

**BIG RIVERS ELECTRIC CORPORATION
POLE INSPECTION
AND
TREATMENT PROCEDURE
(Based on RUS Bulletin 1730B-121)**

MARCH 13, 2002

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OSMOWELD MPF MSDS	
OSMOWELD MSDS	
MITC – FUME MSDS	
OSMOPLASTIC WOOD PRESERVING COMPOUND MSDS	

I **POLE INSPECTION**

- A) SOUND:** This method involves striking a pole with a hammer from groundline to as high as the inspector can reach and detecting voids by a hollow sound. Strike pole at groundline and at eighteen (18") inch intervals. Each level will be struck a minimum of eight (8) times.
- B) BORE:** Bore all poles that are suspected of having internal rot or voids. When voids are discovered a shell thickness indicator can be used to measure the extent of the voids. This information can be used to estimate the reduction in strength caused by the void, as discussed in IV "Determining the Serviceability of Decayed Poles". All borings shall be plugged with a treated wood plug, which is properly sized for the respective hole.
- C) EXCAVATION:** Poles should be excavated to a depth of eighteen (18") inches in most locations. Deep excavation may be required in dry climates. After excavation the exposed pole surface should be scraped clean to detect early surface decay. The best results can be obtained by using a triangular scraper.

Shell rot and external decay pockets should be removed from the pole using a specially designed chipper tool. Axes or hatchets should never be used for this application. The remaining pole section should be measured to determine if the pole has sufficient strength with the reduced circumference. Tables 2, 3, and 4 assist in determining the effective circumference.

After complete inspection and application of preservative treatment, the pole is backfilled by tamping every six (6) to eight (8) inches of dirt at a time until the hole is filled. The backfill should mound up around the pole to allow for future settling and drainage away from the pole.

- ## **II** **INSPECTION RESULTS:** Inspection results should be used to update pole plant records, evaluate pole conditions, plan future inspection and maintenance action, and provide information for system map revisions. The inspection process will result in identifying the condition of each individual transmission pole.

A pole is considered "serviceable" under any of the following conditions:

- 1) Large portion of completely sound wood exists.
- 2) Early stages of decay which have not reduced the pole strength below NESC requirements.
- 3) Pole condition is as stated in (1) or (2) but a defect in equipment may exist, such as a broken ground or loose guy wire. Equipment defects should be repaired.

II INSPECTION RESULTS – (CONTINUED)

Any pole that does not meet the above conditions should be classified as a "reject". Any of the following conditions are characteristics of rejects:

- 1) Decay, insect or mechanical damage has reduced pole strength at the groundline below NESC requirements.
- 2) Severe woodpecker hole damage has weakened the pole such that it is considered below NESC requirements.
- 3) Hazardous conditions exist above ground, such as split top.

III REMEDIAL TREATMENT

A) **GROUNDLINE TREATMENT:** All treated poles eventually lose resistance to decay, and groundline treatment provides an economical extension of their useful life. Experience has shown that groundline decay can be postponed almost indefinitely in cases where periodic inspection and maintenance programs are in effect. Groundline treatment is required under the following conditions:

- 1) Whenever a pole is excavated during an inspection, and the pole is sound or decay is not so far advanced that the pole has to be replaced or repaired.
- 2) Any pole (new or used) is set.
- 3) Every ten (10) years.

The preservative paste or grease is most commonly brushed onto the pole. Wood preservatives shall be applied one-sixteenth (1/16") of an inch thick from eighteen (18") inches below grade to four (4") inches above grade. A polyethylene backed paper is then wrapped around the treatment and stapled to the pole. The paper helps to facilitate the migration of the preservative into the critical outer shell.

B) **INTERNAL PRESERVATIVE:** Treatment holes drilled in a wood pole are filled with the aqueous solution so the appropriate dosage is applied. Recommended dosages of four (4) to six (6) vials vary according to pole size. MITC (methylisothiocyanate) will be applied in seven-eighths (7/8") inch holes drilled in a stair stepped pattern, beginning at the groundline and continuing in six (6") inch steps indexed ninety (90) degrees apart. Holes are to be drilled in pole at forty-five (45) degree angle. See Table 5 for depth of holes and number of vials required. The MITC vapors then migrate up and down the pole to help control decay.

