

Decision No. 12358

BEFORE THE RAILROAD COMMISSION OF THE STATE OF CALIFORNIA

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Postal Telegraph-Cable Company,
a corporation,

Complainant,

vs.

Pacific Gas & Electric Company,
a corporation,

Defendant.

ORIGINAL

Case No. 1362.

Willard P. Smith and
Walton C. Webb, for Complainant,
C. P. Catten, for Defendant.

MARTIN, COMMISSIONER:

O P I N I O N

This is a proceeding in which Postal Telegraph-Cable Company, complainant, hereinafter referred to as Postal Company, makes formal complaint against Pacific Gas and Electric Company, defendant, hereinafter referred to as Pacific Company alleging that by reason of the proximity of the power lines of Pacific Company to the communication lines of the complainant, and to the condition of defendant's lines that the communication circuits are so affected, due to electric induction, that the transmission of telegraphic messages is interfered with, the speed in sending messages greatly reduced, and equipment and apparatus destroyed.

Complainant further alleges that by reason of defective condition of defendant's line that it is compelled to spend large sums to equip and maintain its telegraph lines with

devices to prevent, as far as possible transient: and permanent electrical induction and damage therefrom to its lines and equipment.

Complainant requests this Commission for an order requiring defendant to repair, reconstruct and equip its power lines so as to prevent surges thereon and on the portion of its lines between the cities of Sacramento and Suisun, and induction therefrom to the line of complainant between the cities of Sacramento and Suisun or require the defendant to remove its line between said cities a sufficient distance from complainant's line to prevent induction thereto; to give such other further and different relief as may appear just in the premises and to repay to it the cost, disbursements, and expenses of this application unnecessarily incurred by complainant.

In the following Opinion and Order certain technical terms are employed in the senses as set forth in the definitions in this Commission's General Order No. 52.

The parallel under consideration in this case involves the 60 Kilovolt power circuits of Pacific Gas & Electric Company and certain telephone and telegraph communication circuits of Postal Telegraph-Cable Company located between the cities of Sacramento and Suisun for a distance of approximately forty miles. Both the power and communication circuits follow for practically the entire distance within the parallel along the right of way of Southern Pacific Company. Between the cities of Sacramento and Davis, a distance of approximately thirteen miles, the power line of Pacific Company consists of a single three phase, 60 KV power transmission line commonly known as Bay Line No. 3. Between the cities of Davis and Suisun, a distance of approximately twenty-seven miles, the power line consists of a twin three phase, 60 KV power transmission line located on separate pole lines paralleling each other and with a horizontal separation of approximately thirty-~~two~~ feet between center lines. These sections of transmission

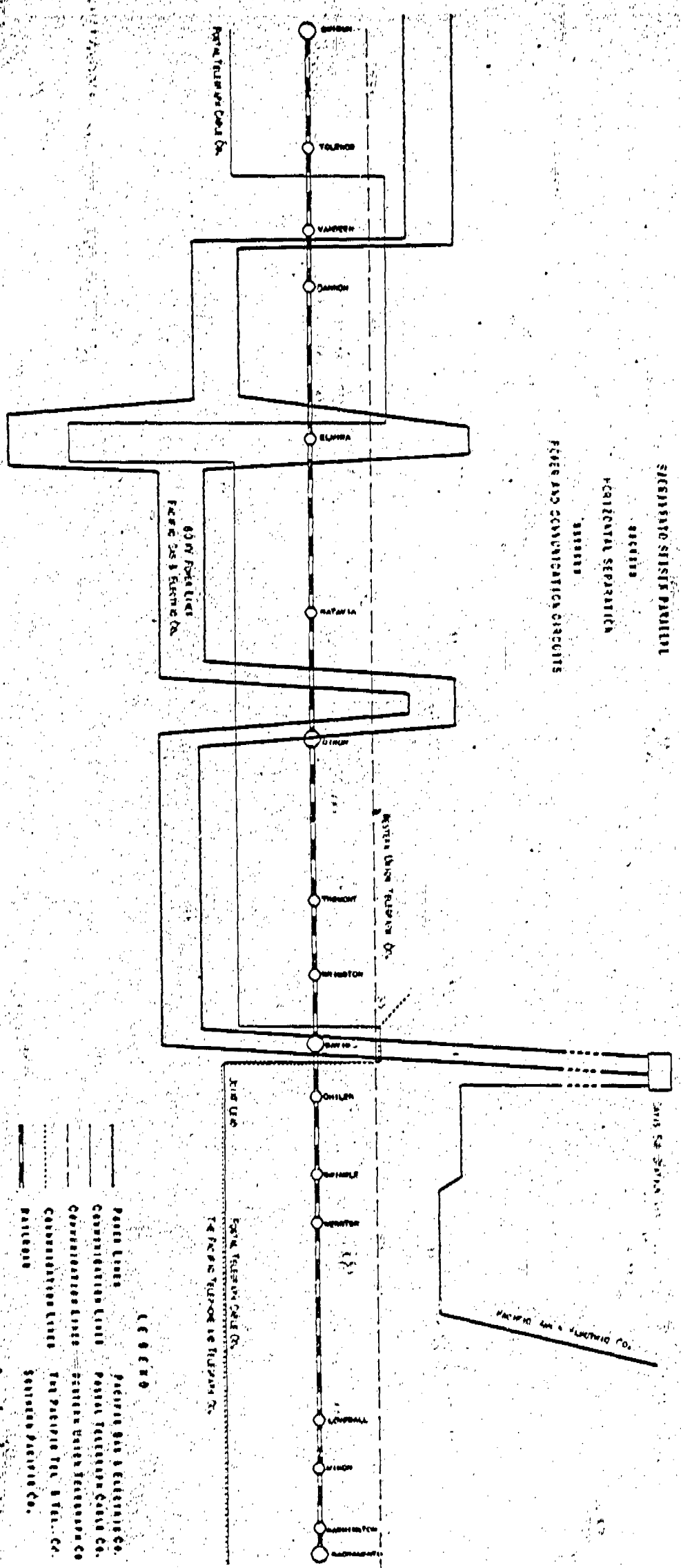
lines are commonly known as Bay Lines Nos. 1 and 2.

