

SOUTHERN CALIFORNIA EDISON COMPANY  
POMONA, CALIFORNIA



**SPECIFICATION MS-0454-2019**

REVISION 3

(Supersedes Specification MS-0454-2018)

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**INSPECTION AND TREATMENT OF WOOD POLES IN**  
**SERVICE**

September 11, 2019

SOUTHERN CALIFORNIA EDISON COMPANY  
POMONA, CALIFORNIA



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SERVICE**

September 11, 2019

Prepared by:

DocuSigned by:  
*Brian Flynn*  
676D31B61CC24B4...

**BRIAN FLYNN**

Wood Products Specialist/Scientist 3  
Distribution Apparatus and Standards  
Engineering, T&D  
9/11/2019

**DATE**

Approved by:

DocuSigned by:  
*Juan Castaneda*  
25BEE76DAF1B4CC...

**JUAN CASTANEDA**

Senior Manager  
Distribution Apparatus and Standards  
Engineering, T&D  
9/11/2019

**DATE**

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September 11, 2019

Approved by:

DocuSigned by:  
*MUSTAFA ALI*  
5BF1349DBC5B4B2

**MUSTAFA ALI**  
Senior Manager  
Transmission Engineering  
T&D  
9/25/2019

**DATE**

DocuSigned by:  
*Norman Jufer*  
1B8F221EFE724AA...

**NORMAN JUFER**  
Senior Engineer  
Poles and Towers Structural Analysis  
T&D  
9/12/2019

**DATE**

DocuSigned by:  
*CLINTON CHAR*  
FC94D7594D9A429

**CLINTON CHAR**  
Manager, Engineering  
Poles and Towers Structural Analysis  
T&D  
9/11/2019

**DATE**

SOUTHERN CALIFORNIA EDISON COMPANY  
POMONA, CALIFORNIA

REVISION SUMMARY

The main purpose of this summary is to document previous and current revisions/amendments.

Revision/ Amendment	Date	Comments	Responsible Engineer
0	08/07/13	Initial Issue	M. Stark
1	03/03/16	Added Appendix 2 and NOC #1. Specification re-issued in 2017.	M. Hansen B. Flynn
2	02/13/18	Revised	B. Flynn
3	09/11/19	Revised	B. Flynn



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# **INSPECTION AND TREATMENT OF WOOD POLES IN SERVICE**

September 11, 2019

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## **SECTION 1**

### **INTRODUCTION**

#### **1.1 INSPECTION AND TREATMENT OF WOOD POLES IN SERVICE**

The Edison Intrusive Wood Pole Inspection Program is intended to meet the intrusive inspection requirements and schedules as mandated by General Order 165 and CAL ISO by inspecting the entire Edison wood pole system. The program includes visual and intrusive inspections designed to detect damage and/or decay in order to identify and prioritize poles needing replacement.

END OF SECTION 1



## **SECTION 2**

### **INSPECTION METHODOLOGY**

#### 2.1 INSPECTION ACTION CODES (IACs)

All Edison wood poles shall be inspected utilizing one of the following inspection methodologies per their appropriate inspection cycles, beginning with a Visual Inspection as described below:

**TABLE 2-1**  
**INSPECTION ACTION CODE**

<b>CODE GROUP - EZ-INSPA</b>	<b>INTRUSIVE POLE INSPECTION ACTION</b>
<b>CODES</b>	<b>SHORT TEXT FOR CODE</b>
1A	Visual – New pole less than ten (10) years old
1C	Visual – Repole/Mod Pole (Automatic one-year replacement)
1F	Visual – Asbestos Fire Wrap (Automatic one-year replacement)
2A	Partial Dig (Intrusive Inspection)
3A	Unable to Inspect – No Access
3B	Unable to Inspect – Obstructed
3C	Unable to Inspect – Removed Pole (DNE)
3D	Unable to Inspect – Any Non-Wood Pole
3E	Unable to Inspect – Conductor Attached to Tree
3F	Unable to Inspect – Incomplete Location Information
3G	Unable to Inspect – Located in Substation
4A	Full Treatment (Intrusive Inspection)
5A	Sound and Bore (Intrusive Inspection)
6A	RPIN Inspections (Repaired Poles)
7A	Through-Bored Pole Inspections

## INSPECTION METHODOLOGY

2.2 RECOMMENDED ACTION CODES (RACs)

As a result of a pole inspection, the appropriate required action (Replace, Steel Stub or Pass Inspection) will be assigned from the table below. Actions grayed-out are no longer used, but are shown for reference only.