Pure MITC is a solid below ninety-four (94) degrees F and contains ninety-seven (97) percent active ingredient. Solid MITC sublimates directly into fumigant vapors. Avoiding the liquid stage helps to minimize loss of fumigant during application through checks and cracks. MITC is packaged in vials to facilitate installation. Just before placing the vial into a treatment hole, the cap is removed. As with any fumigant, application holes should be plugged with pressure treated or plastic plugs. On the second treatment cycle, the plugs are removed and a new vial is inserted into the existing hole and the hole plugged. The old vial may be crushed if necessary to make sufficient room for the new cylinder.

INTERNAL PRESERVATIVE - (CONTINUED)

NOTE: Applicators must keep MITC less than eighty (80) degrees F prior to opening vials to prevent MITC off gassing. Dedicated coolers will be utilized for transport.

C) WOODPECKER DAMAGE REPAIR

Remove as much debris and decayed wood as possible. Use of steel dowel reinforcers is indicated when the diameter of the entry hole exceeds one-third (1/3) pole diameter and if damage extends to the pole center. The holes should be drilled through sound wood, pass through the cavity and enter sound wood on the opposite side. Most nesting cavities will require the use of four (4) steel dowels. Holes that do not extend to the center of the pole may require only two (2) steel dowels. Minor surface damage can usually be repaired without steel dowels.

After all debris and foreign matter has been removed from the damaged area, wet inside of woodpecker hole with Cop-R-Nap before adding wood filler or treated wood. Drill a hole at a forty-five (45) degree angle, above the damaged area and cover the entry hole with tape. Fill the cavity with Osmoweld and plug the drilled hole with treated wooden dowel.

D) POLE TOP TREATMENT AND COVERS

Pole top deterioration is caused by both fungus decay and weathering action. Wherever decay causes slight depressions, usually in the faster growing more vulnerable springwood rings, water can collect to cause wood fibers to shrink and swell, freeze and thaw. Checks develop which eventually allow moisture and decay spores to travel beyond the original treatment and break down wood fibers. When neglected, severe decay will necessitate the replacement of otherwise sound poles. Osmose Pole Topper and Pole Topper Fluid are proven effective methods of preventing or stopping pole top decay.

Once a lineman is in position, Pole Topper and Pole Topper Fluid (Cop-R-Nap) can be applied in several minutes. Pole Topper Fluid is uniformly poured over the pole top prior to installation of the Pole Topper. Use minimum of eight (8) ounces per pole applying until wood is thoroughly wet. The Pole Topper is then installed.

IV DETERMINING THE SERVICEABILITY OF DECAYED POLES

A) DECAY CLASSIFICATIONS: Decay at the groundline should be classified as:

- 1) General external decay
- 2) External pocket
- 3) Hollow heart
- 4) Enclosed pocket

IV DETERMINING THE SERVICEABILITY OF DECAYED POLES – (CONTINUED)

- B) PERMISSIBLE REDUCED CIRCUMFERENCE SAFETY FACTORS:** Wood pole lines are designed using designated fiber strengths which directly depends on pole circumference. Using Tables 1 through 4, will give assistance in determining when replacement is necessary. If the reduced circumference indicates a pole at or below the "at replacement", the pole should be replaced, splinted, or stubbed immediately.
- C) GENERAL EXTERNAL DECAY:** After removing all decayed wood, measure the circumference above the decayed section and through the decayed section to determine the original and reduced circumference. Enter the original circumference in Table 1 and find the minimum reduced circumference. If poles are greater than the minimum reduced circumference replacement is not necessary. However, poles with values close to the minimum should be monitored frequently to ensure that the pole does not fall below the minimum.
- D) EXTERNAL POCKETS:** Remove decayed wood and make measurements of the depth and width of the pocket. Measure the pole for the original circumference. Refer to Table 2 to determine the circumference reduction. Subtract the circumference reduction from the original circumference and compare to minimum reduced circumference in Table 1.
- E) HOLLOW HEART:** If hollow heart is found, as shown in Table 3, determine the shell thickness and measure the original circumference of the pole. Refer to Table 3 to determine the circumference reduction. Enter Table 1 with the original circumference and the reduced circumference to compare to minimum reduced circumference.