Bay Lines Nos. 1 and 2 each consists of three #00 bare copper wire. The configuration of each circuit is an equilateral triangle with conductors spaced six feet apart. The average height of the two lower conductors are thirty feet above ground, measured at the poles. Bay Line No. 3 consists of three #1 bare copper wire. The configuration is an equilateral triangle with conductor spacing six feet apart. The average height of the two lower conductors above ground is forty feet, measured at the poles. The top wire of the configuration of each circuit is fastened to an insulator located on a pipe extending approximately forty-six inches above the top of the wooden pole.

The Postal Company's communication circuits involved in this parallel consists of nine wires extending between the cities of Suisun and Davis and seven between the cities of Sacramento and Davis. Two of these wires are composited to form a telephone circuit. All of the telegraph circuits involved in this parallel extend from San Francisco, seven going east via Salt Lake and Denver and two going north via Ashland to Portland, Seattle and points east. Between the cities of Davis and Sacramento the communication circuits of Postal Telegraph-Cable Company are jointly constructed with certain communication circuits of The Pacific Telephone and Telegraph Company on the same pole line. In addition to the communication circuits of the Postal Company, The Pacific Telephone and Telegraph Company, and the Western Union Telegraph Company have certain communication circuits and Southern Pacific Company certain signal circuits located within this parallel herein under consideration. Although these other utilities are not parties to this proceeding, yet their circuits must be given consideration by this Commission in deciding this case.

Drawing No. 1 shows diagrammatically the relative location of the transmission lines of the Pacific Company and communication lines of complainant, The Pacific Telephone and Telegraph

CALIFORNIA RAILROAD COMMISSION
SACRAMENTO SYSTEM PARALLEL
RIGHTS
AGRICULTURAL SEPARATION
RIGHTS
FREE AND COMMUNICATION RIGHTS



- LEGEND
- | | | |
|-----------|---------------------|---|
| ————— | Power Lines | Pacific Gas & Electric Co. |
| - - - - - | Communication Lines | Pacific Telephone Co. |
| | Government Lines | United States Government |
| ————— | Railroads | Union Pacific R.R. & T. Co.
Southern Pacific Co. |

Company and Western Union Telegraph Company. As a matter of convenience, the center line of the railroad tracks of Southern Pacific Company has been used as a base line in this proceeding when referring to the location of power and communication circuits.

It will be noted by referring to Drawing No. 1 that the power lines between Sacramento and Davis are located to the north of the railroad right of way. At Davis this line joins the twin line which extends to Suisun and beyond. Between Davis and Suisun, however, these two circuits cross the Southern Pacific right of way and also the communication circuits of the various utilities involved at five different points. These transmission lines involved in this parallel form a part of an extensive high voltage transmission system of the Pacific Company for transmitting electric energy from its various power plants located in the Sierra Nevada Mountains to the Sacramento Valley and San Francisco Bay region.

