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Decision No. 36344

ORIGINAL

BEFORE THE RAILROAD COMMISSION OF THE STATE OF CALIFORNIA

In the matter of the application of PACIFIC GAS AND ELECTRIC COMPANY for an order of the Railroad Commission of the State of California amending and modifying those provisions of General Order No. 95 herein mentioned.	Application No. 25309

BY THE COMMISSION:

O P I N I O N

The construction of overhead electric supply and communication lines, essentially from viewpoint of safety, is governed by the provisions of General Order No. 95. That order was adopted by the Commission on December 23, 1941, (Decision No. 34884, Case No. 4324) and became effective on July 1, 1942. Pacific Gas and Electric Company has requested that a number of the rules contained in that general order be amended and modified in certain particulars. The application will be considered as one requesting authority to deviate from the requirements of the general order.

Some of the requested deviations or exemptions appear to be justifiable, in whole or in part, and will be authorized. Such authorizations, however, will contain certain limitations and will be granted only to the extent which, in the opinion of the Commission, they are justified in the light of reasonable standards of safety, service, construction and operation. Measured by such standards, certain of the requested deviations appear to be inadvisable and unreasonable, and will be denied. The deviations sought will be discussed briefly in the order in which they appear in the application.

Rule 37, Table 1, Case No. 8, Columns D, E and F - Page 36(1)

Table 1, in Case No. 8, Columns D, E and F, prescribes certain basic minimum clearance distances of 15 and 18 inches between supply conductors and the center lines of poles. The application alleges that these clearance requirements are difficult to meet in actual practice with respect to the terminal bushings of transformers and the lead wires thereto, because the energized parts at the bushings of the smaller size transformers, when hung in a conventional manner in the center position on a single pole, are generally less than the foregoing clearance distances. Pacific points out, in its application, that the general laws of California (Chapter 499, Statutes 1911, and Chapter 600, Statutes 1915), and General Order No. 64 of this Commission issued May 1, 1922, contained exceptions in the case of "lead wires to transformers" from similar clearance requirements.

It is the opinion of the Commission that limited deviations from the prescribed clearances of 15 and 18 inches from center line of pole should be permitted relative to the installation of transformers, regulators, and capacitors supported in the center position on a single pole structure where such equipment, conventionally supported, has its terminal bushing and associated energized parts less than 15 inches (for 0-7500 volts) or less than 18 inches (for 7500-20,000 volts) from the center line of pole, and the order will so provide. These deviations will not apply to so-called bus or interconnection wiring of polyphase installations, nor to any lead wire passing between pole and transformer or regulator or capacitor, and will be limited to terminal bushings of transformers, regulators and capacitors and the lead wires extending between such terminals and the next point of support of such lead wires, which point of support shall have the minimum distance from center line of pole specified in Table 1, Case 8, Columns D and E.

(1) The page numbers cited throughout this opinion are the pages in General Order No. 95 where the particular rule under discussion appears.

Rule 52.7-D - Page 90

Pacific interprets the provisions of Rule 52.7-D as prohibiting, among other things, the use of dead-end hardware and steel pins in connection with metal crossarms. Such a prohibition was not intended. In our opinion the first sentence of the said rule clearly requires a clearance of not less than 1½ inches between metal pins or dead-end hardware and all of the other items of hardware or equipment listed therein, where metal pins or dead-end hardware are attached to or supported by wood crossarms or by wood poles, with no implied or expressed intent that any minimum clearance need be secured or maintained between any items of hardware and metal pins or dead-end hardware attached to metal arms. Furthermore, Rule 52.5 specifically recognizes the use of metal crossarms with but one prohibition which relates to the support of conductors of different voltage classifications on the same metal arm. Having in mind the purpose of the rule, it is obvious that any attempt to prescribe a clearance of 1½ inches between items of hardware commonly attached to or supported by metal arms would be meaningless. We believe that the rule is clear and that the requested deviation therefrom is unnecessary.

