


<b>SUBSTATION MAINTENANCE STANDARD</b>	<b>TITLE</b>  FIELD REPAIR OF PENNSYLVANIA TYPE PA BUSHINGS, 115 KV AND ABOVE	<b>Page</b>
		No. 6476 023 1
<b>Date</b> August 15, 1966		

TRANSMITTAL LETTER NO. S-(S)-67-2

Subject: Field repair of Pennsylvania Type PA bushings,  
115 kv and above

Enclosed is Substation Maintenance Standard No. 6476-023-1 describing  
the procedure for replacing the oil level gauge gaskets in the Pennsylvania  
or Federal Pacific Type PA bushings rated 115 kv and above.

  
Charles J. Slatt  
Chief of Maintenance

Enclosure

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PURPOSE:

To describe the procedure for replacing the oil level gauge gaskets in Pennsylvania or Federal Pacific Type PA bushings rated 115 kv and above.

GENERAL:

BPA has experienced several instances of oil leaks in the expansion chambers of Pennsylvania Type PA bushings. As a result of this problem the Pennsylvania Transformer Company was contacted to obtain the proper method of repair. The bushings are sealed with a positive pressure nitrogen blanket on top of the oil when they are shipped from the factory.

The following procedure has been obtained from Pennsylvania as the proper method of recharging the nitrogen blanket when repairs to the bushing are required.

PROCEDURE:

The following procedure has been used successfully in the field in replacing the oil level gauge gasket:

1. Remove the plug relieving the nitrogen pressure above the oil level.
2. Remove approximately  $1\frac{1}{2}$  - 2 gallons of insulating oil until gauge dial pointer indicates between 6 and 7 o'clock. A new or clean automotive type bilge pump can be used for this purpose.
3. Remove oil gauge and replace gasket.
4. Reinstall oil gauge.
5. Refill expansion chamber to correct level with insulating oil.
6. Install filling plug a little less than finger-tight.

Use Superior charging engaging assembly, CD-202, for purging and topping off bushing with nitrogen as follows. A print of this drawing is attached.

7. Remove the air valve core from Item 5 of CD-202 and attach hose assembly from nitrogen bottle equipped with a low pressure regulator.
8. Attach CD-202 to the oil sampling Schraeder Valve.
9. Set regulator for 3-4 psi and depress valve core of the oil sampling Schraeder valve by means of the air chuck, Item 4 of CD-202.

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10. Permit nitrogen to purge top of expansion chamber for a minimum of five minutes. Flow can be heard at the filling plug and from bubbling of nitrogen through the oil in bushing. At least three times during the purge tighten the filling plug until the o-ring makes a seal allowing the pressure to build up slightly in the expansion chamber, then release pressure by backing out on filling plug.
11. After purging and while nitrogen is still flowing, tighten filling plug completely. Adjust regulator to top off from 4 - 7 psi depending on temperature. Normal pressure at 60°F is from 8 - 10 psi.
12. After topping of pressure is obtained, release the oil sampling valve core by backing off the air chuck and remove the CD-202.
13. Bushing should not be energized for 12 hours after topping off with nitrogen.

An alternate method of lowering the oil level in the expansion chamber is to use the CD-202 with the air valve core removed and attaching to the oil sampling Schraeder valve. When using this method, the filling plug is left sealed, and the nitrogen pressure will expel the oil when the air chuck is used to depress the sampling valve core. In case the temperature is so low that insufficient pressure is available to remove the required quantity of oil, then it will be necessary to open the filling plug to complete the draining.

It should be noted that in removing the tank assembly of the oil gauge, Item 3 of FC-1944, a small quantity of oil will run out because of the location of the gasket with respect to the hole for the oil gauge. Normally, the retaining screws at the 3, 9, and 12 o'clock locations are backed off until lock washers are free, and the 6 o'clock screw removed last. If oil continues to escape after loosening the bottom screw, then further lowering the oil level will be necessary.