TABLE 2-2  
RAC (PRIORITY) SYSTEM

CODE GROUP - EZ-RECMA R/A CODE	INTRUSIVE POLE RECOMMENDED ACTION
1	Replace Pole - Priority 1 (72 Hours)
2	Replace Pole - Priority 2A (1 Year)
3	Replace Pole - Priority 2B (2 Years)
4	Replace Pole - Priority 2C (3 Years)
5	Steel Stub - Priority 2C (3 years)
6	Fiberwrap - Priority 2C (3 years) – idle program
7	SAM - Priority 2A (1 year) – idle program
8	SAM - Priority 2C (3 years) – idle program
9	Replace Bands – Pass RPIN Inspection (3 year)
10	Pass - Intrusive Pole Inspection (Priority 3)

END OF SECTION 2

## **SECTION 3**

### **VISUAL INSPECTIONS**

#### **3.1 GENERAL NOTE**

Visual inspections will be performed on **all** wood poles prior to performing the intrusive inspection. When the visual inspection has been completed and the pole is **not** any of the IAC 1s, proceed to Section 4 – Intrusive Inspections.

#### **3.2 VISUAL METHODOLOGY**

- A. Visual inspection shall include determination of prior reinforcement/restoration, inspection history, and circumference at groundline. Pole characteristics (Class, Pole height, Species, Initial Treatment, Reinforcement Type, and Inspection History) should be recorded if legible brand is present.
- B. Pole shall receive a visual inspection from the pole top to groundline, from four (4) points, each 90 degrees apart (four (4) quadrants).
- C. The visual inspection shall identify conditions that could have high safety risk to the public/workers, property, or environment and would require immediate replacement of the pole or repair of attachments or equipment on the pole.
  - 1. When visually assessing the pole greater than 6 feet above groundline, see Table 3-1, Typical Discrepancies for Visual Rejects Greater than 6 Feet Above Groundline.
  - 2. When visually assessing the pole up to 6 feet above groundline, physical measurement will need to be taken and inputted in to an SCE approved damage calculator to determine the RSM.
- D. Poles shall be “sounded” if evidence of voids and/or mechanical/insect damage is detected during sounding, suspect areas shall be intrusively inspected with 9/16-inch diameter boring.
  - 1. Inspection boring must pass 2/3 the diameter of the pole, but not closer than 2 inches from the opposite side.
- E. For poles meeting the description of IAC 1A, if no high safety risk conditions are found and no voids identified via sounding or visual observation, leave Recommended Action blank, no further action is required. If a void is found during sounding; proceed to Section 4 – Intrusive Inspections.

