

Dr. E. M. Mendenhall

MINUTES OF MEETING
FLORIDA UTILITIES COORDINATING COMMITTEE
ORLANDO, FLORIDA - MAY 16, 1941

Representatives present:

<u>Name</u>	<u>Affiliation</u>	<u>Location</u>
H. H. Alshouse	Southern Bell Tel. and Tel. Co.	Orlando, Fla.
W. M. Bostwick	Florida Power & Light Company	Daytona Beach, Fla.
C. M. Broom	Florida Power & Light Company	Lake City, Fla.
W. J. Clapp	Florida Public Service Company	Orlando, Fla.
C. E. Crow	R.E.A.	Wauchula, Fla.
B. N. Darlington	Peninsular Telephone Company	Tampa, Fla.
R. S. Davis	Florida Power & Light Company	Sarasota, Fla.
W. T. Ewing	Southern Bell Tel. and Tel. Co.	Orlando, Fla.
A. J. Parson	Florida Public Service Company	Orlando, Fla.
W. F. Girtman	Florida Telephone Corporation	Leesburg, Fla.
H. R. Huntley	American Telephone and Teleg. Co.	New York, New York
E. C. Lavendey	Florida Public Service Company	Orlando, Fla.
W. D. LeVeille	State Road Department	Deland, Fla.
J. A. Lindsey	Postal Telegraph-Cable Company	Atlanta, Georgia
Wilkins Linhart	Fla. Railroad Commission	Tallahassee, Fla.
W. H. Mansfield	Southern Bell Tel. and Tel. Co.	Jacksonville, Fla.
A. P. Michaels	Consulting Engineer	Orlando, Fla.
L. B. Moore	Florida Public Service Company	Orlando, Fla.
H. D. Ownby	Florida Public Service Company	Orlando, Fla.
E. W. Parrish	Florida Public Service Company	Orlando, Fla.
R. A. Pattvill	Florida Public Service Company	Orlando, Fla.
E. C. Pritchett	American Telephone and Teleg. Co.	Atlanta, Georgia
W. T. Smith	Rural Electrification Admin.	Washington, D. C.
H. V. Street	Florida Power & Light Company	Miami, Fla.
A. R. Swanson	American Telephone and Teleg. Co.	Jacksonville, Fla.
Stanley Warth	Southern Bell Tel. and Tel. Co.	Jacksonville, Fla.
K. H. Williams	Inter County Tel. & Tel. Co.	Ft. Myers, Fla.
B. E. Wilkerson	Seaboard Air Line Railway	Jacksonville, Fla.
P. H. Wright	Atlantic Coast Line Railroad Co.	Jacksonville, Fla.

The meeting was called to order by Mr. Stanley Warth, Chairman, at 9:50 a.m.

Minutes of the February meeting were read, and, there being no corrections were approved as read.

Carry-over business was discussed and correspondence relative to future construction was read. Mr. Linhart advised that he had nothing further to report relative to revision of the Safety Code. Mr. Huntley of A.T.&T. Co. reported that things were moving along and that all letter ballots sent out by the Sectional Committee of A.S.A., except two, were in. (It is understood that these two ballots have since come in.)

Mr. R. S. Davis introduced Mr. E. N. Darlington of the Peninsular Telephone Company who was representing Mr. R. W. Shriner at the meeting. Mr. Darlington reported that Mr. Shriner had been called into Naval service and expressed his regrets at being unable to attend.

Mr. Davis reported that he had talked with Mr. Shriner about the Pine Island case and that Mr. Shriner had advised him the Committee appointed at the last meeting had not viewed the Pine Island line recently constructed by R.E.A., but that he (Mr. Shriner) had talked with those involved and everything was "practically amicable" in Ft. Myers. Mr. Williams, of Inter County Telephone & Telegraph Company, Ft. Myers, reported that although feelings were not running high in Ft. Myers the conditions still existed and he would like the Committee to inspect conditions. In view of this Mr. Warth appointed Mr. W. F. Girtman to replace Mr. Shriner, and requested that the Committee report on the conflict at the next meeting.

There being nothing further to discuss relative to carry-over business, Mr. Warth introduced Mr. Warner T. Smith, Technical Standards Division, R.E.A., and Mr. H. R. Hantley of the American Telephone and Telegraph Company who were to speak to the assembly relative to Inductive Coordination.

Mr. Smith expressed his pleasure at being able to accept the Committee's invitation and the opportunity it afforded him to talk to the members. He stated that the R.E.A. is primarily a lending agency set up for the purpose of making loans to organizations for supplying electric power service in rural areas. While most of the loans have been made to cooperative organizations, loans are also made to private power companies and other types of organizations.

