

Decision No. 83420

ORIGINAL

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

In the Matter of the Application of PACIFIC
GAS AND ELECTRIC COMPANY for an Order
Modifying General Order No. 95 by Amending
Rules 49.4-C(4); 58.3-C(3); 59.4-A(1);
59.4-A(2); 38, Table 2, Cases 4, 5 and 6,
Column "G" and Case 7, Columns D, E, F and G;
38, Table 2, Case 9, Column "G" and the Guide
for Installation of Temporary Decorations.

} Application No. 54714
} (Filed March 6, 1974;
} amended June 28, 1974)

O P I N I O N

Pacific Gas and Electric Company (PG&E) seeks an order of the Commission modifying G.O. 95 by amending Rules 58.3-C(3); 59.4-A(1); 59.4-A(2); 38, Table 2, Cases 4, 5, and 6, Column "G" and Case 7, Columns D, E, F and G; 38, Table 2, Case 9, Column "D"; The Guide for Installation of Temporary Decorations and, by amendment to the application, requests a deviation from Rule 49.4-C(4) under certain specified conditions.

During the past six years, PG&E has been in the process of raising the nominal operating voltage of many of its existing distribution lines to 20.8 kv. This conversion has been necessitated by the constant increase in suburban load densities and the related problem of supplying these loads at the former lower voltages.

RULE 49.4-C(4)

This rule requires that conductors of voltages exceeding 17 kv crossing conductors of less than 17 kv or crossing a public highway shall have a strength at least equal to No. 4 AWG stranded medium-hard drawn copper. Many of the high voltage conductors involved in the conversions to 20.8 kv are No. 6 AWG solid medium-hard drawn copper. The present necessity of replacing the existing No. 6 AWG copper when the line in question crosses a public highway or other conductor of lesser voltage results in significant cost with little corresponding benefit. Rule No. 44 requires that lines and

elements of lines provide minimum safety factors as specified in Table 4. Under these limitations, a conductor equal in strength to No. 6 AWG can be utilized for all applications without any limitations in regard to voltage including crossing major communication lines and major railways. The only exception is when conductors over 17,000 volts cross over public highways and/or conductors of a lower voltage, in which case No. 4 AWG is required.

PG&E estimates that it would presently cost approximately \$500 to \$550 to convert each crossing to No. 4 AWG stranded copper, when a distribution voltage has been converted to 20.8 kv. At this rate, the total cost of conversion of PG&E's existing system over the life of the conversion program would be in excess of \$1,000,000. In addition, certain amounts of street traffic and electric service interruption would be necessitated by the replacement work.

In order to avoid additional expense and inconvenience to the general public, PG&E requests to be allowed to deviate from the provisions of Rule 49.4-C(4) when converting existing distribution lines to 20.8 kv. Such deviation would result in significant savings to PG&E's customers and will not weaken the general order since the existing rule will still apply to new construction and all other cases except conversion from 12 to 20.8 kv.

This deviation would apply only to PG&E. Other utilities in similar circumstances may wish to request deviation likewise.

RULE 58.3-C(3)

PG&E seeks a revision of this rule to allow use of a metal bracket to support three transformers without the use of crossarms. The present rule requires that no transformer case shall be in contact with a metal crossarm or a metal beam attached to a wood pole or a wood structure.

There is a danger that a transformer case might become energized through insulation failure or other cause. A metal crossarm which became energized through contact with an energized transformer case might constitute a greater hazard than the transformer alone.

In a letter dated October 30, 1967, the staff indicated that three transformers would not be permitted on a single metal bracket unless the transformers were insulated from the bracket by means of a nonmetallic insulating spacer providing a minimum of $1\frac{1}{2}$ " creepage distance. The assumption was that if a transformer case were to accidentally become energized the insulators would prevent the bracket from also becoming energized.

In tests conducted in 1968 PG&E found that the spacers insulating the transformer from the bracket had a tendency to deteriorate. Due to this deterioration, dirt and carbon tracking, the effectiveness of isolation insulators on transformers was found not to be dependable. PG&E feels, and the staff agrees, that it is safer to fasten the transformer solidly to the bracket and to approach the bracket and transformers with as much caution as would be utilized when approaching the normal pole-mounted single transformer.