## VISUAL INSPECTIONS

**TABLE 3-1**  
**TYPICAL DISCREPANCIES FOR VISUAL REJECTS GREATER THAN 6 FEET ABOVE GROUNDLINE**

RECOMMENDED ACTION CODE	TIME FRAME/ ACTION	SPLIT OR DECAY IN POLE	HOLE/BORING DAMAGE – ANIMAL, BIRD OR INSECT (DRY-WOOD TERMITES)	EXTERIOR DAMAGE – COMPRESSION/FIRE/ ANIMAL/MECHANICAL
<b>RAC-1</b>	<b>Immediate</b> – Replace within 72 hours	<ul style="list-style-type: none"> <li>Split or decay damage causing unstable structure. Failure imminent.</li> </ul>	<ul style="list-style-type: none"> <li>Hole/boring damage causing unstable structure. Failure imminent.</li> </ul>	<ul style="list-style-type: none"> <li>Exterior damage causing unstable structure. Failure imminent.</li> <li>Cross Break.</li> </ul>
<b>RAC-2</b>	<b>Urgent</b> – Replace within 1 year	<ul style="list-style-type: none"> <li>Split or decay allows light through pole.</li> <li>Split or decay at critical attachment; bolt pulling through pole.</li> </ul>	<ul style="list-style-type: none"> <li>Hole allows light through pole.</li> <li>Hole &gt; 2" diameter and extends past center.</li> <li>Holes &gt;2" diameter within 18" vertical at high stress area.</li> </ul> <p><b>Note: Holes more than 12" above the uppermost attachment will not be grounds for rejecting the pole.</b></p>	<ul style="list-style-type: none"> <li>Compression wood, peeling off &gt;2" depth.</li> <li>Exterior damage &gt;2" depth and &gt; 1/4 pole circumference (1 quadrant).</li> </ul>
<b>RAC-3</b>	<b>Advanced Degradation</b> – Replace within 2 years	<ul style="list-style-type: none"> <li>Split within 6" of critical attachment, not pulling through.</li> <li>Decay within 6" of critical attachment, not pulling through.</li> </ul>	<ul style="list-style-type: none"> <li>Hole &gt;2" diameter with possible cavity in high stress area.</li> <li>Three or more holes &gt;2" diameter within 18" vertical.</li> </ul>	<ul style="list-style-type: none"> <li>Compression wood, peeling off 1" to 2" depth.</li> <li>Exterior damage 1" to 2" depth and &gt;1/4 pole circumference (1 quadrant).</li> </ul>
<b>RAC-4</b>	<b>Moderate Degradation</b> – Replace within 3 years		<ul style="list-style-type: none"> <li>Hole &lt; 2" diameter with possible cavity</li> </ul>	<ul style="list-style-type: none"> <li>Exterior damage 1" to 2" depth and 2" to 1/4 pole circumference (1 quadrant).</li> <li>Extensive top damage &gt;6" above all critical attachments.</li> </ul>

## Notes:

1. Critical Attachment – Examples: guy fixture, cross-arm through-bolt, insulator through-bolt, or equipment through-bolt.

## VISUAL INSPECTIONS

2. Examples of holes (Woodpecker) in high stress areas.



3. The picture below shows a starter hole created by a woodpecker causing minor damage with avenue for moisture to flow out of entrance pocket.



### 3.3 ADDITIONAL VISUAL DAMAGE NOT REQUIRING POLE REPLACEMENT

Inspector shall make immediate notification to the Edison Program Manager if dangerous or imminent failure situations or conditions are identified during visual inspection (Inspector shall provide pictures when required by Edison).

END OF SECTION 3

## **SECTION 4**

### **INTRUSIVE INSPECTIONS**

#### **4.1 GENERAL NOTES AND REQUIREMENTS FOR ALL TYPES OF INTRUSIVE INSPECTIONS**

- A. All intrusive inspection types will include a full visual inspection prior to boring (see Section 3 – Visual Inspections).
- B. Plugs – Edison Approved – All inspection and treatment borings shall be plugged with:
  - 1. Scotty Replug:
    - i. Type A13F – White (7/8-inch diameter borings)
    - ii. Type A9 – White (9/16-inch diameter borings)
  - 2. Genics Inc.:
    - i. PO # - 30789 White (7/8-inch diameter borings)
    - ii. PO # - 30749 White (9/16-inch diameter borings)
- C. Deteriorated pole software program – The Remaining Section Modulus (RSM) will be determined through use of a deteriorated pole software program that must be approved by Edison’s Wood Product specialists (i.e., D-Calc). All RSM percentages shall be rounded down to the nearest whole number (i.e., 98.3% = 98, or 96.7% = 96%).
- D. Inspecting Previously Intrusively Inspected Wood Poles.
  - 1. A maximum of two (2) sets of drill bore patterns shall be allowed on any wood pole at groundline and above.
  - 2. Contractor shall not drill additional borings at groundline unless authorized by Edison’s Wood Products Specialists.
    - i. When performing an inspection and 3 or more existing borings are present at groundline, add one (1) additional 9/16-inch diameter inspection boring 6 inches above groundline (AGL), see Section 4.3.2 – Groundline (GL) Borings.
- E. It is important to use the shell thickness measurements to validate the depth of the void based on a 45-degree angle, in order to convert to an RSM.

