Decision No. 37698

BEFORE THE RAILROAD COMMISSION OF THE STATE OF CALIFORNIA

ORIGINAL

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:

THIRD SUPPLEMENTAL OPINION

Pacific Gas and Electric Company (also referred to as Pacific) has heretofore been authorized to deviate in certain respects from the rules of General Order No. 95, such authorization being the subject of Decisions Nos. 36344 (44 C.R.C. 684), 36791 (45 C.R.C. 135), and 37088, rendered in response to the original and first and second supplemental applications herein, respectively. The third supplemental application herein seeks authority to deviate from certain other rules and in certain other respects above and beyond those deviations heretofore authorized by this Commission.

The specific deviations requested will be considered in the order in which they have been presented in the application.

1. Pacific's 6600 Volt (Nominal) Circuits

Applicant alleges that General Order No. 95, in general, imposes relatively more stringent construction requirements upon lines whose voltage is less than 7500 volts than on lines whose voltage is more than 7500 volts, and deduces that the reason therefore arises from the usual practice of performing operations thereon while the lines are energized. Applicant operates certain overhead lines on its system which are designed and equipped to operate ultimately at 12,000 volts Wye, although these circuits are initially operated at 6600 volts Delta. Applicant's safety rules for employees, under rules 108 and

308, prohibit "hot work" on circuits of more than 4500 volts, which would mean that the 6600 volt circuits would be worked either de-energized or with "live line" tools. Applicant alleges, therefore, that the need for more stringent requirements does not apply to these 6600 volt circuits, and asks permission to construct said circuits in accordance with the provisions of General Order No. 95, which govern construction for 7500 volt circuits. Under these circumstances applicant's request appears reasonable and the order will provide for this deviation.

2. Rule 38 (G.O. 95, Page 39) - Minimum Clearances of Wires from Other Wires

Applicant quotes Rule 38, Table 2, Case 17, Column D, and alleges that it is at times impossible to comply with the 3-inch clearance specified therein in the case of transformer secondary leads of 0-750 volts under certain connection requirements. It further alleges that this difficulty has been overcome by the use of a porcelain insulator having a dry flash-over value of 5,000 volts or more. Applicant seeks to be relieved of the necessity of maintaining this 3-inch clearance and desires permission to use such insulators. The proposed deviation seems reasonable and will be authorized.

3. Rule 38 (G.O. 95, Page 39); Rule 56.4-C4, (Page 132); Rule 86.4-C4, (Page 219), - Clearances Between Guys Cables

The rules referred to specify that a clearance of 3 inches shall be maintained between guys passing communication conductors supported on the same poles. Applicant alleges that under certain conditions which are frequently met in practice, due to the physical limitation of the construction elements, it is impossible to maintain this specified clearance at all times and under all conditions of service. Applicant seeks permission to be allowed to decrease this clearance under certain conditions, provided that mechanical separation is maintained by the use of a suitable wood separator between the guy and the communication conductors. The Commission is cognizant of the fact that in

certain respects maintenance of the 3-inch clearances is unduly burdensome and deviation from the requirements of the rule, under specified conditions, will be authorized.

4. Rule 52.7-D (G.O. 95, Page 90) - Separation from Metal Pins and Dead-end Hardware

Applicant quotes a portion of this rule requiring clearances of not less than 1½ inches between metal pins and dead-end hardware on the one hand and other equipment hardware on the other, and alleges that strict construction of this provision would necessitate the discontinuance of the use of certain apparatus which has long been accepted as standard equipment on overhead lines. As examples of the equipment which would be prohibited, applicant cites pole top, gang operated, disconnect switches in which dead-end insulators are intimately associated with and mechanically attached to the switch base, and which constitute the physical part of the switch mechanism. Applicant seeks relief from this alleged unduly burdensome restriction where the insulator hardware and equipment hardware are associated with the same circuits and are interconnected with a positive electrical contact. The request appears reasonable and will be granted.

5. Rule 53.4-A3 (G.O. 95, Page 92) - Bonding - Conductors of more than One Circuit at the Same Lead

Applicant alleges that item 5 of the original Application No. 25309 and Decision No. 36344 (44 C.R.C. 684, 687), provides for a deviation from Rule 53.4-A2 and that Rule 53.4-A3 is substantially identical with Rule 53.4-A2. Applicant now requests that the same deviation be made applicable to Rule 53.4-A3. The proposed deviation seems reasonable and the order will provide therefor.