To determine the shell thickness, bore three (3) holes (preferably of (3/8") inch diameter), 120 degrees apart, measure the shell thickness at each hole, and average the measurements. After shell thickness is determined, treat and plug holes with tightly fitting cylindrical wood plugs that have been treated with preservative. No transmission pole should remain in service with a shell thickness less than three (3) inches.

- F) ENCLOSED POCKET:** An enclosed pocket is an off-center void as shown in Table 4, and its diameter should be measured by boring holes as described above. Using the minimum thickness of the shell, refer to Table 4 for the reduction in circumference. Measure the original circumference. Enter Table 1 with the original circumference and the reduced circumference and compare to minimum reduced circumference.

V PERSONAL PROTECTIVE EQUIPMENT (PPE)

All of the chemicals required to treat poles have specific PPE requirements as detailed in the attached Material Safety Data Sheets (MSDS). Employees are required to use the PPE listed in the MSDS. Some of the chemicals are restricted use and require state certification before using.

POLE CIRCUMFERENCE

TABLE 1

Original Circumference (Inches)	Minimum Reduced Circumference (Inches)	Original Circumference (Inches)	Minimum Reduced Circumference (Inches)
30	26.1	61	53.1
31	27.0	62	53.9
32	27.8	63	54.8
33	28.7	64	55.7
34	29.6	65	56.6
35	30.5	66	57.4
36	31.3	67	58.3
37	32.2	68	59.2
38	33.1	69	60.0
39	33.9	70	60.9
40	34.8	71	61.8
41	35.7	72	62.6
42	36.5	73	63.5
43	37.4	74	64.4
44	38.3	75	65.3
45	39.2	76	66.1
46	40.0	77	67.0
47	40.9	78	67.9
48	41.8	79	68.7
49	42.6	80	69.6
50	43.5	81	70.5
51	44.4	82	71.3
52	45.2	83	72.2
53	46.1	84	73.1
54	47.0	85	74.0
55	47.9	86	74.8
56	48.7	87	75.7
57	49.6	88	76.6
58	50.5	89	77.4
59	51.3	90	78.3
60	52.2	91	79.2

Note: Poles measured or calculated circumference less than minimum reduced circumference are rejects.

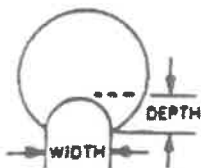


Table 2
Reduction in Measured Circumferences to Compensate
for External Pockets

Pocket Width (ins)	1					2					3					4					5					6									
Pocket Depth (ins)	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5					
Measured Circumference of Pole (ins)	Reduction in Circumferences (ins)																																		
20 to 30	1	1	2	-	-	2	2	3	-	-	2	3	4	-	-	3	4	5	-	-	4	6	8	-	-	6	8	-	-	-	8	-	-	-	-
30 to 40	1	1	1	2	2	1	2	2	3	3	2	3	4	4	4	2	4	5	5	6	3	5	6	7	8	5	7	8	9	-					
40 to 50	1	1	1	2	2	1	2	2	3	3	2	3	3	4	4	2	3	4	5	6	3	4	5	6	7	3	5	6	7	8					
50 to 60	1	1	1	2	2	1	2	2	3	3	2	3	3	4	4	2	3	3	4	5	3	4	4	5	6	3	4	5	6	7					

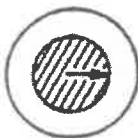


Table 3
Reduction in Measured Circumferences to Compensate
for Hollow Heart

Measured Circumference of Poles (ins)	Minimum Thickness of Shell (ins)					
	2	2.5	3	3.5	4	4.5
20 to 25	1	-	-	-	-	-
25 to 30	2	1	-	-	-	-
30 to 35	3	2	1	-	-	-
35 to 40	4	3	2	1	-	-
40 to 45	5	4	3	2	1	-
45 to 50	7	5	4	3	2	1