# SUBSTATION MAINTENANCE STANDARD

Date August 15, 1966

## TITLE

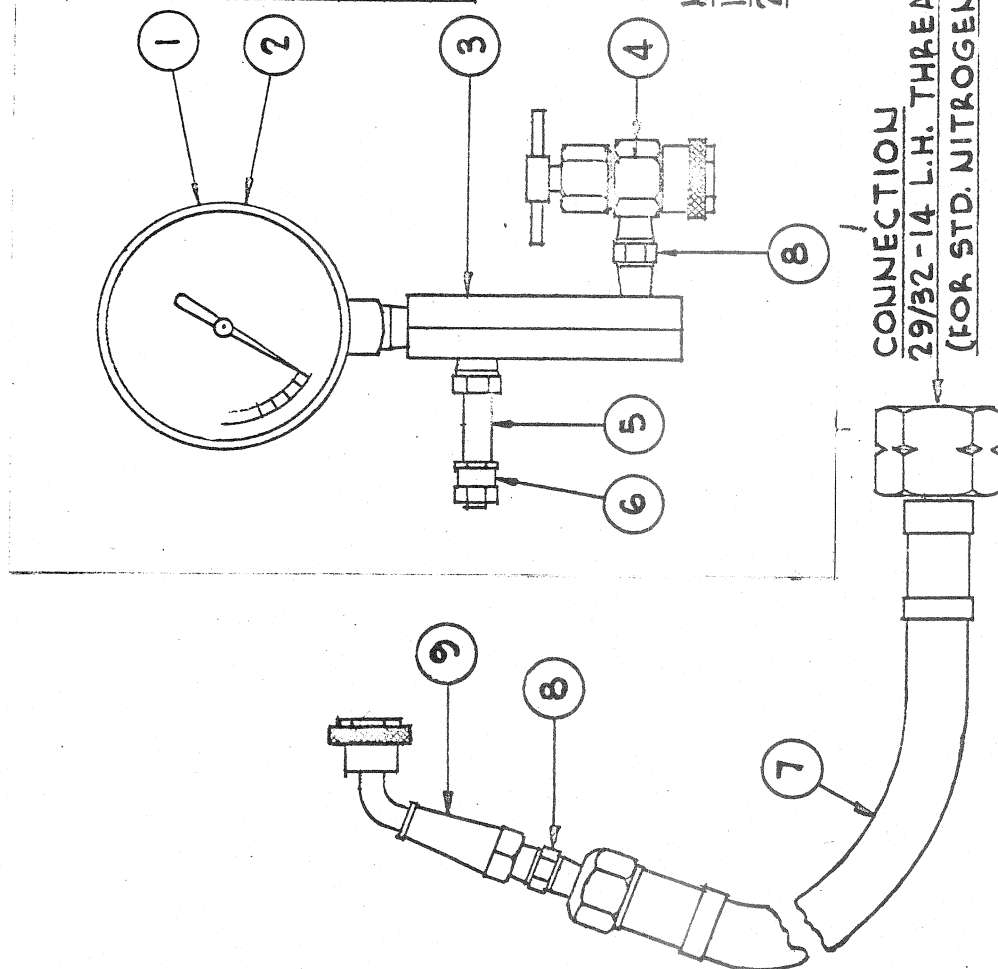
FIELD REPAIR OF PENNSYLVANIA  
TYPE PA BUSHINGS, 115 KV AND  
ABOVE

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No.

6476  
023  
1

ITEM	DESCRIPTION	PART NO.
1	AIR GAUGE 3000 PSI	200-30
2	AIR GAUGE 1500 PSI	200-15
3	ADAPTOR	200-6
4	AIR CHUCK	200-2
5	AIR VALVE	200-7
6	AIR VALVE CAP	200-8
7	HOSE ASSEMBLY	200-5
8	ADAPTOR	200-3
9	AIR CHUCK	200-9



NOTES:  
1. HOSE ASSEMBLY 10'-0" LONG.  
2. ANY ITEM CAN BE ORDERED  
SEPERATELY.

Seals		Weight	Est.	HYDRAULICS DIVISION		Caution: Read all notes: - Do not scale drawing. Tolerances unless otherwise noted: All dimensions are inches. Decimal Dimensions ± . Fractional Dimensions ± . Angular Dimensions ±	
Drawn F.M.V. 8/18/54		Check	Act.	CLEVELAND, OHIO SUPERIOR PIPE SPECIALTY CO. CINCINNATI, OHIO		Drawing Number	
Date	Chf. Dr.	Date	Stf. Eng.	Date	CD-202		
Title ACCUMULATOR CHARGE & GAUGE ASS'Y				Site A			