

DEFECTIVE BURIED AIR CORE PIC CABLE REHABILITATION PROCEDURES

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1. GENERAL

1.01 This section outlines the procedures to follow when trouble develops in buried air core PIC cable as a result of water existing in the cable core and/or splices.

1.02 This section is being reissued to more clearly define the need to PWAC study plans.

1.03 Recognizing that cable trouble can result from a number of other causes, water content is one of the most difficult to identify, isolate, and rehabilitate.

1.04 Since diagnosis is difficult and corrective action is sometimes lengthy, an early detection is desirable. When the cable maintenance supervisor has performed tests to identify the presence of water, an Outside Plant Maintenance Report should be issued which will include the documentation described in Paragraph 3.01. Engineering will then become involved and corrective measures taken before trouble reaches the catastrophic stage.

2. DETECTION

2.01 As stated previously, early detection of cable trouble provides valuable lead time to sectionize the problem and apply rehabilitation measures before excessive trouble develops. This is especially true for 26 gauge conductors where complete deterioration occurs rapidly due to the small conductor cross section.

2.02 Early detection can be accomplished by var-

ious means with some of the more obvious listed below:

- (a) LIT trouble where an office is so equipped.
- (b) Cable trouble reports which can be analyzed manually by CCUPA as shown in BSP 660-003-020.
- (c) Visual inspection of locations where flooding is taking place or has taken place at above ground closures and end seals were not placed initially or before flooding took place.

3. PRE-HABILITATION TESTING

3.01 Before a rehabilitation study is made, repair forces will supply the following information:

- (a) Location of faulted pairs in footage from point of measurement. Nature of trouble such as open, short, low resistance fault (below 5000 ohms) or high resistance fault, etc. The first three conditions will not be cleared with B Reclamation or FARM but the fourth condition will probably clear up.
- (b) Does cable have water in core? Presence was determined by which of the following methods?

- (1) Opening or splices and observing water.
- (2) By making a comparison between capacitance and resistance measurements as described in BSP 644-200-030 and BSP 644-104-101. If capacitive length is greater by 15%, the section contains water but the beginning and end cannot be identified. Then, a time domain reflectometer, such as Biddle CME 110A Cable Test Set can be used to determine where water begins. Some idea of extent can be obtained but wet portion should be viewed from both ends for confirmation of beginning and end. The set is shown in BSP 634-305-515 and its use for water detection is covered in BSP 644-104-101NB.

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SECTION 644-104-900NB

- (c) Testing should be limited to one section at a time. A section is generally between two above ground closures but further sectionalization will be required if closures are separated by a considerable distance.

3.02 When tests have been completed, the number and location of defective pairs will be known. Utilizing this information, the engineer can foresee the defective pairs which will remain if cable replacement is not performed and decide if sufficient spares will be available to last a reasonable length of time.

4. REHABILITATION METHODS

4.01 Rehabilitation of buried air core PIC cable containing water may be accomplished in any one or a combination of the following methods:

- (a) Water removal by draining and drying method. FARM — BSP 644-200-030
- (b) In-place reclamation with C Reclamation Compound. BSP 644-200-033
- (c) Replacement — Covered in various BSPs

4.02 Buried cable represents an appreciable portion of our outside plant investment and every other means of rehabilitation should be investigated before cable replacement is performed.

5. REHABILITATION STUDY

5.01 Utilizing Exhibits A, B, and C with the information below as a guide, a PWAC cost com-

parison should be made between the various rehabilitation methods. If the cost difference is very small between methods, intangibles may favor the more expensive method.

5.02 C Reclamation Method — BSP 644-200-033 should be used to determine length and time of push as well as reclamation compound that is required. Once length has been determined, the number of plugs, flanges, splice pits, and repairman hours can be derived. Some typical costs for items shown below appear in Broad Gauge Costs but may be adjusted to represent costs which you are experiencing locally. Use Exhibit B to prepare estimated costs.