The bracket that PG&E proposes to use supports the two outer transformers well away from the pole. They are actually further away from the climbing and working space than when mounted on crossarms. PG&E states that use of the proposed bracket would improve the appearance of their overhead lines and would be more compatible with their new construction which uses horizontal and vertical post insulators and brackets. The proposed bracket is similar to a two-transformer bracket which has been used by PG&E for many years. PG&E states that there have been no accidents attributed to the two-transformer type of bracket.

RULE 59.4-A(1)

This rule presently requires that a grounding conductor equal in strength to No. 1 AWG be run from the grounding electrode to the base of the pole. The conductor running up the pole must be splice-free and equal in strength to No. 4 AWG copper. PG&E is requesting that splices with an approved type of compression connector be allowed and that the strength requirements for the conductor from

the grounding electrode to the base of the pole be reduced to No. 4 AWG.

The present rule requires that the conductor from the grounding electrode to the pole be buried a minimum of 12 inches below the ground. PG&E states that this provides sufficient protection against damage for a conductor of size No. 4 AWG and that there is no longer any reason why the size and strength specifications for the grounding conductor extending from the ground electrode to the base of the pole should differ from those for the grounding conductor on the pole. One splice is already required at the base of the pole between the No. 1 AWG conductor and the No. 4 AWG conductor. When properly installed, the strength of a modern compression type connector is equal to or greater than that of the conductor with which it is used. PG&E states that very often when reconstructing, rearranging, or repairing facilities, full length grounding conductors must be replaced because they are just inches short and the rule will not allow a second splice.

Permitting the same size conductor to be used from the grounding electrode to the common neutral line conductor will, in many cases, permit the grounding conductor to be run splice-free saving the labor and expense of a splice at the base of the pole. Permitting more than one splice in a conductor will save the labor and expense involved in replacing the entire grounding conductor when making repairs or rearrangements. The safety and electrical effectiveness of grounding installations will not be adversely effected by the proposed changes.

RULE 59.4-A(2)

The rule presently requires that all ground rods used on common neutral circuits be placed at least two feet from the base of the pole so that they will be in undisturbed earth. PG&E proposes to limit this requirement to branch circuits extending from the common neutral grid without a loop return.

The importance of low resistance grounds on the common neutral grid where there are two or more metallic return paths is less than on branch circuits where there is no loop return. On branch circuits a broken or high resistance ground could allow the buildup of dangerous voltage levels on the neutral conductor. This is far less likely where there are at least two metallic return paths as required for the common neutral grid.

The proposed change would allow use of existing ground electrodes when converting to the 20.8 kv common-neutral distribution system. PG&E states that the cost of replacing an existing ground rod is approximately \$35 where pavement does not need to be broken or three-times that where concrete must be broken. PG&E states it has encountered considerable customer resistance to the necessary pavement breaking and excavation involved in replacing existing ground electrodes.

Allowing use of ground rods placed less than two feet from the base of the pole on common neutral grid systems will not materially affect the safety of workmen or the general public and will result in significant savings on conversion costs.

RULE 38, TABLE 2

PG&E proposes to reduce the clearances between conductors below 22.5 kv and not supported on the same poles from 96 inches to 72 inches. These clearances appear in Table 2, Cases 4, 5, and 6 for Column "G" and Case 7, Columns "D, E, F and G".

Twelve kv distribution conductors are required to have a radial clearance of 72 inches from trolley contact conductors and communication conductors and 48 inches from supply conductors, service drops and trolley feeders. Supply conductors operating between 20 kv and 35 kv must have a 96-inch clearance in the same cases. Converting existing distribution lines from 12 kv to 20.8 kv frequently requires increasing clearances by 2 feet resulting in considerable expense and numerous pole replacements. PG&E proposes to allow a 72-inch clearance for conductors operating between 20 kv and 22.5 kv.

Present 12 kv distribution lines are required to have a vertical clearance of 48 inches from supply conductors and service drops operating between 0 and 750 volts as shown in Table 2, Case 9, Column G. Again, increasing the voltage to above 20 kv requires increasing the clearance by 24 inches. Considerable additional costs are incurred and pole replacement is frequently required. PG&E proposes to apply the 48-inch clearance to conductors operating between 20 kv and 22.5 kv.

PG&E states that safety would not be sacrificed by the reduction in clearance because the same live-line tools, protective equipment, operating procedures and rigging devices are used for construction, operation and maintenance of overhead lines carrying voltages of 750 volts to 75 kv.