Rule 52.7-F2 - Page 90

Pacific requests a deviation from this rule which would permit work on de-energized conductors without temporary grounding of the conductors provided the hardware of cutouts, switches, and the like, which are used to isolate the conductors, are temporarily grounded. The specific provision of the rule from which a deviation is requested appears as an alternative to certain basic requirements stated in the rule. It is believed inadvisable to authorize a general deviation from the alternative provision which requires that de-energized conductors shall be securely grounded during periods of work thereon. It does appear appropriate, however, to authorize deviation from the rule in two particulars. First, with respect to the grounding of de-energized conductors of circuits exceeding 7,500 volts extending in the form of leads, beyond cutouts, to transformers, regulators or capacitors, it is the opinion of the Commission that where

cutout or switch bases are permanently grounded or are temporarily grounded during periods of work on the de-energized equipment, the grounding of said leads may properly be omitted provided during such periods of work, after the conductors and equipment are de-energized by removing fuses or opening switches, the de-energized conductors or equipment can not become energized from another source of energy. Secondly, with respect to the connection of de-energized line conductors to a temporarily grounded switch, it is furthermore the opinion of the Commission that such connection may properly be omitted provided that when work is performed at the location of the switch, a ground will be connected to the de-energized line conductors preferably at an adjacent pole, but not at a greater distance than two poles from the switch pole. The order will so provide.

Rule 53.4-A3a - Page 93

Pacific correctly construes this rule as precluding work on either of the two circuits of double circuit construction even though both circuits were de-energized, unless the procedural requirements are met. Pacific states further that an error has apparently occurred in the wording of this rule, which we find, in consideration of this request, is not the case. The requested deviation would eliminate the grounding of conductors of a second de-energized circuit on which no work is being performed, which condition would not be desirable. However, the request will be granted in part by authorizing a deviation from the rule by permitting Pacific to omit the requirement that the bond wire of the circuit not being worked on be connected to its related de-energized and grounded conductors, and the order will so provide.

Rule 53.4-A2 - Page 92

This rule permits certain bond wires to be installed vertically between crossarms without a suitable protective covering where such bond wires are not less than 30 inches from the center lines of poles. Pacific requests a similar provision for bond wires installed, at a similar distance from poles, horizontally between crossarms in double arm construction. This deviation, as proposed, would permit a bond wire to run lengthwise of the arms in the space between the two

arms of a double arm. It is the opinion of the Commission that the request is reasonable if limited to portions of bond wires which extend from the underside of one crossarm of a double arm to the underside of the companion arm of the double arm, provided such portions of the bond wires are approximately perpendicular to the arms and are not less than 30 inches from the center line of pole. The order herein will provide for such a deviation.

Rule 53.4-B - Page 93

This rule requires, among other things, that bond wires of circuits of 7,500 volts or less on wood poles or wood crossarms shall be fully covered by a suitable protective covering. The application states that Pacific operates a number of 6,600-volt (nominal) circuits which are operated and worked upon as circuits of more than 7,500 volts. Pacific desires to bond these 6,600-volt circuits in accordance with the provisions in Rule 53.4-A for circuits of more than 7,500 volts. Pacific's request appears to be reasonable, and a deviation will be authorized under the conditions that all of the 6,600-volt circuits are constructed and maintained in accordance with the rules for lines of 7,500 to 20,000 volts inclusive, and are worked upon and operated in accordance with the company's safety and operating rules for lines of such voltage.

Rule 54.6-B - Page 108

Among other things, this rule requires that ground wires on the surface of wood poles and structures shall be covered throughout their length by a suitable protective covering. In the application Pacific states that it is constructing certain lines as additions to its transmission system on which overhead ground wires, sometimes called lightning protection wires, are to be installed. Pacific states further that good engineering practice requires that such overhead ground wires be connected to a ground electrode at each and every structure. Accordingly, Pacific requests that an exception be made to the requirement of a suitable protective covering over ground wires on the surface of the wood poles of such lines since it alleges that the construction, except for the use of wood poles and wood crossarms, will be identical with that of steel tower or steel pole lines.