## INTRUSIVE INSPECTIONS

- F. If any inspection results in an RSM value that meets requirements for RAC 1 based on Section 3 – Visual Inspections, identify pole as a replacement candidate, and make required notifications. No further inspection is required.
- G. Drill cautiously to avoid all other borings and/or checks when adding new 9/16-inch borings.

#### 4.2 INTRUSIVE INSPECTION METHODOLOGY DETAILS

##### 4.2.1 PARTIAL DIG INSPECTION (IAC 2A)

###### A. General Notes and Requirements for Partial Dig Inspections

- 1. Poles set in dirt will receive a partial dig inspection, except the following:
  - a. Gas poles and “push poles” (see Section 4.2.2 – Full Treatment Inspection).
  - b. Poles with “Through-boring” pattern (see Section 5.2 – “Through-Boring” Pole Inspection).
  - c. Previously restored poles (see Section 5.1 – RPIN Inspections).

###### B. Partial Dig Methodology

- 1. Excavate a minimum of one (1) quadrant around the pole to 20 inches in depth.
- 2. If the pole surface below ground line does not exhibit external decay, proceed to Section 4.3.1 – Below Groundline (BGL) Excavation and Boring.
- 3. If the pole surface BGL exhibits external decay or shell rot, proceed to Section 4.2.2 – Full Treatment Inspection (IAC 4A).

##### 4.2.2 FULL TREATMENT INSPECTION

###### A. Criteria to Perform Full Treatment Inspection

- 1. Gas pole or push pole set in dirt, or

## INTRUSIVE INSPECTIONS

2. If a Partial Dig inspection reveals external decay

B. Full Treatment Methodology

1. Excavate 360 degrees around the pole to 20 inches in depth.
  - a. Poles with obstructions must have a minimum 2/3 of the poles circumference excavated. If pole cannot be excavated at this minimum, pole is an auto reject RAC 2 unless a higher priority is identified as a result of the internal inspection.
2. If pole does not exhibit external decay, bore holes in accordance with Section 4.3.1 – Below Groundline (BGL) Excavation and Boring.
3. If the pole exhibits decay or shell rot:
  - a. Remove all external decay down to 20 inches in depth.
  - b. Calculate the RSM based on the external decay.
  - c. Bore holes in accordance with Section 4.3.1 – Below Groundline (BGL) Excavation and Boring.

4.2.3 SOUND AND BORE INSPECTION (IAC 5A)

A. Criteria to Perform Sound and Bore Inspection

1. Includes all wood poles set in concrete, asphalt, rock, *or* where excavation cannot be performed, and where a “through-boring” pattern is not present.

B. Sound and Bore Methodology

1. Two (2) groundline borings are required to be drilled, 90 degrees apart; first boring shall be 2 to 3 inches from the largest check.
2. Bore in accordance with Section 4.3.2 – Groundline (GL) Borings.
3. Designate all gas poles and push poles set in asphalt or concrete as Recommended Action RAC 2, unless higher priority is identified as a result of groundline boring.



## INTRUSIVE INSPECTIONS

4.3 BORING METHODOLOGY4.3.1 BELOW GROUNDLINE (BGL) EXCAVATION AND BORINGA. BGL General

1. All soil, sod, flowers, and shrubs shall be placed on a tarp during removal and excavation. Sod, flowers, and shrubs shall be carefully replaced subsequent to backfilling.
2. When digging is required, excavation shall be to a depth of 20 inches BGL to adequately check the shell for decay and accommodate the required new boring at a 45-degree angle.
3. All inspection borings will be a 9/16-inch diameter auger bit drilled to the specified depths listed in Table 4-1, Boring Depth Requirements at 45 degrees.
4. The ONLY exception to the 20-inch depth requirement is when obstructions BGL are present, e.g., rock, pipes, and excessive root system.
  - a. If obstructions BGL are present, the second excavation and boring shall be performed up to 180 degrees from the first.
  - b. Contractor shall provide a mark (indicator) at GL to identify the location of the excavation/boring.
5. After completion of inspection, the soil shall be replaced around the pole to a maximum height of 3 inches above normal grade.
  - a. All wood chips/shavings from borings may be placed in excavated hole.
  - b. One-half of the excavation shall be backfilled, then tamped; after initial tamping, the remainder of the dirt shall be placed in the hole and tamped.