Evidence in this proceeding shows that Bay Line No. 3 between Sacramento and Davis was constructed by California Gas and Electric Corporation in about the year 1904, and since that time has been constantly in operation. Bay Lines Nos. 1 and 2, between Suisun and Davis, were constructed by Bay Counties Power Company in the year 1900 and since that time have been constantly in operation. The evidence also shows that communication circuits of Postal Company were constructed in the present location in the year 1866. Complainant in this proceeding acquired these lines on about June 23, 1908, and since which time it has constantly operated these lines. Table No. 1 shows the relative horizontal separation between the transmission and the communication and signal lines of other utilities involved in this parallel.

Inductive troubles reported by Postal Company as occurring on its communication circuits involved in this parallel resulting from operation on the power system of Pacific Company were first

TABLE NO. 1

HORIZONTAL SEPARATION BETWEEN POWER AND COMMUNICATION LINES.

Location	Power Circuit	Length of Parallel Miles	Horizontal Separation in Feet Between Power line and Lines of		
			Postal Company	Pac. Tel. & Tel. Company	Western Union Telegraph Co.
Sacramento - A	Single	6 $\frac{1}{2}$	---	---	---
A - Swingle	Single	3 $\frac{1}{2}$	140	140	40
Swingle - Davis	Single	3 $\frac{3}{4}$	155	155	55
Davis - Dixon	Twin	8	24	---	115
Dixon	Twin	2	115	---	25
Dixon - Elmira	Twin	5 $\frac{1}{4}$	22	---	110
Elmira	Single	1 $\frac{1}{4}$	---	---	---
Elmira - Vandeen	Twin	4 $\frac{3}{4}$	95	---	85
Vandeen-Suisun	Twin	5 $\frac{1}{4}$	115	---	25
Total		40			

Note: Distances given in above table are approximate distances. Horizontal separations are measured between communication and center line of nearest power line.

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officially brought to the attention of this Commission by the Postal Company in April 1919. Since that time the Railroad Commission has required Postal Company to file reports regarding each particular trouble as it occurred and also Pacific Company to submit information relative to the operations of their system which might in any way cause resulting trouble on the Postal Company's circuits.

Complainant in this proceeding seeks relief by order of this Commission requiring defendant to mitigate the inductive interference in complainant's communication circuits and by the granting of compensation for resulting damage to its equipment caused by inductive interference and by the payment to it of certain sums covering its cost of this proceeding.

Relative to the matter of damages to be allowed the Postal Company as a result of inductive interference due to the paralleling power circuits of Pacific Company this Commission does not exercise jurisdiction to determine damages. Such action must be taken in the court of proper jurisdiction. Complainant's request insofar as it pertains to compensation for damages to equipment or for loss of service will therefore be denied without prejudice. This Commission has not jurisdiction to grant compensation covering the cost of a proceeding and, therefore, complainant's request relative to this item will be denied.

The power circuits between Sacramento and Davis were originally constructed in 1904 and between Davis and Suisun in 1900. To maintain these circuits in a reasonably good operating condition a relative large annual expense is required. During the past year the Pacific Company has reconstructed this entire line. The Commission's Engineers have made an investigation of these power lines of the Pacific Company and the communication circuits of the Postal Company relative to their construction as complying with Chapter 499-600 of the State Statutes and General Order No. 64 of the Commission.

A considerable number of violations of the state laws exist on the power lines. Under the present orders of the Commission these violations must be removed during the present year and it appears advisable that any change in line construction necessary to mitigate inductive interference in the communication circuits should be made at the same time.

The evidence indicates that the inductive trouble experienced by the Postal Company in its communication circuits between the cities of Sacramento and Suisun is largely due to the relatively small horizontal separation between these circuits and the paralleling power circuits of defendant. This induction into the complainant's communication circuits due to the paralleling power lines of defendant may be mitigated by the prevention of the conditions creating the induction, suppression of induction in the communication circuits, discontinuance of the operation of the power circuits, or separation of power and communication circuits.

The prevention of the conditions creating induction involve, to a certain extent, proper switching methods, correct design of transformers and other apparatus, employment of good line construction, selection of the best type of circuit configuration and the employment of co-ordinated system of transpositions. Care in these matters will largely mitigate normal and certain classes of abnormal induction but are not adequate against line failures which cause induction difficult to guard against. A consideration of the evidence indicates that little further can be economically gained by the preventions of the conditions creating induction. It also appears that the Postal Company has used and is using all reasonable means for the suppression of induction.

The discontinuation of the operation of power circuits will result in a total elimination of all induction which may result from the operation of the power circuits. The power lines in question are not, at the present time, used by the

Pacific Company as the main supply lines but are used to a certain extent in the nature of tie lines and as an emergency supply line in case of interruption of other circuits and also to supply intermediate points between Sacramento and Suisun. The elimination of interference by this means does not appear entirely practicable.

Abnormal induction in the communication circuits of complainant are not necessarily caused by line failures occurring on that section of defendant's line between Sacramento and Suisun, but such disturbances may result from some abnormal condition occurring on portions of defendant's transmission network located outside of the parallel.

