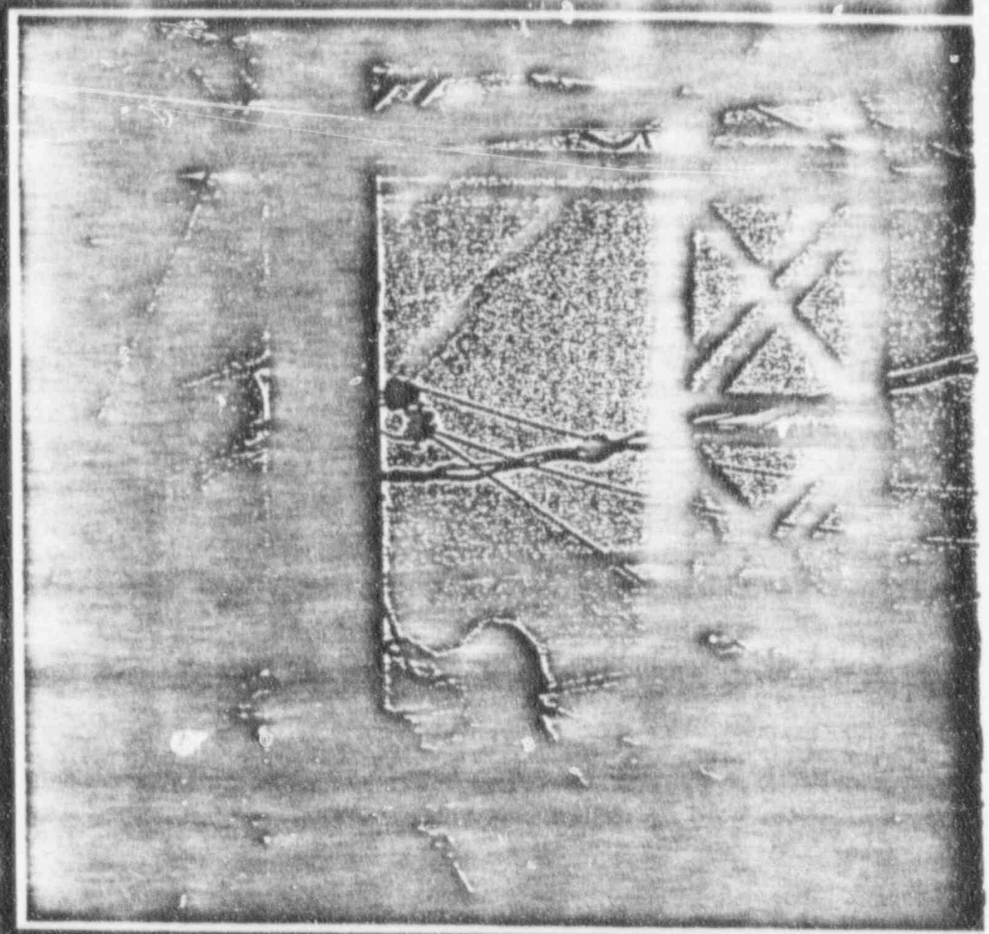
A-24 50-348/364-CLP 2/19/92

APCo Exhibit 24

THE LINEMAN'S AND CABLEMAN'S HANDBOOK

Sixth Edition



Edwin B. Kurtz ● Thomas M. Shoemak

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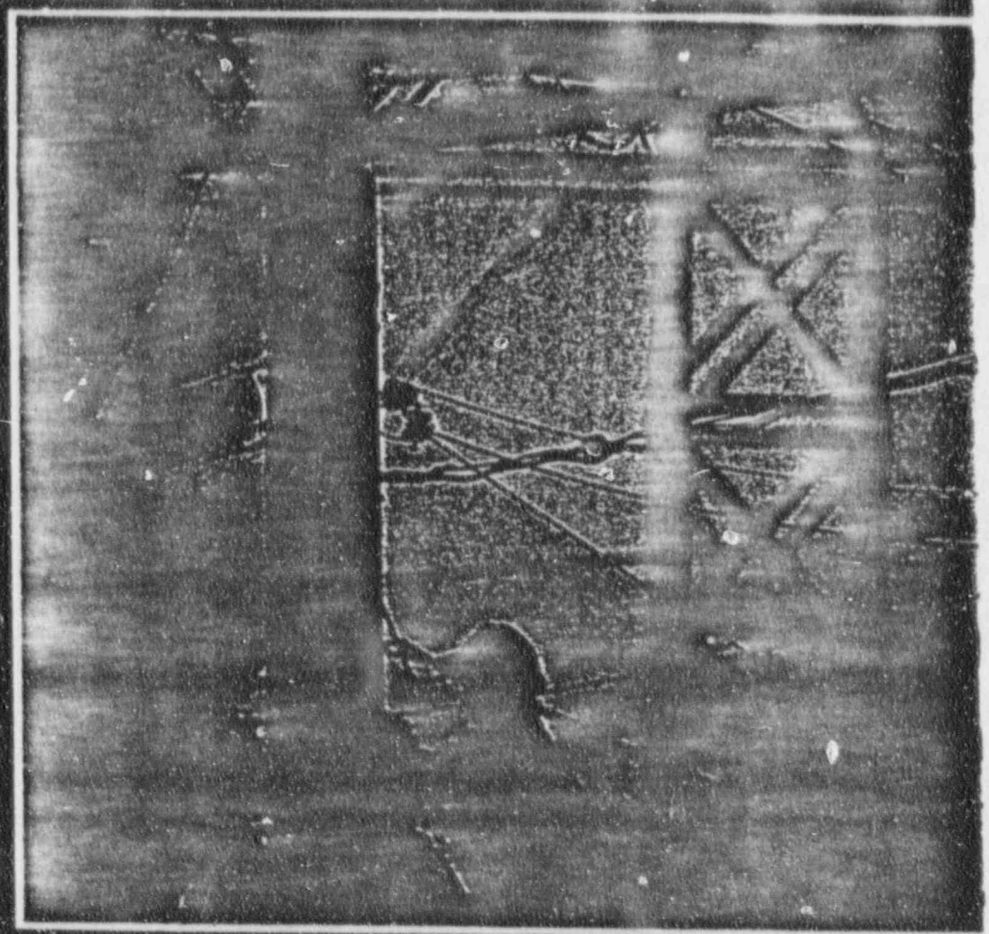

Edwin B. Kurtz • Thomas M. Shoemak

NUCLEAR REGULATORY COMMISSION

Docket No. 50-348/364 Civil Offered/Exh. No. 24

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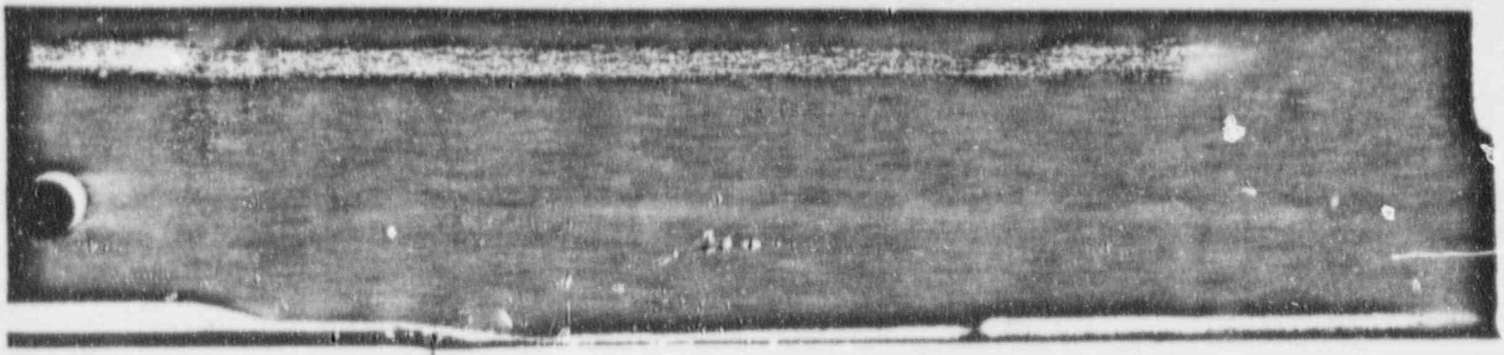

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The Linemar's and Cableman's Handbook

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SIXTH EDITION

McGraw-Hill Book Company
New York St. Louis San Francisco Auckland
Bogotá Hamburg Johannesburg London Madrid Mexico
Montreal New Delhi Panama Paris São Paulo
Singapore Sydney Tokyo Toronto

ISBN 0-07-035678-5

Library of Congress Cataloging in Publication Data

Kurtz, Edwin Bernard, date.
The lineman's and cableman's handbook.