**Note: Inspector shall make notes explaining any deviations from the required specification.**

## INTRUSIVE INSPECTIONS

B. BGL Boring Procedure

1. Inspector shall clean the surface of the wood exposed in the excavation by brushing or scraping the pole with tools and methods approved by Edison Wood Products Specialists—axes shall not be used to scrape soil away from the pole.
2. Drill a new boring between 3 and 4 inches to the right or left of the largest check at a depth between 8 and 10 inches BGL.
3. A 9/16-inch diameter boring shall be drilled downward at a 45-degree angle past the center of the pole to the specified depths listed in Table 4-1, Boring Depth Requirements at 45 degrees.

TABLE 4-1  
BORING DEPTH REQUIREMENTS AT 45 DEGREES

POLE CIRCUMFERENCE (INCHES)	RECOMMENDED AUGER BIT LENGTH (INCHES)	BORING DEPTH REQUIREMENT (INCHES)
25-27	12	8.50
28-29	12	9.25
30-32	12	11.25
33-36	18	11.75
37-40	18	13.75
41-44	18	14.50
45-50	18	16.50
51-66	18	17.50
Greater than 66	18	17.50

4. Inspection borings shall be probed with a shell gauge to determine the presence and extent of void(s).
5. The RSM shall be determined and documented.
6. If there are no voids BGL, proceed to Section 4.3.2 – Groundline (GL) Borings.
7. If a void is detected, excavate 90 degrees from the first boring and drill a second 9/16-inch boring at a 45-degree angle past the center of the pole to the specified boring depths listed in Table 4-1, Boring Depth Requirements at 45 degrees. Drill cautiously to avoid the first boring's path.

## INTRUSIVE INSPECTIONS

8. The RSM shall be determined for the second BGL boring.
9. Record the lesser of the two RSM values for the BGL record.
10. Proceed to Section 4.3.2 – Groundline (GL) Borings.

#### 4.3.2 GROUNDLINE (GL) BORINGS

- A. New inspection borings will be 9/16-inch diameter auger bit on all poles drilled to the specified depths listed in Table 4-1, Boring Depth Requirements at 45 degrees.
- B. If the pole **does not have any existing borings**, Partial Dig (IAC 2A) and Full Treatment (IAC 4A) inspections will require one (1) new boring. Sound and Bore (IAC 5A) inspections will require two (2) borings 90 degrees apart.
  1. Sound and Bore (IAC 5A) Inspection: Drill a new boring between 3 and 4 inches to the right or left of the largest check. Second boring shall be bored 90 degrees from the first.
  2. Partial Digs (IAC 2A) and Full Treatment (IAC 4A) inspections: The first GL borings shall be drilled 90 degrees from the first BGL boring. If a void is detected, a second 9/16-inch inspection boring shall be bored 90 degrees from the first drilled inspection boring.
- C. If two (2) borings or less exist at GL, add one (1) additional 9/16-inch diameter inspection boring at GL on an un-bored quadrant (90 and 120 degrees adjacent from existing boring).
  1. For Sound and Bore (IAC 5A) inspections, efforts shall be made to remove two (2) of the previously installed plugs in addition to adding the one (1) new 9/16-inch inspection boring at GL to determine the condition of the wood structure.
  2. Partial Digs (IAC 2A) and Full Treatment (IAC 4A) inspections: If a void is detected, a second 9/16-inch inspection boring, 6 inches AGL shall be bored 90 degrees from the first drilled inspection boring.
- D. If three (3) or more existing borings are present at GL, add one (1) additional 9/16-inch diameter inspection boring 6 inches AGL, between 3 and 4 inches to the right or left of the largest check.