6. Rule 53.4-A3a (G.O. 95, Page 93) - Bonding of Conductors of more than One Circuit at the Same Level

Applicant states that in its original Application 25309, under item 4, it applied for a deviation from the second sentence of the above rule, which request was denied in Decision No. 36344 (44 C.R.C. 684,687), and alleges that

in denying the requested deviation the Commission misconstrued the request,[1] The specific provision involved is the second sentence of the above rule, which is 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 is connected to the de-energized and grounded conductors on the pole where work is done."

Applicant alleges that in the case of work on parallel circuits where both circuits are de-energized and grounded, a strict construction of the rule would still require the interconnection of the bond wires with the de-energized and grounded conductors. Applicant believes that under these circumstances the interconnection of the bond wires with the grounded conductors is unnecessary and unduly restrictive and seeks permission to be relieved of the necessity of making such interconnection. It is the Commission's opinion that under the circumstances recited above the interconnection of the bond wires to the de-energized and grounded conductors adds nothing to the safety of the operation, provided it is established that no potential difference exists between the de-energized and grounded conductors of the line being worked on and the bond wires associated with that same circuit. The request appears reasonable and the order will provide for a deviation from this rule with certain restrictions.

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(1) In connection with such request, the Commission's 1943 decision stated as follows:

> "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."

The order in that decision provided in part as follows:

> "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-energized and grounded conductors on the pole where such work is done.'"

7. Rule 54.4-D7 (G.O. 95, Page 102) - Conductors - Radial Clearance from Center of Pole

Applicant asserts that the requirements of this rule are objectionable and burdensome in requiring the modification of basic radial clearances between the center line of the pole and the conductors of different voltages in certain cases of dead-end construction. The objections raised are:

1. The clearances for dead-end construction exceed the clearances for the same line when not dead ended.
2. Construction in conformity with the General Order will considerably increase the investment.
3. The required construction is more hazardous, particularly with respect to the use of "live line" tools.
4. The required construction will, because of the mechanical arrangement, impair the separation between lines so equipped and lines at a lower level.
5. The use of the alternative construction would necessitate the use of arm guys which likewise would result in increased cost and hazards.

The inclusion of this rule in General Order No. 95 was an attempt to minimize certain hazards which were present in construction permitted by an earlier General Order. The method applied to eliminate these hazards, however, was not exclusive. It is believed that alternative methods of construction can achieve the same result and at the same time be less restrictive than the present requirements. The request for relief from the provisions of this rule appears justified to a limited extent and the order will authorize a deviation therefrom.

8. Rule 54.7-A (G.O. 95, Page 112) - Climbing Space

This rule provides in effect that climbing space through a conductor level must be maintained both 4 feet above and 4 feet below the level and that under certain conditions climbing space need only be provided up to the level of conductors at the top of a pole. Applicant alleges that in those instances where related buckarms are subsequently installed, the requirement that the

climbing space be maintained 4 feet above the level of the buckarm and the requirement that the climbing space need not extend through the level of the top conductors, are either inconsistent or would necessitate increasing the separation between the line conductors and the conductors on the related buckarm. It is the Commission's opinion that the conductor level includes both the line conductors and the conductors supported on the related buckarm. Therefore, if the climbing space is maintained up to the horizon of the top conductors, the subsequent installation of a related buckarm would not necessitate provision for climbing space through and above the top horizon of the conductor level. Applicant further seeks permission to deviate from this rule for all conductors of 6500 volts or more, and thereby seeks to have included in this proposed deviation these nominal 6600 volt circuits which are the subject of item 1 herein. Under the circumstances outlined above, there would seem to be no need for a deviation to cover this particular provision and under the deviation authorized by item 1 of the order herein, 6600 volt circuits of Pacific will qualify for the application of the rule as here construed.

9. Rule 52.7-D (G.O. 95, Page 90); Rule 54.4-D7, (Page 102); Rule 54.7-A4,(Page 116) - Climbing Space for Single Circuit, more than 6500 Volts at Top of the Pole

Applicant refers to the above rules as they affect a single circuit at the top of a pole whose nominal voltage is such that the circuit is only worked on when de-energized and grounded, or with "live line" tools, and asserts that the requirements, if met, occasion increased cost but contribute nothing to operating safety. This assertion is based on the conclusion that with an installation of this type, there is no necessity for the workman to climb to or through, or work at the level of such a pole top circuit while the circuit is energized. The order herein will provide for limited relief from the requirements of these rules.

