.2-A, change "Fig 82" to "Fig. 83".
(22) 248	Rule 87.4-C3, second paragraph, last line, change "Fig. 84" to "Fig. 85".
(23) 224	Rule 84.4-D1, last line, change "Fig. 84" to "Fig. 85".
(24) 31	Rule 21.10, change "Fig. 87" to "Fig. 88".
(25) 4	Table 15, page reference, change "237" to "236".
(26) 4	Table 16, page reference, change "247" to 246".
(27) 113	Rule 54.4-C4c, first subparagraph, change "Fig. 88" to "Fig. 89".

APPENDIX B

G.O. 95 - Typographical, Editing Corrections
(Continued)

Page	Error or Problem
(28) 382	Figure 89, add to title reference: "and Rule 54.4-C4c".
(29) 388	Climbing Space, Allowable Obstructions, change page "131" to "130".
(30) 148	Rule 54.11-B(1) Clearance, third line, change "54.5-D2" to "54.4-D2".
(31) 394	Index, Grounding, Requirements for - continued, 11th line, Transformer Cases, add "58.3-C3" and page "173".
(32) 299	Appendix D, Guys, at the end of the last sentence, change "Fig. 85" to "Fig. 86".
(33) 90	Section Contents, Section V, delete the entry for Rule 54.11-H.
(34) 21	Section Contents, Section II, delete the entry for Rule 20.10.

APPENDIX B

G.O. 95 - Typographical, Editing Corrections
(Continued)

Page	Error or Problem
(35) 386	Index, Bonds (or Bonding), 10th line, change "On Post Insulator Construction" to "Vertical Circuits Bonded Together".
(36) 388	Index, Climbing Space, 8th line, change "Post Insulator Construction" to "One Vertical Circuit at Pole Top".
(37) 389	Index, Conductor (or Conductors), 2nd line, change the entry to "Arrangement Without Wood Crossarms -- Rule No. 54.11-B2 -- page 148".
(38) 390	Index, Conductor Clearances, 24th line, change entry to "On Insulators Without Wood Crossarms -- Rule No. 54.11-E -- page 148".

APPENDIX B

G.O. 95 - Typographical, Editing Corrections
(Continued)

Page	Error or Problem
(39) 396	Index, Hardware, 1st line, change the entry to "Construction without Wood Crossarms".
(40) 396	Index, 18th and 19th lines, delete entry "Horizontal Post Insulator -- Definition -- Rule No. 54.11-A -- page 147".
(41) 401	Index, 24th line, delete entry "Pin Type Insulator -- Rule No. 54.11-H -- page 150".
(42) 402	Index, 25th line to 43rd line, delete headings "Post Insulator" and "Post Insulator Position" and all subheadings under them.
(43) 396	Index, Insulators, 3rd to 5th lines, delete the entries for "Pin Type (see Pin Type insulators)" and "Post Type (see Post Insulators)".

APPENDIX B

G.O. 95 - Typographical, Editing Corrections
(Continued)

Page	Error or Problem
(44) 408	Index, Triangular Configuration of Conductors, 3rd line, change "On Post Insulators" to "On Pole Mounted Insulators".
(45) 409	Index, Vertical Configuration, 3rd line, change "On post insulators" to "On Pole Mounted Insulators".
(46) 409	Index, Vertical Post Insulator, change the word "Post" to "Mount".
(47) 390	Index, Conductor Insulators, delete subheading, "Post Type (see Post Insulators)".
(48) 388	Index, Clearances, delete "Post Insulator".

APPENDIX B

G.O. 95 - Typographical, Editing Corrections (Continued)

Page	Error or Problem
(49) 396	Index, add the following entry: Insulators Without the Use of Wood Crossarms Attachment.....54.11-B2 148 Bonding.....54.11-F3 149 Clearances.....54.11-B1, 148, 54.11-E 148 Climbing Space..54.11-F 148 Conductor Arrangement....54.11-B2 148 Conductor Spacing.....Table 2, 53, Case 20, 148 54.11-D Hardware.....54.11-B1 148 Horizontal Position - Definition.....54.11-A 147 Hotline Methods..54.11-F1a, 149, 54.11-F2a 149 Triangular Configuration...54.11-B2 148 Vertical Clearance Between Levels..Table 2, 52, 54.11-E 148 Vertical Position - Definition.....54.11-A 147
(50) 48	Table 1, Case 10, Column B, delete "(00)".
(51) 49, 50	References to Rules Modifying Minimum Clearances in Table 1, Ref. (U)6, add "87.4-D5" page "249;" Ref. (ss) change "to" to "for."

APPENDIX B

G.O. 95 - Typographical, Editing Corrections
(Continued)

Page	Error or Problem
(52) 138	Rule 54.8-D1, 3rd line, place "unattached" in parentheses and delete "shall clear;" 4th line delete comma after "poles;" 5th line delete semicolon and add "shall clear" after "fixtures;" 6th line delete semicolon; 8th line after "extend" add "not less than."
(53) 144	Rule 54.10-B6, 2nd line place "unattached" in parentheses; 3rd line delete "shall clear" and comma after "poles;" 5th line delete semicolon after "fixtures;" 5th and 6th lines delete "a radial distance of 15 inches as specified in Table 1, Case 10, Column D" and substitute "... may have a clearance less than the 36 inches specified in Table 1, Case 10, Column D, but shall have a clearance of not less than 15 inches, ..."; 8th line after "extend" add "not less than."
(54) 163	Rule 57.4-H, 1st line, delete "passing unattached;" 2nd line delete "shall clear" and substitute "passing (unattached);" 4th line delete semicolon; 4th, 5th and 6th lines delete "a radial distance of 15 inches as specified in Table 1, Case 10, Column D" and substitute "... may have a clearance of less than the 36 inches specified in Table 1, Case 10, Column D, but shall have a clearance of not less than 15 inches, ..."; 8th line, after "extend" add "not less than."

APPENDIX B

G.O. 95 - Typographical, Editing Corrections
(Continued)

Page	Error or Problem
(55) 226	Rule 84.4-D, 2nd line place "unattached" in parentheses; 3rd line delete "to;" 4th line delete comma after "poles;" 6th line delete semicolon; 9th line after "extend" add "not less than."
(56) 238	Rule 84.8-E1, 3rd line place "unattached" in parentheses and delete "shall clear;" 4th line delete comma after "poles;" 5th line delete semicolon and add "shall clear" after "fixtures;" 6th line delete semicolon; 8th line after "extend" add "not less than."
(57) 224	Rule 84.4-D1, last line change "Fig. 84" to "Fig. 85."
(58) 249	Rule 87.4-D5 change "Conductors" to "Cables or Messengers."