In order to safeguard those loans the R.E.A. set up standards for construction and exercises a certain amount of supervision over operations. Adequate communication is an important factor in the operation of a project and the R.E.A., therefore, has a direct interest in seeing to it that telephone service is not disrupted.

Mr. Smith pointed out that he and his group spend practically all of their time on inductive coordination. This group is in the Technical Standards Division of the R.E.A. which is responsible for specifications and other types of standards for construction and operation.

In handling the problem of inductive coordination, the R.E.A. is governed by a policy which it believes is fair to both telephone and power industries and will result in the best service of both kinds to the public at the least overall cost. This policy is based on the same general concepts in connection with inductive coordination that have been used by the electric and telephone industries for a long time. Briefly, these concepts are as follows:

1. The R.E.A. will limit the influence of its power systems as far as practicable consistent with service requirements and cost.
2. The R.E.A. expects the telephone organizations to limit the susceptivensas of their systems as far as practicable consistent with service requirements and cost.
3. The R.E.A. will cooperate with the telephone organizations to limit the extent of inductive exposures as far as practicable consistent with service requirements and cost.

Mr. Smith pointed out that, of course, the most complete coordination is obtained when there is complete separation between the power and telephone systems. In the case of rural power and telephone lines serving the same groups of people, however, complete separation is, of course, impossible but every reasonable effort should be made to avoid unnecessary exposures.

The R.E.A. has worked and is working on the control of the inductive influence of its systems in two ways:

1. Control of the wave shape of equipment. In cooperation with the various manufacturers, limits have been placed on the TIF of generators installed in R.E.A. generating plants. In the past the wave shape of relatively small generators has not usually been of serious concern because these smaller units were usually located and operated in such a way that only occasionally did they cause induction problems. However, when smaller generators are connected to R.E.A. type systems, bad wave shape would frequently result in widespread noise problems. Since the limits on TIF have been established, the wave shape of these small generators compares favorably with that of larger units.

The wave shape of the exciting current of distribution transformers has also been found to be of great importance from the standpoint of inductive influence of R.E.A. type systems. Steps are now being taken to limit the wave shape distortion due to these exciting currents and it is anticipated that satisfactory results will be obtained.

2. Control of the wave shape of existing systems. In this work the R.E.A. has cooperated with the Bell System, and field tests have been made on over 25 separate systems. The R.E.A. has a testing truck which contains the latest type of equipment available to conduct these tests. The tests were made to determine what, if any, remedial measures can be applied to the power system to reduce its influence to a reasonable value and to determine the susceptiveness conditions on the telephone system and what could be done to reduce them. In cases where it is found that measures on the power system are desirable, the Cooperatives assume the expense of applying them. The measures which have been used include shunt capacitors, resonant shunts and non-resonant shunts applied to the distribution side of the substation transformers. To date, the results obtained from these tests have clearly demonstrated that in the usual case, R.E.A. type systems can be satisfactorily coordinated with metallic telephone systems. It is contemplated that the tests will be a continuing function of the R.E.A. in cooperation with the Bell System and other telephone organizations.

Mr. Smith outlined a suggested procedure to be followed by a telephone company experiencing noise which results from an R.E.A. financed power line as follows:

The first step is to check the transposition arrangements and balance conditions on the telephone system. If it is found that the line is properly transposed and satisfactorily balanced, the next step is to present the case to the Superintendent of the local Cooperative and request the Superintendent to write the R.E.A. in Washington, giving as much detailed information as possible along the following lines:

1. Sketch showing location, length of and number of telephone and power circuits involved in each exposure.
2. The magnitude of noise being experienced. Measured values are desirable but estimated values can be used if measuring equipment is not available.
3. As much information on the wave shape of the voltages and currents on the power system as can be obtained with the measuring equipment at hand.
4. Approximate number of telephone customers affected by the noise.
5. Total number of telephone circuits or number of customers served by the Telephone Company exchange.
6. Any other pertinent data that would assist in analyzing the problem.

The case will then be considered by R.E.A. on its merits and placed on schedule for handling. Mr. Smith explained the problems facing the engineers in R.E.A. working on inductive coordination. There are approximately 750 Cooperatives throughout the country and there are only three men with one truck to handle inductive coordination work. It can readily be seen that it is necessary for these engineers to weigh the merits of each case carefully and that the cases must be handled in the order of their importance - that is, the more serious noise conditions affecting the greatest number of people have to be considered first.

Mr. Smith pointed out that the above discussion applies, of course, primarily to situations involving metallic telephone circuits. Ground return telephone circuits present a much more difficult problem because such circuits are about 100 times as susceptible as metallic circuits on the average. It has been found, however, that in some cases the influence of the power system can be reduced sufficiently so that the noise on ground return telephone circuits which have relatively short exposures (particularly to "tag end" single phase branches) is made reasonably satisfactory. Thus, in an extensive ground return telephone system, it is sometimes possible to work out a satisfactory overall solution by reducing the power system influence and metallicizing the telephone circuits having the longer exposures. Even in such cases, however, it has been found to be desirable for the telephone organization to undertake a program which will result in complete metallicizing throughout all exposures over a period since it is doubtful if the extremely low power system influence required for coordination with ground return telephone circuits can be maintained indefinitely.