10. Rule 54.7-A4 (G.O. 95, Page 116) - Obstructions in Climbing Space for Circuits of Any Voltage Located Below a Circuit at the Top of the Pole

Provisions of this rule do not recognize hardware attached to dead-end insulators as an allowable climbing space obstruction. Applicant alleges that this prohibition constitutes a restriction upon the common practice of attaching dead-end insulators to space bolts in double arm construction where any part of the space bolt extends into the climbing space. Permission is sought to deviate from this rule by recognizing such space bolts as permissible climbing space obstructions so long as the bolt is placed in the outer 1/3 of the long dimension of the climbing space. The use of this type of construction appears warranted from the standpoint of reasonable practice, and the order herein will permit the use of such hardware in the climbing space as long as it is suitably protected so that human contact with the equipment inside the boundaries of the climbing space is unlikely.

11. Rule 54.8-B4b (G.O. 95, Page 120) - Clearances from Openings in Residential Buildings

Applicant alleges that the 3 foot clearance specified in a portion of this rule does not clearly apply to conductors (service drops) attached to a building, and further alleges that it has endeavored to apply the 3 foot clearance to all service drops, but finds that such application in some cases is economically impossible, and asks permission to reduce the clearance to a vertical distance of 1 foot above the plane of any opening where the service drops are attached to the building above the opening. The Commission approves of applicant's position in endeavoring to exclude all conductors from that space enclosed by a surface, all points of which are a distance of 3 feet from any building opening, and is further cognizant of the difficulties which such might entail when attempts are made to apply it without exception to certain types of residential construction. The requested deviation appears not unreasonable and the order herein will provide for mitigation of this difficulty.

12. Rule 58.5-D (G.O.95, Page 156); Rule 54.7-A4 - Clearance of Switches from Center Line of Pole

Applicant cites portions of the above rules and infers therefrom that the rules prohibit the use of certain equipment heretofore adopted as standard apparatus in the construction of applicant's overhead lines. As specific examples it cites the installation of gang operated air-disconnect and fuse assemblies which, when installed in accordance with accepted past practice, violate these rules when strictly construed. The Commission recognizes the difficulties outlined by applicant, and is of the opinion that no useful purpose would be served by denying applicant the right to use the equipment mentioned. The requested deviation appears reasonable and the order herein will provide relief.

13. Rule 103.1A (G.O. 95, Page 244); Rule 113.1A (Page 249) - Conductor Splices

Applicant requests that splices made in accordance with specifications shown on their Drawing No. 022487 (Exhibit N of this third supplemental application) be found by the Commission to be an accepted standard method of splicing as contemplated in the above rules, in which event they would then be permissible for use in overhead spans crossing railroads and major communication lines.(2) In support of the request applicant submits a tabulation (Exhibit M of this third supplemental application) of the results of certain tensile strength tests heretofore performed in the presence of members of the Commission's staff.

Splicing methods which applicant seeks to have declared as standard methods are of two kinds; the "Nicopress" method is of the compression type wherein the two ends of the conductor to be joined are inserted in a splicing tube with coincident axes and the tube is deformed by compression with the use of suitable tools, proper performance being supervised with the use of gauges.

The twisted sleeve splices consist of the manual twisting of a suitable tube into

(2) The second paragraph of each of the rules mentioned reads as follows:

"The provisions of this rule shall not apply to conductor splices which are made by any accepted standard method which has been proved by test before the Railroad Commission to develop practically the full strength of the conductor in which the splice is made."

which the ends of the conductors to be joined are inserted and overlapped and the axes of which are not coincident. Efficiency of the splice in this latter case is more dependent upon human manipulation and no mechanical means are available to assure definitely if the resulting splice conforms to the required specifications. The applicant proposes to use the Nicopress splice on copper conductors ranging in size from No. 8 to No. 2 copper, and for comparable sizes of wire of other materials. It likewise proposes to use the twisted sleeve splice on stranded copper conductors in sizes from No. 4 to No. 0000. It is the Commission's opinion that the use of the Nicopress splice as an accepted standard method of splicing is justified, provided that the splices are made to meet the proposed specifications and certain safeguards are established to insure that the specifications are actually equalled in practice. In spite of the test results obtained with twisted sleeve splices, the Commission is of the opinion that because of the great dependability of the efficiency of the splice on performance of the maker of the splice, and because of the structural details of the splice itself, the showing, so far, is insufficient to permit the Commission to accept the twisted sleeve method as an approved standard method for use in crossing spans over railroads or major communication lines. Further demonstrations of the reliability of the splice under adverse conditions of manual performance, vibration and corrosive atmospheres would seem to be desirable. Permission to use the twisted sleeve splice as an approved standard method will be denied without prejudice.