Pacific's request appears to be reasonable when applied to lines carrying only circuits of more than 35,000 volts with certain other limitations. The order herein will provide a deviation therefor.

Rule 54.6-F - Pages 110-111

First, under designation (a), Pacific requests that in regard to rack construction, terminals of risers or runs be permitted to extend above the bottom conductor but not above the top conductor of a rack group. The rule requires that terminals of risers or runs shall not extend above the level of line conductors, and that such terminals shall, under certain conditions, be protected. It is the opinion of the Commission that the requested departure from the rule is not desirable. The terminals of risers, if located as proposed by Pacific, would present extensive grounded metal surfaces, which can not be fully protected and which would be usually exposed in the immediate area where men must perform necessary work on the unprotected conductors. Correspondingly, terminals of runs so located would be equally undesirable.

Second, under designation (b), Pacific requests an exception to the requirement of a guard, in the form of a wood block or crossarm, over terminal fittings at the upper ends of vertical runs or risers of 0-750 volts, where such terminal fittings are within approximately 2 feet of the top of the pole. In crossarm construction this exception appears to offer needless hazard and to be unnecessary since, with proper care in design, the crossarm can readily be used as the required guard. On the other hand, where rack construction is used, the guarding block or arm is not without value in preventing contact of a lineman with grounded surfaces. If, however, the terminal fitting at the upper end of a vertical run or riser is placed directly beneath the lowest line or service drop attachment in rack construction, whether the rack attachment is or is not in the top conductor position of the pole, it would appear reasonable that the wood block or crossarm as a guard be omitted. Pacific's request for deviation from this rule will otherwise be denied.

Rule 54.7-A2 - Page 113

The application points to the provision of this rule which would require that climbing space where line arms only are involved must be so located that the center line of pole is approximately in the center of one side of the climbing space. Pacific states that this rule necessitates the use of longer than standard crossarms at dead ends in order that dead-end insulators may be kept out of the climbing space. While the rule, by use of the term "approximately midway," permits of some shifting of the climbing space laterally, Pacific does not construe the rule as clearly permitting a shift of as much as 5 inches. It appears justifiable that a deviation be authorized to permit the shifting of the climbing space a maximum distance of 5 inches laterally under the conditions that all climbing spaces so treated shall have the full horizontal dimensions required by the provisions of Rule 54.7-A2 but without the use of the reduction of 2% specified in the last paragraph of said rule where the shift is more than 2 inches. The order will authorize such deviation from the rule.

Rule 54.8-A - Page 118

This rule provides in part that service drops shall have a weather-resistant covering at least equivalent to double-braid weatherproofing. The application asserts that by reason of the war emergency Pacific is having difficulty in obtaining weatherproof wire for service drops, and further, the War Production Board has authorized the purchase and use of bare wire subject to the condition that weatherproof wire be used only on the ungrounded wires of services, and that bare wire be used on the grounded conductors. Pacific states that the grounded neutral of such services is grounded on the customer's premises at the house service, and is also connected to supply mains which have the neutral grounded at the transformer.

In view of the critical situation in regard to procurement of material brought about by war conditions, it is the opinion of the Commission that a deviation is warranted authorizing the use of bare wire for the grounded conductor of service drops, under certain conditions, and as provided in the order herein.

Rule 54.9-E1 - Page 126

Pacific requests interpretation of and certain deviations from the rule pertaining to the guarding of conductors in rack construction, where such conductors are less than 6 feet below other conductors supported on the same pole.

It is generally desirable, where rack construction is used, to obtain a vertical separation of at least 6 feet as specified in the first paragraph of Rule 54.9-E. The provisions which are stated in Rule 54.9-E1 for a vertical separation of less than 6 feet, but not less than 4 feet, are intended for use with restraint and discretion in situations where multiplicity of equipment and crowded conditions or other abnormal conditions of pole line construction make the obtaining of a vertical separation of at least 6 feet difficult and unduly costly. For these reasons Rule 54.9-E1 requires, among other things, that "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," and "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."