Mr. Warth then asked Mr. Huntley, who has been working with Mr. Smith on R.E.A.-Bell System inductive coordination, to make a few remarks.

Mr. Huntley expressed his thanks to the Committee for being invited to talk to the members. He stated that the joint work between the R.E.A. and Bell System has been greatly facilitated by what has been learned in the long experience in cooperative work between the private power companies and the Bell System. He reviewed the early history of inductive coordination problems and pointed out that they started back in the days of the earliest arc lights before the incandescent light had been invented and that the inductive problem at that time has been called "the great controversy" between the two industries. Methods of handling the problems then existing were worked out cooperatively, but with the rapid growth in the power and telephone industries around the turn of the century, new difficulties multiplied on every hand. Most of the specific field problems were settled amicably but a number of them resulted in controversies - some of which were tried in the courts. By 1920 both industries were thoroughly convinced that the only satisfactory solution to the whole matter was through cooperation - not only from the standpoint of the organizations concerned but, more important still, from the standpoint of the public.

In 1920 a Joint General Committee of the N.E.L.A. and the Bell System was formed and in 1922 this Committee issued Principles and Practices, which have been used as a guide by the operating power and telephone organizations ever since. These Principles and Practices are based on the broad foundation that the public interest is paramount and that coordination work must be carried out in such a way as to promote the ideal of the best practicable power and telephone service at the least overall cost.

Mr. Huntley stated that inductive coordination work has been carried on between the R.E.A. and the Bell System on this same basis and that the general methods of attack have been about the same as those where private power companies are involved. The R.E.A. and the Bell System have investigated at least 25 important problems and have found relatively inexpensive solutions to all of them. The measures applied have been based on the limitation of harmonics in the power system and of unbalances in the telephone system - rather than on measures which would affect directly the transmission of 60-cycle power over the power lines or speech over the telephone lines.

Mr. Warth stated that, to his knowledge, only one important case of inductive interference had arisen involving R.E.A. lines in Florida and that this problem had been solved satisfactorily.

Mr. Lindsey of the Postal Telegraph-Cable Company asked Mr. Smith about an inductive problem affecting their lines between Jacksonville and Savannah, Georgia, brought about by an R.E.A. line in Georgia. Mr. Smith suggested that Mr. Lindsey follow the general procedure which he had outlined previously. He said that most telegraph problems seemed to be concerned with 60 cycles rather than with harmonic frequencies and that it is, of course, not practicable to remove 60-cycle current from the power line. He cited one instance, however, where the R.E.A. had been able to reduce the 60-cycle ground

return current (which is usually controlling in telegraph induction) in a three-phase line by changing the phasing of the single phase taps. This change had substantially reduced the induction in the telegraph circuits. Not enough experience has been obtained, however, to determine how extensively this method can be used or what other methods can be developed.

Mr. Smith was asked about hot line work and he stated that most R.E.A. construction and reconstruction work is done with the lines cold because of lack of hot line tools and competent linemen.

Mr. Huntley was asked about separation of power and telephone facilities. He reiterated Mr. Smith's statement that separation is the most nearly fool-proof method of coordination but that, on account of the fact that rural power and telephone customers are in general the same people, it is becoming increasingly difficult to avoid inductive exposures. On the other hand, the newer methods of coordination are producing very satisfactory results where exposures are necessary. He illustrated this by citing one large area having about 50,000 miles of R.E.A. line, of which about 13 per cent. is involved in exposures to Bell System lines. By making use of modern methods of coordination, less than three per cent. of this exposure mileage resulted in unsatisfactory noise conditions. The costs involved in obtaining these results were relatively small. Cooperative investigations are now under way or are planned to find solutions in the remaining cases.

Mr. Mansfield, District Plant Superintendent of Southern Bell Telephone and Telegraph Company, Jacksonville, who was a visitor to the meeting, was introduced by Mr. Warth. Mr. Mansfield expressed the opinion that the work of the Committee was of great importance and that he was sorry he could not attend all meetings.

The next meeting will be held in Miami, Florida, Friday, August 15, 1941, at 9:30 a.m., in Florida Power & Light Company's "Sunshine Service Room" - Room 243, Ingraham Building.

The meeting was adjourned at 12:30 p.m. to attend a luncheon given by Mr. Parrish of the Florida Public Service Company.

H. V. Street
Secretary
Florida Utilities Coordinating Committee