- (a) Reclamation Compound
- (b) Splice Pit
- (c) Plug
- (d) Flange
- (e) Craft Hours

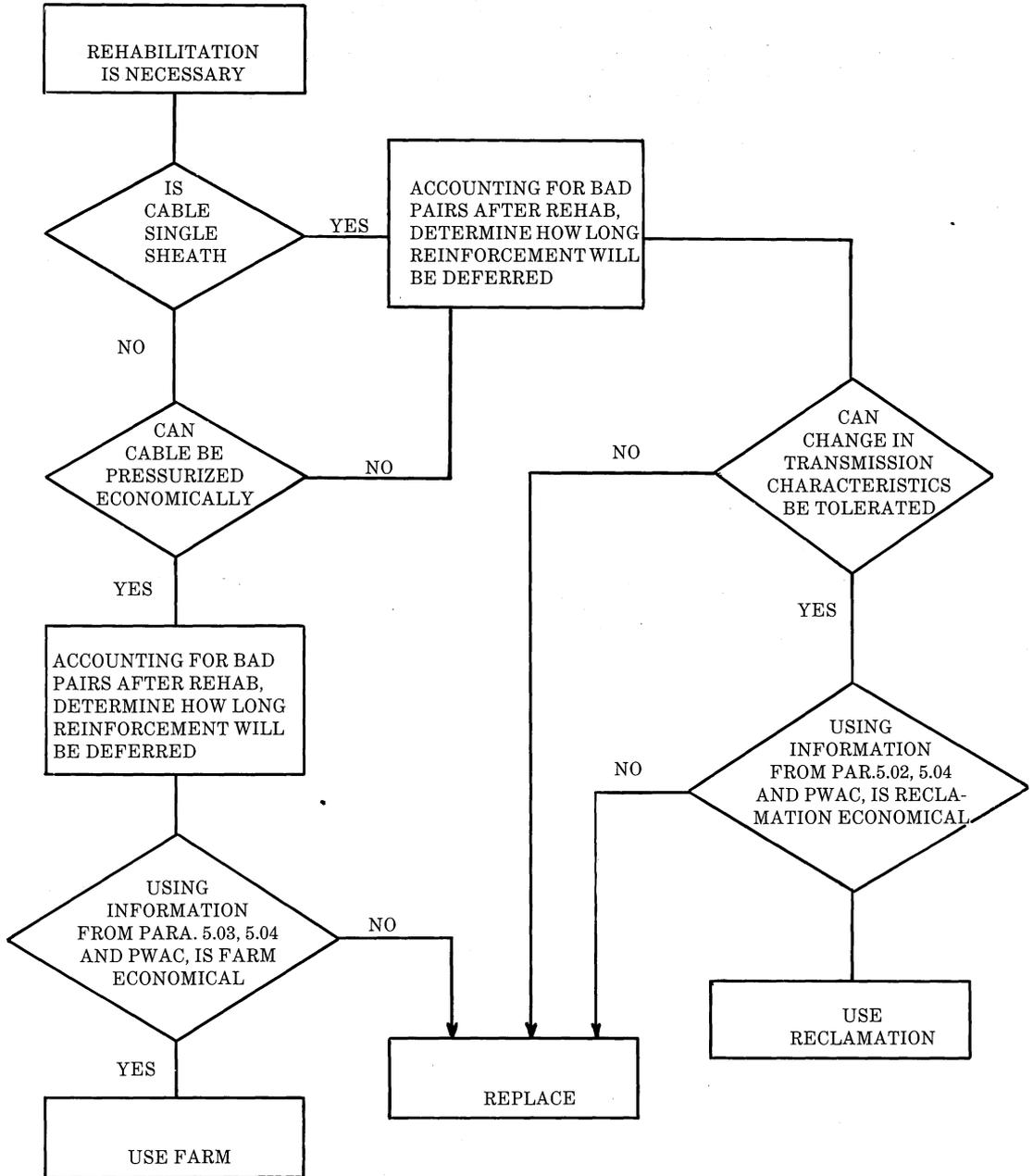
5.03 FARM Method — BSP 644-200-030 should be used to determine the length of section to be treated at a time. Sections should be limited to 1000 feet in length and have a total pneumatic resistance no greater than 0.4 in value. Purge and drying time for each section should be figured to last from two to three days and costs for other associated work can be obtained from Broad Gauge Costs to figure total costs. Use Exhibit C to prepare estimated costs.