After giving consideration to Pacific's requests, we are of the opinion that certain deviations are justified. Where line conductors are dead ended and terminate less than 6 feet, but not less than 4 feet below conductors at the next conductor level above, it appears satisfactory that the guard arm parallel to the conductors be omitted, provided a guard arm is placed directly above the rack attachment and at right angles to the dead-ended line conductors, and further provided service drop conductors attached to such dead-end rack shall not have a horizontal angle of more than 90 degrees from the vertical plane of the line conductors. The order will so provide, and will also include a deviation to permit such limited attachment of service drops to a rack which supports dead-ended line conductors.

In situations where the line conductors extend in two or more directions from a rack attachment on one side of pole or where the line conductors make an angle referred to in item 2 of Pacific's application as "Tee taps from main lines,"

and in item 3 as "Angles," a single guard arm installed directly above and approximately parallel to the top line conductor nearest the climbing space will be considered as meeting the requirements of Rule 54.9-E1.

Rule 58.3-B3d - Pages 148-149

Pacific requests authority to deviate from the provisions of this rule in so far as they apply between conductors and the unenergized metal parts of street lighting insulating (or isolating) transformers, and other similar small transformers, and suggesting certain clearances in lieu of those specified. A deviation appears warranted if limited to installations consisting of sealed case transformers of series lighting circuits, and the order herein will so provide.

Rule 58.3-B5 - Page 150

This rule provides, among other things, that transformer cases, hangers, and other metal parts in contact therewith shall clear through bolts, arm braces, and other hardware by not less than 1½ inches. Pacific states that, as a result of studies by committees of the electric industry and electrical manufacturers, mountings have been designed for bolting transformers directly to poles. In order to utilize such mountings it is necessary to support the transformers directly on through bolts. The application asserts that had Pacific used pole-bolted transformers for single phase installations during the year 1941, it would have been possible to save approximately 50 tons of steel and 3 tons of zinc.

It is the opinion of the Commission that provisions should be made for support of transformers of the new design directly on through bolts provided that proper care is taken to prevent the exposure of linemen to metal parts which are remote from the transformer, but which may be energized through contact with the metal parts of the transformer. We believe it would be impractical to devise and issue a general deviation which would endeavor to embrace all of the future and satisfactory methods that may be designed to afford a reasonable degree of safety. Pacific proposes here to cover the portion of through bolts which extend into climbing spaces. It may well be that insulation of through bolts from transformer cases and their associated parts, or some other method of satisfying the

situation may be equally as effective as the use of coverings over through bolt assemblies. Therefore, it appears necessary to give individual consideration to each separate proposal, such as Pacific's present request. In making its proposal Pacific knows that one of the standards of suitable protection (Rule 22.2 of G.O. 95) is that wood coverings, other than hardwood, shall have the insulating efficiency afforded by 1½-inch thickness of wood. Nevertheless, request is made for approval of the use of wood, not classed as hardwood, with thickness of only 1/2 inch. In our opinion, such a proposed covering is insufficient and Pacific's request must accordingly be denied at this time.

Appendix G, Figure 33 - Page 327

Pacific asserts that there is an inconsistency between the Rule 54.9-E3 and Figure 33 in Appendix G. That appendix, as stated therein, illustrates the requirements of a number of rules, and is to be used "as a guide only for the application of such rules. Under no conditions shall these diagrams be given precedence over the rules as written" (G.O.95, p. 307). Rule 54.9-E3 requires, among other things, that the clearance distance between the lowest point of the drip loop of primary leads to the transformer and the top conductor supported in rack construction below the transformer, shall be not less than as specified in Rule 54.4-C6. The clearance distance there specified ranges from 12 inches to 36 inches, depending upon the voltage of the lead wires, while the clearance distance shown in Figure 33 is at variance for primary leads of 750-20,000 volts and is shown as 24 inches minimum. However, as the required clearance distances are to be applied as specified in Rule 54.4-C6, there is no occasion to authorize any deviation.