The Commission is in sympathy with changes, either by deviation or modification, in the overhead electric line standards when such can be accomplished to the advantage of the industry and its customers provided that hazards to the workmen and to the general public are not increased. Every effort should be made to build and maintain overhead electric lines at minimum costs consistent with the high service standards required in this state.

It is found that those certain deviations from General Order No. 95 hereinafter authorized are reasonable under the conditions specified. The Commission desires, however, to emphasize the close relationship between the minimum standards of performance as provided in General Order No. 95 and Pacific's own rules governing its workmen on overhead electric lines. It is clear that certain relaxations in the General Order are being permitted on the basis that certain standards of working performance will be realized. Accordingly, it is strictly the obligation of the utility to see that such working performances are maintained and carried out.

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 HEREBY ORDERED that the 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.

1. Pacific's 6600 Volt (Nominal) Circuits

Those 6600 volt circuits which are designed, constructed, operated, and maintained as if they were in fact circuits of 7500 volts or more, may be classified as circuits of more than 7500 volts, and all provisions of General Order No. 95 and all deviations heretofore and concurrently authorized, and pertaining to lines of 7500 volts or more, shall apply to and govern the design, construction, operation, and maintenance of Pacific's 6600 volt (nominal) circuits, provided that such circuits shall in fact be operated and maintained as circuits of more than 7500 volts, and that in no event shall any work be performed on such circuits unless the circuits are de-energized and grounded, or, is energized, with approved "live line" tools.

2. Rule 38 (G.O. 95, Page 39) - Minimum Clearances of Wires from Other Wires.

In cases where it is impractical to maintain the required clearances of 3 inches between 0-750 volt lead wires to transformers, porcelain insulators having a dry flash-over value of 5,000 volts or more, may be used to separate said lead wires in lieu of maintaining said 3 inch clearances.

3. Rule 38 (G.O. 95, Page 39); Rule 56,4-C4, (Page 132); Rule 86,4-C4,(Page 219); - Clearances Between Guys and Communication Cables

Clearances between anchor guys and communication conductors other than open wire conductors may be less than 3 inches, provided that mechanical separation is maintained with a suitable nonconducting separator installed on the guy or the communication conductor which has an insulation value equal to the insulation of the highest voltage line attached to the guyed structure, that the relative point of crossing is positively maintained, and that all other pertinent requirements of the General Order with respect to guys are complied with.

4. Rule 52,7-D (G.O. 95, Page 90) - Separation from Metal Pins and Dead-end Hardware.

Bolts and hardware of line equipment and bolts and hardware of insulators, all of which are associated with the same circuit, and on the same crossarm, may be metallically interconnected provided a positive electrical contact is made.

5. Rule 53,4-A3 (G.O. 95, Page 92) - Bonding - Conductors of more than One Circuit at the Same Level

Bond wires that extend from the underside of one arm to the companion arm of a double arm shall be exempt from the required protective covering specified by this rule provided such wires are substantially perpendicular to the arms, extend directly between the arms, and are not less than 30 inches from the center of the pole,

6. Rule 53.4-A3a (G.O. 95, Page 93) - Bonding of Conductors of more than One Circuit at the Same Level

Rule 53.4-A3a may be applied as though the following sentence was a part of such rule:

"In the event both circuits are de-energized, shorted and securely grounded, the bond wires of either circuit need not be connected to the de-energized and grounded conductors, provided that before work is done the bond wires are tested for and drained of any potential difference between themselves and the de-energized and grounded conductors."

7. Rule 54.4-D7 (G.O. 95, Page 102) - Conductors - Radial Clearance from Center of Pole

Rule 54.4-D7a may be applied as though it contained the following additional provision:

"The clearance of 20 inches or 30 inches referred to above may be reduced to 15 inches in the event the crossarm concerned is supporting only one circuit and that circuit is in the top position on the pole, and further, that no part of any conductor of the circuit concerned is closer than 15 inches to any of the boundaries of the climbing space. The exceptions to clearances shown on Table 2 shall not be applicable to poles on which the foregoing construction is used."