PG&E states that in Application 47540 the Commission declined to reduce any clearances in Table 2 because of the necessity for keeping certain clearances for 20.8 kv conductors greater than those for 12 kv conductors; however, vertical clearance between 20.8 kv conductors and 0-750 volt conductors was not an issue.

Reducing the clearances for conductors below 22.5 kv as proposed will not materially jeopardize safety of the general public or workmen and will result in considerable savings during conversion.

GUIDE FOR INSTALLATION OF TEMPORARY DECORATIONS

PG&E proposes to revise the current "guide" to allow energized decorations, on non-climbable poles to be less than 15 inches from the center line of the pole.

The Guide for Installation of Temporary Decorations is an informal interpretive document prepared and revised from time to time by the staff. No formal action is required by the Commission in its revision.

Decisions Nos. 70489 and 71094 issued in 1966 revised General Order No. 95 to permit PG&E to utilize the 12/20.8 kv four wire common neutral distribution system. The present application follows

6 years of experience with this system. The purpose of most of the proposed revisions is to effect economies in conversion without affecting safety of workmen or the general public.

PG&E submitted its proposals to: Southern California Edison Company, San Diego Gas & Electric Company, Pacific Power and Light Company, Los Angeles Department of Water and Power, Sierra Pacific Power Company, Sacramento Municipal Utility District and the International Brotherhood of Electrical Workers, AFL-CIO. No objections to the proposed modifications were received.

Since it appears that the proposed revisions will not affect the safety of workmen or the general public and significant economies can be obtained thereby and since the proposals were reviewed by other electric utilities and representatives of the workmen involved and no objections were raised, the Commission finds that the application should be granted and that a public hearing is not necessary.

O R D E R

IT IS ORDERED that:

1. The Commission's General Order No. 95 "Rules For Overhead Electric Line Construction" is hereby amended to read as set forth in the appendix attached to this order.
2. Pacific Gas and Electric Company is hereby authorized to deviate from the provisions of Rule No. 49.4-C(4) of General Order No. 95 to the extent that existing conductors may be used in crossing conductors of less than 17 kv, or crossing a public highway when 12 kv distribution circuits are being converted to operate at 20.8 kv.

3. The Secretary shall cause a copy of this order and its appendix to be served upon each electric and telephone utility operating within California and the State Division of Industrial Safety.

The effective date of this order is the date hereof.

Dated at San Francisco California, this 11th
day of SEPTEMBER, 1974.

Gregory A. Steiner
President
William Symons, Jr.
Thomas Moran

Commissioners

Commissioner William Symons, Jr., being necessarily absent, did not participate in the disposition of this proceeding.

Commissioner Thomas Moran, being necessarily absent, did not participate in the disposition of this proceeding.

APPENDIX
Page 1 of 2

The Commission's General Order No. 95, "Rules For Overhead Electric Line Construction," is amended to read as follows:

RULE 58.3-C3 (Last sentence, second paragraph)

No transformer case shall be in contact with a metal support (crossarm, metal beam, metal bracket) attached to a wood pole or wood structure, excepting when no portion of a transformer case or its metal support extends beyond a vertical plane through the center line of pole.

RULE 59.4 Grounding

A. MATERIAL AND SIZE

- (1) Grounding conductors: The grounding conductor from each ground electrode to the base of pole shall be not less than 1 foot below the surface of the ground and shall have not less conductivity and mechanical strength than the grounding conductor from the base of the pole to the common neutral line conductor. The grounding conductor to the common neutral line conductor shall be continuous, unless suitable electrical compression connections are used and shall be not less than No. 4 AWG copper.

RULE 59.4-A2 (First sentence, second paragraph)

On branch circuits extending from the grid, where return metallic paths are not available, the driven ground rod, pipe or equivalent shall be located not less than 24 inches from the surface of the pole.

APPENDIX
Page 2 of 2

RULE 38, TABLE 2

Add a footnote *(nn) in reference to Case 9, Column "G" which would permit a reduced vertical separation between supply conductors and service drops of 0-750 volts for 20,000-22,500-volt supply conductors. ✓

*(nn) The vertical separation between supply conductors and service drops of 0-750 volts and 20,000-22,500-volt conductors may be reduced to 48 inches.

Add a footnote *(00) in reference to Cases 4, 5, and 6, Column "G", and Case 7, Columns D, E, F, and G.

*(00) May be reduced to 72 inches for conductors of 20,000-22,500 volts.