Rule 12.3 - Page 9

This rule provides that facilities constructed or reconstructed before July 1, 1942 (effective date of G.O.95), shall conform to the requirements of earlier general orders. Except as to certain safety factor requirements, the requirements of the new order do not apply to such lines. The purpose of this rule, as stated in Decision No. 34884 (43 CRC 872), was to obviate the necessity of

complete and immediate reconstruction of then existing lines, it being found that it would be unreasonable to order such wholesale and immediate reconstruction. In many respects the requirements of G.O. No.95 are more stringent than the requirements of preceding orders. In other respects the new order is less exacting in its requirements. Because of this fact Pacific has a number of lines, or parts of lines, which are required to conform to more exacting rules than would be applicable to identical lines built today. We believe that Pacific's request to be relieved of the burden of having such lines conform to the more stringent requirements of earlier orders is justified and should be authorized.

O R D E R

The Commission having considered the above application, and being of the opinion that a public hearing is unnecessary, and good cause appearing, IT IS ORDERED that Pacific Gas and Electric Company be and it is hereby authorized to deviate from the provisions of General Order No. 95 in the following particulars and under the conditions hereinafter specified, it being found that such deviations and exemptions are justified:

1. Rule 37, Table 1, Case No. 8, Columns D and E (G.O.95, p. 36)

Transformers, regulators or capacitors may be installed on poles consisting of a single pole structure or on crossarms attached thereto so that energized parts of the terminal bushings of such equipment and the 0-20,000-volt unprotected lead wires extending between said terminals and the next point of support may be less than the 15- or 18-inch clearance of Rule 37, Table 1, Case 8, Columns D and E, as specified in Rules 58.3-B7 and 58.4-B6, provided (1) said terminals and lead wires shall be not less than 6 inches from surface of pole instead of the distance of 3 inches specified in Table 1, Case 9, Columns D and E, and shall have as much as practicable of the 15-inch or 18-inch clearance of Table 1, Case 8, Columns D and E as can be obtained; and (2) this deviation shall not apply to so-called bus or interconnection wiring of polyphase installations nor

to any lead wire passing between pole and transformer, or regulator or capacitor.

2. Rule 52.7-F2 (G.O.95, p. 90)

The alternate temporary grounding of lead wires between the cutouts or air-break switches and equipment of transformer, regulator, or capacitor installations may be omitted provided the bases of all types of cutouts or air-break switches shall be grounded during periods of work on de-energized conductors and equipment, and further provided that during periods of work, after the conductors and equipment are de-energized by removing fuses or opening switches, the de-energized conductors or equipment can not become energized from another source of energy. Furthermore, the attachment of de-energized line conductors to a temporarily grounded switch or cutouts may be omitted, provided such de-energized conductors are shorted and temporarily grounded within a distance not greater than two poles from the switch or cutout pole on which work is being performed.

3. Rule 53.4-A3a (G.O.95, p. 93)

The second sentence of Rule 53.4-A3a may be applied as though it read as follows: "Neither circuit shall be worked on while de-energized unless the de-energized conductors are shorted and securely grounded and the bond wire of the de-energized circuit on which work is being performed is connected to the de-onergized and grounded conductors on the pole where such work is done."

4. Rule 53.4-A2 (G.O.95, p. 92)

The requirement that portion of bond wires, which extend from the underside of one crossarm of a double arm to the underside of the companion arm of the double arm, be covered by a suitable protective covering may be omitted provided such portions of bond wires are approximately perpendicular to the arms, extend directly between arms and are not less than 30 inches from center line of pole.

5. Rule 53.4-B (G.O.95, p. 93)

The requirements of Rule 53.4-B need not be applied to the bonding of circuits of 6,600 volts (nominal) provided that (1) such circuits, if bonded, are bonded in accordance with the requirements of Rule 53.4-A; (2) such circuits, where bonded, are constructed and maintained in accordance with the rules of G.O.95 for lines of 7,500 to 20,000 volts inclusive, particularly Rule 32.4-A, and are not on the same end of a crossarm as any constant current circuit, and (3) work on such circuits shall be performed under the conditions prescribed in the company's operating (safety) rules for circuits of more than 7,500 volts.