5.04 Replacement Method — Use Broad Gauge Costs with adjustments made to reflect local conditions at time of replacement.

Attachments:

Exhibits A, B, and C

REHABILITATION STUDY FLOW CHART



	<u>Cost In</u>	<u>Tel-Labor</u>
	<u>Dollars</u>	<u>Manhours</u>
5. Estimated Preparation and Closing Costs		
a. Excavating and Closing Pits		
No. of Pits ___ X Contractor (if used) Cost/Pit (Loc) ___	= _____	
No. of Pits ___ X Tel-Labor Hours/Pit (Loc) ___	= _____	_____
No. of Manhours ___ X Labor Rate (BGC) ___	= _____	
b. Plugs		
No. of Plugs ___ X Cost/Plug (BGC) ___	= _____	
No. of Plugs ___ X One Hour/Plug	= _____	_____
c. Injection and Bleed Flanges		
No. of Flanges ___ X Cost/Flange (BGC) ___	= _____	
No. of Flanges ___ X One Hour/Flange	= _____	_____
6. Estimated Pumping Costs		
Pumping Time Per BSP 644-200-033	= _____	_____
No. of Manhours ___ X Labor Rate (BGC) ___	= _____	
No. of Gal. of Reclam. Comp. ___ X Cost/Gal. (BGC) ___	= _____	
7. Estimated Cleanup Cost		
No. of Sections ___ X One Hour/Section	= _____	_____
No. of Manhours ___ X Labor Rate (BGC) ___	= _____	
8. Total Estimated Costs and Manhours for Reclamation Completion	_____	_____
9. PWAC Results		
a. Plan I - Reclamation and Deferred Reinforcement	_____	
b. Plan II - Reclamation and Deferred Replacement	_____	
c. Plan III - Replacement	_____	
10. PWAC Difference Between Plan I or II and Plan III	_____	
11. Plan Selected		_____

	<u>Cost In</u> <u>Dollars</u>	<u>Tel-Labor</u> <u>Manhours</u>
5. Estimated Preparation and Closing Costs		
a. Excavating and Closing Pits		
# of Pits ___ X Contractor (if used) Cost/Pit (Loc) ___	= _____	
# of Pits ___ X Tel-Labor Hours/Pit (Loc) ___	= _____	_____
# of Manhours ___ X Labor Rate (BGC) ___	= _____	
b. Plugs		
# of Plugs ___ X Cost/Plug (BGC) ___	= _____	
# of Plugs ___ X One Hour/Plug	= _____	_____
c. Flanges		
# of Flanges ___ X Cost/Flange (BGC) ___	= _____	
# of Flanges ___ X One Hour/Flange	= _____	_____
d. Removing and Replacing Splice Cases or Sleeves (Include New Sheath Openings Required)		
# of Openings ___ X 3 Hours/Opening	= _____	_____
# of Manhours ___ X Labor Rate (BGC) ___	= _____	
# of Cases or Sleeves ___ X Cost/Case or Sleeve ___	= _____	
e. Electrical Hookup (if needed)		
# of Hookups ___ X Cost/Hookup (Loc) ___	= _____	
# of Poles ___ X Cost/Pole (BGC) ___	= _____	_____
# of Months ___ X Electrical Cost/Month ___	= _____	
6. Estimated Pumping and Cleanup Costs		
# of Sections ___ X 8 Hours/Section	= _____	_____
# of Manhours ___ X Labor Rate (BGC) ___	= _____	
7. Total Estimated Costs and Manhours to Complete FARM	= _____	_____
8. Plan Selected Based Upon PWAC Results or Intangibles		_____