Rule 54.4-D7b may be applied as though it contained the following additional provision:

"The clearance of 24 inches and 36 inches referred to above may be reduced to 18 inches in the event the crossarm concerned is supporting only one circuit, and that no part of any conductor of the circuit concerned is closer than 18 inches to any of the boundaries of the climbing space. Transformers and cutouts may be connected to such circuit when that circuit is in the top position on the pole. The exceptions to clearances shown on Table 2 shall not be applicable to poles on which the foregoing construction is used."

9. Rule 52.7-D (G.O. 95, Page 90); Rule 54.4-D7, (Page 102); Rule 54.7-A4, (Page 116) - Climbing Space for Single Circuit, more than 6500 Volts at Top of the Pole

Rule 52.7-D need not be applied to through bolts and dead-end hardware of a single circuit of more than 7500 volts constructed at the top of a pole in any configuration. A related buckarm and equipment installed thereon may be considered elements of said circuits, provided that all other applicable clearance rules of the General Order are complied with, that through bolts and dead-end hardware are metallically interconnected so that a positive electrical contact is established, and that any portion of such through bolts on the related buckarm which are in the climbing space shall be covered with a suitable non-conducting shield or cover, having an insulation value equal to the insulation value of insulators on the associated circuit. No part of any guy may be nearer than 1½ inches to any through bolt which is metallically interconnected to dead-end hardware.

Rule 54.4-D7 shall be applied in conformity with the deviation and interpretation heretofore granted under subdivision 7 of this Third Supplemental Application.

Rule 54.7-A4 shall be applied in accordance with the deviation and interpretation discussed in this section under Rule 52.7-D.

10. Rule 54.7-A4 (G.O. 95, Page 116) - Obstructions in Climbing Space for Circuits of Any Voltage Located Below a Circuit at the Top of the Pole

Space bolts used for the attachment of dead-end hardware to crossarms supporting circuits of any voltage located below a circuit at the top of the pole may project into the climbing space, provided they are protected with a suitable nonconducting shield or cover having an insulating value equal to the insulating value of the insulators on the associated circuit, and provided further that the area of the climbing space on any horizontal plane is not reduced by more than 10 per cent by reason of the installation of such insulating covers.

11. Rule 54.8-B4b (G.O. 95, Page 120) - Clearance from Openings in Residential Buildings

Applicant may deviate from the requirements of Rule 54.8-B4b to the following extent:

Service drops shall be so installed that they clear all points on the surfaces which form the boundary lines of exits, windows, doors, and other openings at which human contact might be expected by 3 feet radially, except that in the case of service drops located above the horizontal plane through the top extremity of such opening, the maximum practical radial clearance must be maintained, but in no event shall it be less than 1 foot.

12. Rule 58.5-D (G.O. 95, Page 156); Rule 54.7-A4 - Clearance of Switches from Center Line of Pole

Rule 58.5-D may be applied as though it read as follows:

"Switches and cutouts shall be so located that when in either open or closed position all energized parts thereof are not less than 15 or 18 inches from the center line of pole as required by Table 1, Case 8, and no part of such equipment shall be in the climbing space. Such apparatus is permitted to be wholly or in part within the working space. Nonfusible pole top switches connected to lines installed as provided in Rule 54.4-D8b are not subject to the above clearance limitation provided the switches are installed substantially in the same vertical plane as the conductors to which they are attached.".

13. Rule 103.1A (G.O. 95, Page 244); Rule 113.1A, (Page 249) - Conductor Splices

"Nicopress" splices made in conformity with Pacific's Drawing No. 022487, dated August 15, 1944, are hereby declared an approved method of splicing as contemplated in Rules 103.1A and 113.1A. In using the splice under the provisions of Rules 103.1A and 113.1A, Pacific shall devise a method of control to be used in the application of this construction which will provide assurance that the specifications called for are complied with, that responsibility for proper installation is fixed and that the individual performance of any such splice may be readily determined. When Pacific shall have determined

such procedures the Commission shall be fully advised of the details thereof.

In all other respects Application No. 25309, Third Supplemental Application, is hereby denied.

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

Dated at San Francisco, California, this 27th day of February 1945.

L. Harold Anderson

Justin F. McCarthy

Richard Mitchell

Ira H. Powell

Commissioners.