#### INTRUSIVE INSPECTIONS

1. For Sound and Bore (IAC 5A) inspections, efforts shall be made to remove two (2) of the previously installed plugs in addition to adding the one (1) new 9/16-inch inspection boring 6 inches AGL to determine the condition of the wood structure.
  2. Partial Digs (IAC 2A) and Full Treatment (IAC 4A) inspections: If a void is detected, a second 9/16-inch inspection boring, 6 inches AGL shall be bored 90 degrees from the first drilled inspection boring.
- E. Inspection borings shall be probed with a shell gauge to determine the presence and extent of void(s).
- F. The RSM shall be determined and documented.
- G. Record the lesser of the two RSM values for the groundline record.
- H. If any internal RSM (BGL or GL) is < 88%, proceed to Section 6 – Poles with Deterioration. Only exception are “Penta-Cellon,” “Penta-Dow,” and “push-poles” set in concrete or asphalt. See Section 4.2.3 – Sound and Bore Inspection.

END OF SECTION 4

## **SECTION 5**

### **SPECIALIZED POLES**

#### **5.1 RPIN INSPECTIONS (REPAIRED POLES – IAC 6A)**

##### **A. General Notes and Requirements for Intrusive Inspection and Treatment of Restored Poles**

1. Includes all poles with Steel Stub or Fiberglass Wrap restoration systems.
2. Inspectors shall evaluate the quality of the restoration system as well as the quality of the wood pole.
3. All gas treated poles with a steel stub or fiberglass wrap shall be tagged as R2 with a Recommended Action Code 2 (RAC 2) – Urgent.

##### **5.1.1 STEEL STUBBED POLES**

###### **A. Step 1 – Check the following:**

1. Compression Failure – Wall of pole collapsing, if found – tag as R2 with RAC 2 – Urgent.

###### **B. Step 2 – Boring, Top of Steel Stub**

1. Pole shall be horizontally bored with 9/16-inch auger bit 3 inches above the top of the steel stub.
  - a. Inspection boring must pass 2/3 the diameter of the pole, but not closer than 2 inches from the opposite side.
2. Inspection boring shall be probed with a shell gauge to determine the presence and extent of void(s).
3. The RSM shall be determined.
4. If RSM at top of steel stub = 100%, proceed to Step 3 – Boring, Groundline (GL).
5. If RSM at top of steel stub is 68% to 99% or is 100% with void, designate the pole as a replacement candidate with a Recommended

## SPECIALIZED POLES

Action Code RAC 3 and tag the pole as an R2.

- a. No other borings are necessary.
6. If RSM at top of steel stub is 23% to < 68%, designate the pole as an Urgent Replacement with a Recommended Action Code RAC2 and tag the pole as an R2.
  - a. No other borings are necessary.
7. If RSM is < 23%, designate as RAC 1 and immediately make required notifications.

C. Step 3 – Boring at Groundline (GL)

1. Drill a new 9/16-inch diameter inspection boring between 3 and 4 inches to the right or left of the largest check. The inspection boring shall be drilled downward at a 45-degree angle past the center of the pole to the specified depths listed in Table 4-1, Boring Depth Requirements at 45 Degrees.
2. Inspection boring shall be probed with a shell gauge to determine the presence and extent of void(s).
3. The RSM shall be determined.
4. If the RSM  $\geq$  45%, proceed to Step 4 – Boring at Upper and Lower Bands.
5. If RSM at GL is < 45%, designate the pole as a replacement candidate with a Recommended Action Code (RAC) 3 and tag the pole with an R2.
  - a. No other borings are necessary.

D. Step 4 – Boring at Upper and Lower Bands

1. General
  - a. A 9/16-inch diameter boring shall be drilled horizontally 2 inches above the top of both upper and lower bands.

## SPECIALIZED POLES

- b. Inspection boring must pass 2/3 the diameter of the pole, but not closer than 2 inches from the opposite side.
- c. Inspection boring shall be probed with a shell gauge to determine the presence and extent of void(s).
- d. The remaining “**Shell Thickness**” shall be determined and RSM’s calculated when needed for Recommended Action.

## 2. Upper Bands

- a. If there are no voids, proceed to 5.1.1D3-Lower Bands.
- b. If RSM is 68% to 99% or is 100% with void, designate the pole as a replacement candidate with a Recommended Action Code RAC 3 and tag the pole as an R2.
- c. If RSM is 23% to < 68%, designate the pole as an Urgent Replacement with a Recommended Action Code RAC2 and tag the pole as an R2.
- d. If RSM is < 23%, designate as RAC 1 and immediately make required notification.