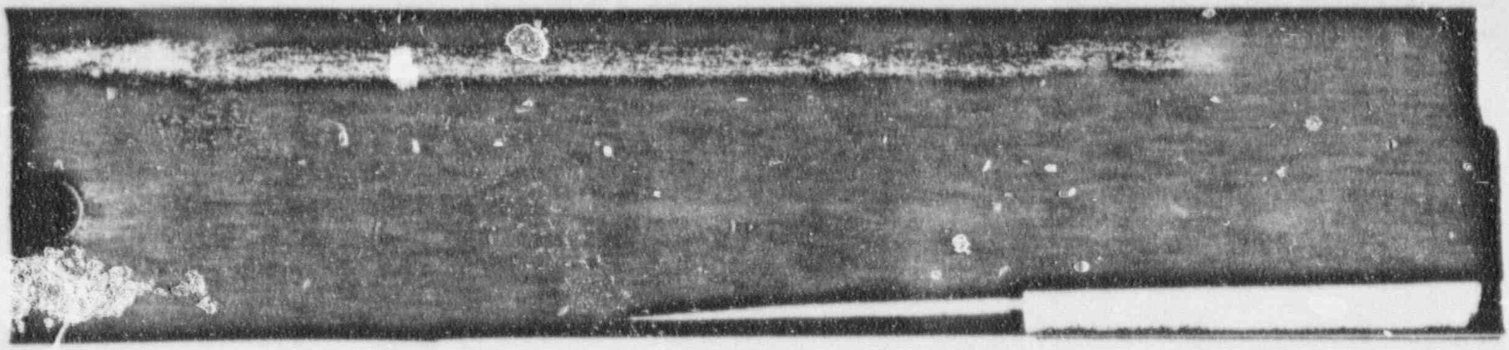
Includes index.
1. Electric lines—Handbooks, manuals, etc.
2. Electric cables—Handbooks, manuals, etc.
I. Shoemaker, Thomas M., date. II. Title.
TK3221.K83 1981 621.319'22 81-5985
AACR2

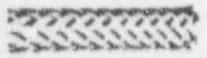
234567890 KPKP 898765432

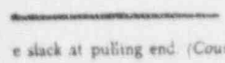
ISBN 0-07-035678-5

The editors for this book were Harold B. Crawford and Margaret Lamb, the designer was Blaise Zito Studios, and the production supervisor was Teresa F. Leaden. It was set in Caledonia by University Graphics, Inc.

Printed and bound by The Kingsport Press.







e slack at pulling end. (*Courtesy Edison*

end to signal a stop to prevent pulling
he top of the manhole to relay signals

onditions and cable size. It is
single cable can be pulled in
difficulty in greasing properly and in
per min, or 8 ft per sec, is preferable
les are pulled into one duct, the speed
speed will prevent the possibility of

ible, as the time required for drawing
small part of the total time needed to

up to the manhole rigging, the first
available in the manhole to reach
wall, additional pulling is necessary.
grip must be applied to the cable the
asket" grip (Fig. 32-25) is used. This
to the desired position. Care must be

he forward end is placed on the cable
e cable into its final position. This will
ee that the seal at the end of the cable
h enough slack left to train it properly
so placed on its supports, and the end
reel is also sealed.

Section 33

Splicing Cable

Multiple lengths of cable are connected together to form a continuous length. These connections are called joints or splices. If underground ducts are used, the splices are normally completed in a manhole. When a cable is cut, in preparation for splicing or for any other reason, it must be protected from moisture and dirt. Cable ends exposed to the atmosphere will collect moisture and contamination. The cable ends should be properly sealed at all times except during the period when the splice is being completed or the cable termination is being installed. The cable ends should be thoroughly inspected before they are trained into final position for splicing.

If the splices are to be completed in a manhole, the cables and the splices should be supported on racks mounted on the manhole wall as illustrated in Section 29. The joint or splice is supported between two brackets located on the central portion of the manhole wall. Because of the expansion and contraction of the cables, caused by changes in the cable temperature, it is necessary to provide reverse curves or offset bends in the portion of the cable in the manhole. These reverse curves enable the cable to take up the expansion and contraction movements without cracking or buckling of the insulation or lead sheath. Therefore, the training of cables on the manhole wall is not only for making a neat arrangement in the manhole but more importantly for providing the expansion space needed to absorb the movements of the cable.

In general, the bending radius R (see Fig. 33-1) of the reverse curves in lead-covered cables must be no less than eight times the overall diameter of the cable. Thus a 3-in cable should have a minimum bending radius of 24 in or more, and a 4-in cable should have a minimum bending radius of 32 in or more.

The range of values of R in terms of cable diameter varies from 7 to 12 and depends on size and number of conductors and whether it is a polyethylene, thermoplastic, rubber-, varnished-cambric-, or paper-insulated cable, as well as on the rated voltage of the cable.

At least 6 in of straight cable should extend beyond each end of the splice to provide space for resting on the saddles of the supporting racks. The clips holding the saddles on the bracket should be spread enough to permit the saddle to slide freely along the bracket.

All cables and joints should be so racked in the manhole that they are not directly under the manhole cover.

The exact makeup of a splice depends on the specific cable construction, that is, whether the cable is a single- or multiple-conductor cable; whether the insulation is rubber, polyethylene, thermoplastic, varnished cambric, or impregnated paper; or whether the cable insulation has a conducting shield; etc. The general installation procedure is similar to those described in this section. The cable manufacturer's specific instructions must be followed in all instances. The worker must maintain tools in good condition and keep them clean and dry. The working area and the area of the cable being worked on should be protected from moisture with a rubber blanket or other waterproof material. The cable splicer or lineman performing the work must maintain clean and dry hands.