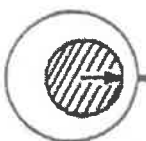


Table 4
Reduction in Measured Circumferences to Compensate
for Enclosed Pockets

Diameter of Pocket (ins)	3			4			5		
Shell Thickness (ins)	1	2	3	1	2	3	1	2	3
Measured Circumferences of Poles (ins)	Reduction in Circumferences (ins)								
20 to 30	2	1	-	3	1	-	4	2	-
30 to 40	2	1	1	3	1	1	4	2	1
40 to 50	2	1	1	3	2	1	4	3	1

Glen Thweatt

From: "Pope, Tom" <tpope@osmose.com>
To: <bkramer@bigrivers.coop>; <gthweatt@bigrivers.coop>
Cc: "Arington, Kenny" <karington@osmose.com>
Sent: Wednesday, June 18, 2003 7:38 AM
Subject: Proposed changes to MITC-FUME Label

Bill and Glen:

Following is the language we are going to submit to the EPA regarding changes to the recommended drilling depth instructions on our MITC-FUME label: *"For interior decay bore a pattern of holes at a 45 degree downward angle to the center of the pole or timber or a maximum of 15" deep, whichever is less. For small diameter poles or timbers, it will be necessary to increase the boring angle as the hole must be at least 12" deep to accommodate both the tube and the plug."* This will replace the first sentence in the 4th paragraph under the Directions for Use heading on the label.

My apologies for the delay in getting you this information.

Feel free to call if you have any questions.

Tom Pope
Technical Marketing Support Specialist
Osmose Utilities Services Inc.
1-800-877-7653 extension 3524

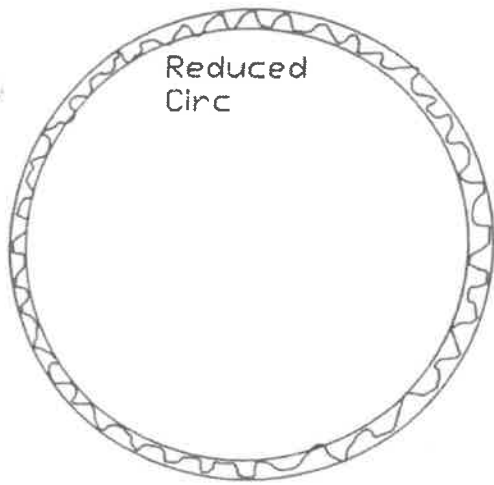
6/18/03

MITC-FUME

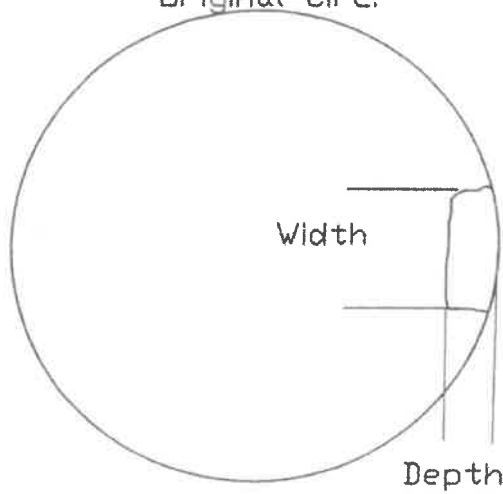
TABLE 5

Pole Diameter-Inches	Drill Depth-Inches	Vials Required
10	13	3
11	14	3
12	15	4
13	16	4
14	18	4
15	19	4
16	20	5
17	21	5
18	23	5
19	24	5
20	25	6
21	26	6
22	28	6
23	29	6
24	30	6
25	31	6
26	33	6
27	34	6
28	35	6
29	36	6
30	38	6

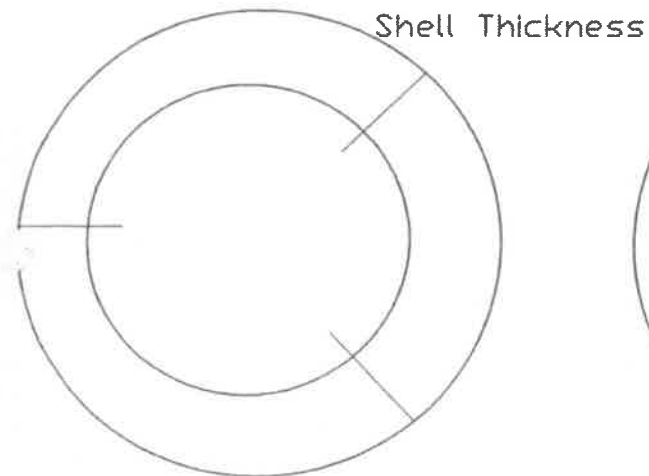
Original Circ.