6. Rule 54.6-B (G.O.95, p. 108)

Ground wires connected to overhead lightning-protection wires installed on poles or crossarms supporting only circuits of more than 35,000 volts need not be covered by a suitable protective covering provided (1) said lines are situated in rural areas; (2) the ground wires have mechanical strength not less than that of 1/4-inch (diameter) steel strand, and (3) the ground wires conform to the requirements of Rule 49.4-A with respect to the use of corrosion-resisting material.

7. Rule 54.6-F (G.O.95, pp. 110-111)

Where terminal leads extending from the upper ends of risers or vertical runs are connected to conductors in rack construction, the wood block or arm required as a guard may be omitted, provided the top of the terminal fitting shall be not less than 3 inches and not more than 6 inches below the lowest conductor of the rack, and such terminal fitting shall be approximately centered in the vertical plane of the rack conductors.

8. Rule 54.7-A2 (G.O.95, p. 113 and Figure 16, p. 320)

The climbing space required by Rule 54.7-A2 may be shifted laterally not more than 5 inches under the conditions that (1) the midpoint of the side of the climbing space coinciding with the center line of pole shall

be not more than 5 inches from the center line of pole, and (2) that full climbing space dimensions shall be maintained, but without the use of the 2% reduction where the shift is more than 2 inches.

9. Rules 54.8-A, 54.9-C1, and 49.4-C7a (G.O.95, pp. 118, 125 and 66)

Until restrictions of the War Production Board no longer prohibit the installation of weatherproof conductor for the grounded wire of low voltage circuits, bare conductor may be used as the grounded conductor of two-wire or three-wire services where the voltage to ground from any conductor of such services does not exceed 150 volts, provided that such bare service-drop conductor is connected to a line conductor or transformer lead which is effectively grounded, and further provided that such service-entrance conductor to which such a bare service-drop conductor shall be attached is connected to a ground on the premises served, and further provided that the minimum radial clearance of such bare service-drop conductors from police and fire alarm conductors shall be not less than the clearances specified in Table 11, page 121 of G.O.95 under the caption "From other communication conductors."

10. Rule 54.9-E1 (G.O. 95, p. 126)

In cases where the top conductor of a group of line conductors of rack construction are dead ended only and terminate less than 6 feet but not less than 4 feet below conductors at the next conductor level above, the guard arm required to be placed above and parallel to such line conductors in rack construction may be omitted, provided a guard arm not less than 48 inches long is placed directly above the rack attachment and at right angles to the line conductors, and further provided service-drop conductors attached to such dead-ended line conductors or attached to the rack supporting the dead-ended line conductors, shall not have a horizontal angle of more than 90 degrees from the vertical plane of the line conductors. Only under the foregoing conditions will it be permissible to omit the requirement that "No service-drop conductors supported on such rack shall

pass between the surface of pole and the vertical plane of the line conductors."

In cases where line conductors in rack construction extend in two or more directions from a rack attachment on one side of pole, or where the line conductors make an angle, a guard installed directly above and approximately parallel to the top line conductor nearest the climbing space shall be considered as fully meeting the requirements of Rule 54.9-El. 11. Rule 58.3-B3d (G.O.95, pp. 148-149)

The provisions of this rule need not be applied to clearances between conductors and unenergized parts of sealed case insulating transformers connected to series lighting circuits provided a radial clearance of not less than 1½ inches is maintained between such transformers and their related conductors, except leads to the transformers; and further provided a horizontal clearance of not less than 8 inches is maintained between such transformers and (the vertical plane of) unrelated conductors supported on the same crossarm.

12. Rule 12.3 (G.O.95, p. 9)

Lines or portions of lines constructed or reconstructed before July 1, 1942, may conform to and be maintained in accordance with the requirements of General Order No. 95, instead of the requirements in effect at the time of such construction or reconstruction, but only in those instances where the requirements of General Order No. 95 are less stringent than such earlier requirements.

In all other respects Application No. 25309 is hereby denied.

This order shall become effective on the twentieth day after the date hereof.

Dated, San Francisco, California, this 11th day of May, 1943.

Commissioners