Proper separation of power and communication circuits appears to be the only practical and positive means for the prevention of detrimental induction on the Postal Company's system. The evidence shows that certain induction from the Pacific Company's lines was the direct cause of certain trouble occurring in the paralleling communication circuits of the Postal Company.

In the parallel herein under consideration the smallest horizontal separation between center lines of power and communication circuits is about twenty-two feet for a distance of approximately five miles and about twenty-four feet for a distance of approximately eight miles. Such a separation is hazardous not only from the standpoint of induction but also from the possibility of physical contact in the case of failure of any of the power circuits. The location of the lines, as they now exist, would not be allowed by the Railroad Commission if the lines of either utility did not exist and that utility was now applying for permission to so locate its lines. The Railroad Commission has never defined a minimum horizontal separation which shall exist between power and communication circuits because it has been its

belief that such circuits should, at all times, be kept as far away as possible and should only be allowed in close proximity with one another in those cases where no other means of avoiding the parallel are available.

From the evidence in this proceeding and from certain tests made by the Commission's engineers to determine the relative magnitude of the interference induced in the communication circuits of the Postal Company, this Commission is of the opinion that a large portion of the trouble experienced by complainant and the almost continuous induction existing in complainant's circuits involved in this parallel are largely due to the small separation between circuits of defendant and complainant and, further, that this condition can only be properly remedied, so that satisfactory operation of complainant's lines will result, by increasing the horizontal separation between defendant's and complainant's circuits, particularly in those locations where both power and communication circuits are located on the same side of the Southern Pacific Company's right of way between the cities of Sacramento and Suisun, unless the Pacific Company will abandon the operation of its power lines. Before such an order could be given to effect this change the Western Union Telegraph Company and The Pacific Telephone and Telegraph Company and Southern Pacific Company should be given an opportunity to submit their views and plans, as any change in the location of any existing circuit involved in this parallel will affect all other circuits therein located.

It is, therefore, advisable that any final decision in this matter specify exact changes to be made. The Railroad Commission will direct its Engineering Department to call a joint conference of all parties operating either power or communication circuits within the parallel under consideration for

the purpose of promulgating plans for the relocation of the circuits within this parallel, so that all power circuits will be located on the opposite side of the Southern Pacific right of way from all other circuits, unless the existing separation can be increased within those sections, particularly between Davis and Elmira.

If any of the existing circuits are to be re-located or moved to some other location, the question of division of cost will arise. Decision on such apportionment of charges however cannot be made pending the submission of the final plan. This proceeding will be reopened to receive in evidence the report of such a conference and to consider evidence relative to the apportionment of cost resulting from changes requested.

O R D E R

Postal Telegraph-Cable Company, having filed a complaint against Pacific Gas & Electric Company, requesting that this Commission order the defendant to repair, reconstruct and equip its power lines so as to prevent surges on that portion of its lines between the cities of Sacramento and Suisun and induction therefrom to the lines of complainant between said cities, or to remove its lines between the cities of Sacramento and Suisun a sufficient distance from complainant's lines between said cities to prevent induction thereto and make such further order and grant whatever relief as may appear just and reasonable in the premises, requiring defendant to pay the costs, disbursements and expenses of this proceeding ^{unnecessarily} incurred by complainant and pay damages for interference heretofore resulting, a public hearing having been held and the matter submitted, and it now appearing that final order in this matter

relative to remedial measures should be with-held for a period of ninety (90) days, as it now appears that an order which this Commission might make will require changes in the location of either complainant's or defendant's lines, and may affect the communication and signal circuits of utilities other than those involved in this proceeding, and it further appearing that suitable opportunity should be given such utilities before an order should be issued by this Commission in this matter,

IT IS HEREBY ORDERED:

- (1) That this complaint in so far as it requests the payment of damages or for the costs, disbursements and expenses of this proceeding necessarily incurred by this complainant, be dismissed,
- (2) That a joint conference of all utilities operating either power or communication circuits within the parrallel herein considered, be called by the Commission's Engineering Department for the purpose of promulgating plans for the relocation of the circuits within the parallel as set forth in the Opinion preceding this order.
- (3) That this proceeding be reopened and set for hearing at the Commission's offices, State Building, San Francisco, on the 31st day of August, 1923, for the consideration of evidence relative to the plans for re-locating the circuits within this parallel and for the division of cost resulting from such changes.

The foregoing Opinion and Order hereby approved and ordered filed as the Opinion and Order of the Railroad Commission of the State of California.

Dated at San Francisco, California, this 14th day of July, 1923.

C. Seaver
H. H. ...
J. ...
E. ...

Commissioners.