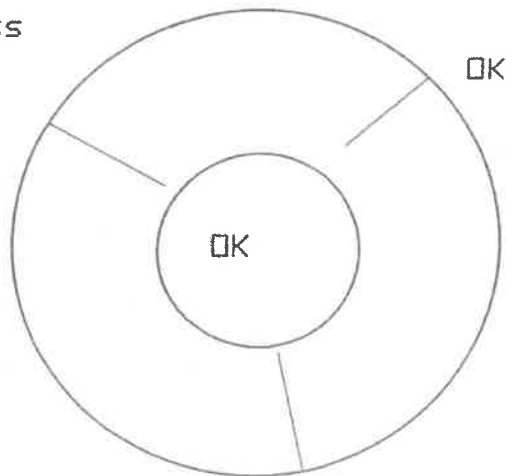
Original Circ.



Hollow Heart
Table 3

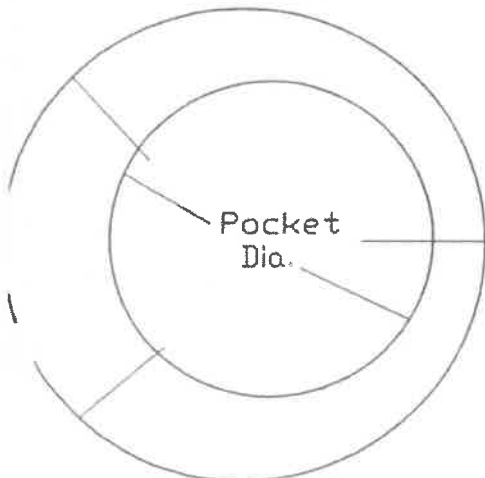


Hollow Heart
Table 3



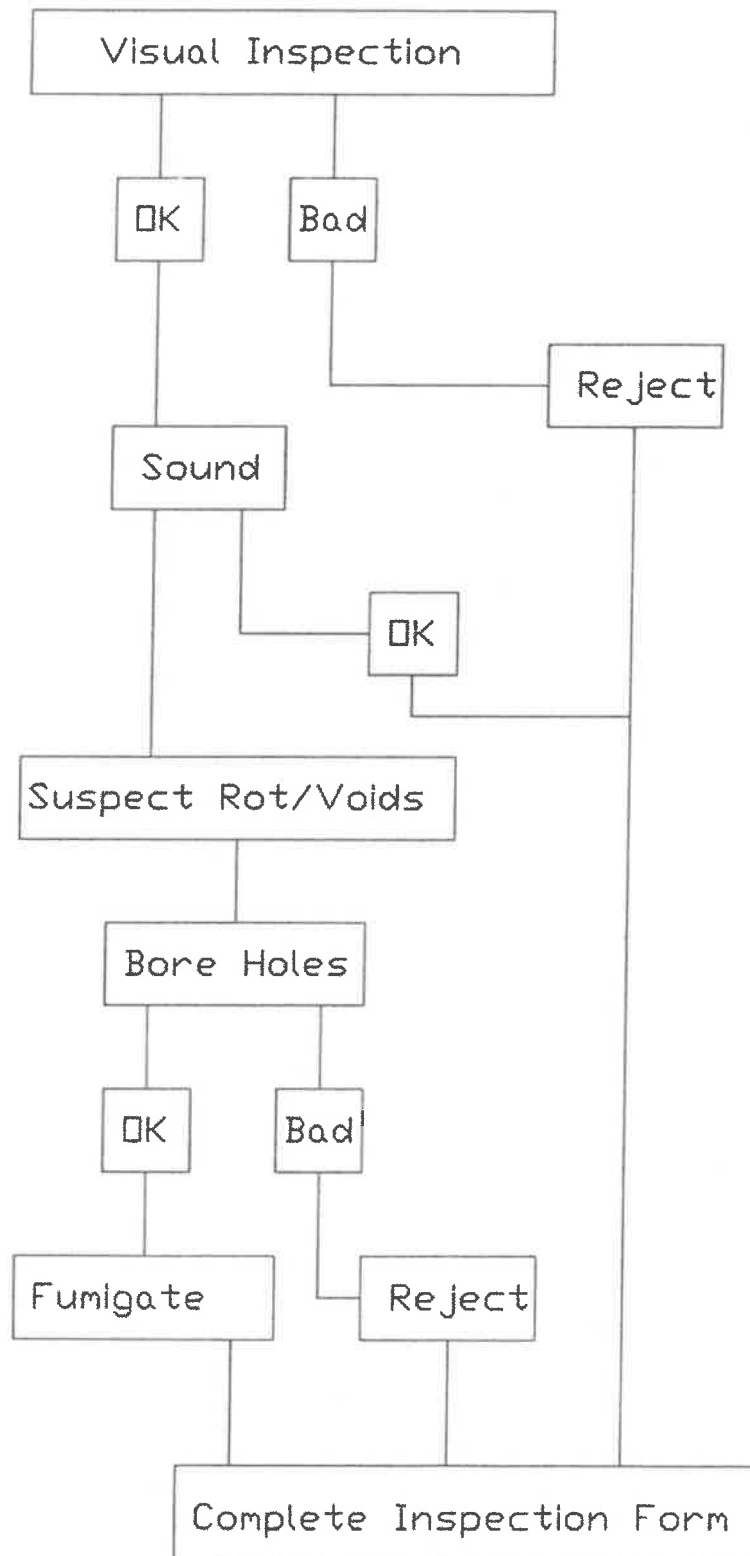
Transmission Poles Minimum 3' Avg Shell

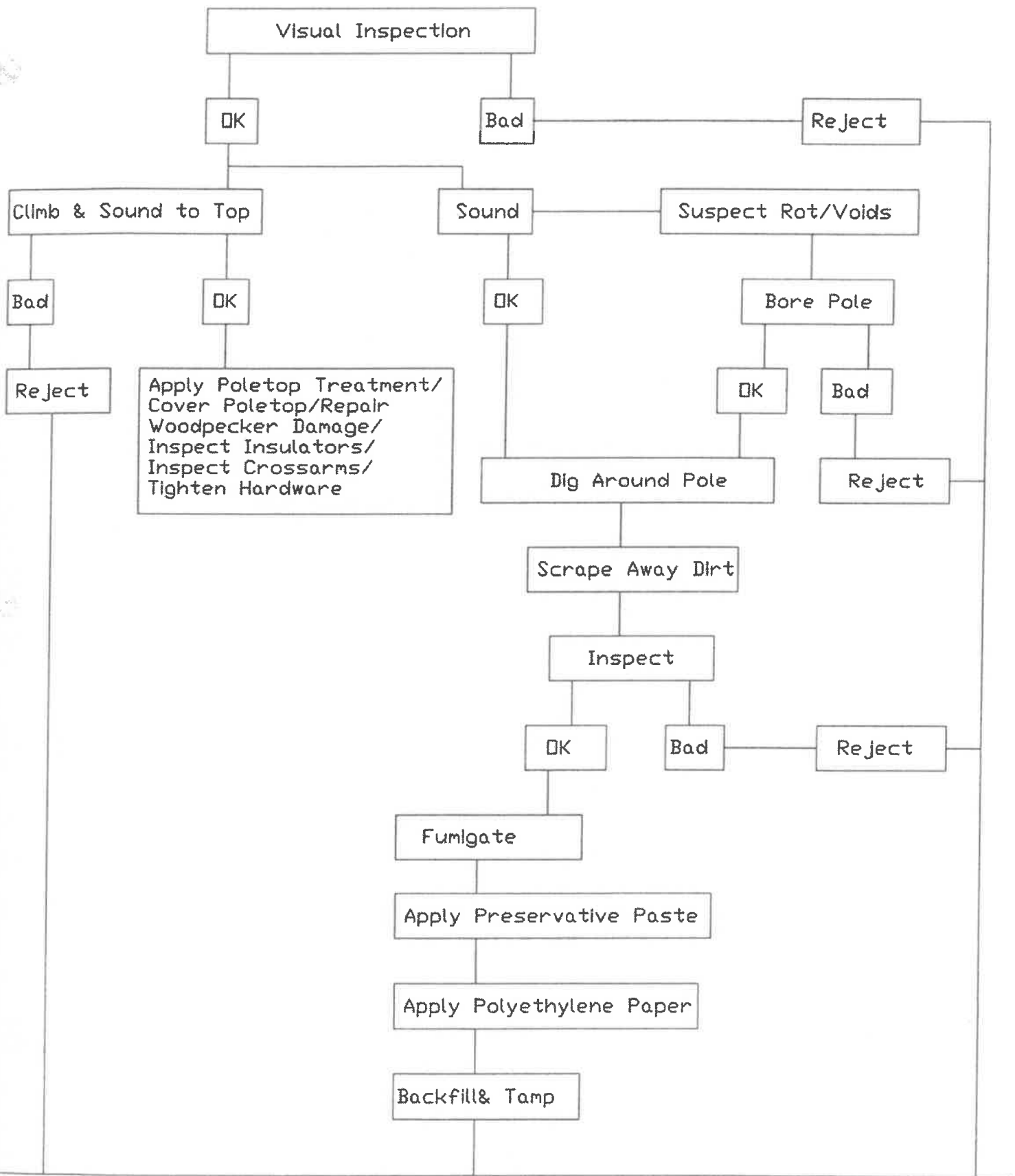
Internal Pocket
Table 4



Bore Poles
(3) 3/8"
Holes

FIVE YEAR POLE INSPECTION





Complete Inspection Forms

POLE MAINTENANCE SCHEDULE

	Year															
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Ground Treat+MITC Fume	1997A	1998A	1999A	2000A	2001A	1997B	1998B	1999B	2000B	2001B	1997A	1998A	1999A	2000A	2001A	1997B
Sound + Inspect	1997B	1998B	1999B	2000B	2001B	1997A	1998A	1999A	2000A	2001A	1997B	1998B	1999B	2000B	2001B	1997A

Notes:

1. New poles will be sounded and inspected at 5 years and every 5 years thereafter.
2. Poles will be ground treated and fumigated at 10 years and every 10 years thereafter.
3. Steel poles will be inspected at 5 years and every 5 years thereafter.

DATE: BIRTH DATE, TYPE POLE & ORIG. TREAT., ORIG. G.L. CIRC., EFFECT G.L. CIRC., DECAY REMOVED (INCHES), TREATED, REJECTED, WOODPECKER TUBES, SOUND, BORE, FUMIGANT VIALS, POLE SIZE, BRAND OF POLE, POLE CAPPED

LINE POLE NO. JOINT INITIALS

LINE	POLE NO.	JOINT	BIRTH DATE	TYPE POLE & ORIG. TREAT.	ORIG. G.L. CIRC.	EFFECT G.L. CIRC.	DECAY REMOVED (INCHES)	TREATED	REJECTED	WOODPECKER TUBES	SOUND	BORE	FUMIGANT VIALS	POLE SIZE	BRAND OF POLE	POLE CAPPED	CROSS SECTION	REMARKS	INITIALS	
																		CT - Can't treat		
																		DP - Decay Pockets		
																		EP - Enclosed Decay Pockets		
																		HR - Heart Rot		
																		MD - Mechanical Damage		
																		BGW - Broken Ground Wire		
																		RB - Rotten Butt		
																		SR - Shell Rot		
																		ST - Split Top		
																		SWP - 2" or less WPH		
																		MWP - 2 - 4" WPH		
																		LWP - 4" or larger WPH		
																		BELOW G-LINE INSP/TREAT		
																		SOUND & G-LINE VISUAL INSP		
																		BORE/INSP/MITC FUME		
																		CLUB/INSP/TR WPCAP		

NOTE: Specify "Danger" poles and to whom reported

DF - Douglas Fir SP - Southern Pine C - Creosote P - Pentachlorophenol