## 3. Lower Bands

- a. If there are no voids, proceed to Step 5 – Internal Treatment.
- b. If a void is detected and the remaining shell thicknesses is less than (<) 2-1/2 inches, designate the pole as a replacement candidate with a RAC 2 and tag the pole with an R2. No other borings or treatments are necessary.
- c. If a void is detected and the remaining shell thicknesses are greater than or equal to ( $\geq$ ) 2-1/2 inches, drill a second 9/16-inch boring 90 degrees to the right or the left. Drill cautiously to avoid existing borings.
  - 1. If shell thickness is  $\geq$  2-1/2 inches, proceed to Step 5 – Internal Treatment.
  - 2. If shell thickness is < 2-1/2 inches, designate the pole as a

## SPECIALIZED POLES

replacement candidate with a RAC 2 and tag the pole with an R2. No other borings or treatments are necessary.

E. Step 5 – Internal Treatment (For “Pass” Candidates only)

A minimum of five (5) treatment borings will be treated with CuB 20 starting at groundline and spiraling up the pole in 1-foot increments, 90 degrees apart. If existing borings exist you shall use them. If you need to add additional borings, use a 9/16-inch auger drilled at a 45-degree angle. Use the table below for determining depth of new treatment borings.

**Note: All treatment borings will be treated with CuB 20 (Product Order No.: 13542 (IT))**

TABLE 5-1  
BORING DEPTH REQUIREMENTS AT 45 DEGREES

POLE CIRCUMFERENCE (INCHES)	RECOMMENDED AUGER BIT LENGTH (INCHES)	BORING DEPTH REQUIREMENT (INCHES)
25-27	12	8.50
28-29	12	9.25
30-32	12	11.25
33-36	18	11.75
37-40	18	13.75
41-44	18	14.50
45-50	18	16.50
51-66	18	17.50
Greater than 66	18	17.50

5.1.2 ENCASED POLES

A. Step 1 – Inspect the Fiberglass Encasement System



## SPECIALIZED POLES

1. Check for the following conditions of the fiberglass encasement system:
  - a. Material delaminating
  - b. Material splitting
  - c. Separation from wood -in two quadrants
2. If either condition is found, notify Edison according to the Scope of Work, designate the pole as a replacement candidate with a Recommended Action Code RAC 2 and tag the pole with an R2. No other borings or treatments are necessary.
3. All gas treated poles with a fiberglass wrap shall be tagged as R2 with a Recommended Action Code RAC 2 -Urgent.

**B. Step 2 – Top of Fiberglass Encasement / Wrap**

1. A new boring shall be horizontally drilled with 9/16-inch auger bit, 3 inches above the top of the fiberglass wrap.
  - a. Inspection boring must pass 2/3 the diameter of the pole, but not closer than 2 inches from the opposite side.
2. Inspection boring shall be probed with a shell gauge to determine the presence and extent of void(s).
3. The RSM shall be determined.
4. If RSM at top of the fiberglass encasement = 100%, proceed to Step 3- Boring, Encasement.
5. If RSM at top of fiberglass encasement is 68% to 99% or is 100% with void, designate the pole as a replacement candidate with a Recommended Action Code RAC 3 and tag the pole with an R2.
  - a. No other borings or treatments are necessary.
6. If RSM at top of fiberglass encasement is 23% to < 68%, designate the pole as an Urgent Replacement with a Recommended Action Code RAC 2 and tag the pole with an R2. No other borings or treatments are necessary.

## SPECIALIZED POLES

7. If RSM is < 23%, designate as RAC 1 and immediately make required notifications.

C. Step 3 – Boring in Encasement

1. A new 9/16-inch boring shall be drilled 10 inches below the top of the Wrap at a 45 degree angle passing the center of the pole, but not closer than 3 inches from the opposite side.
2. Holes shall be probed with a shell gauge to determine the presence and extent of void(s).
3. The RSM shall be determined.
4. If  $RSM \geq 67\%$ , proceed to Step 4- Internal Treatment.
5. If  $RSM < 67\%$ , designate the pole as a replacement candidate with a Recommended Action Code RAC3 and tag the pole with an R2.
  - a. No other borings are necessary.

D. Step 4 – Internal Treatment Fiberglass Encasement

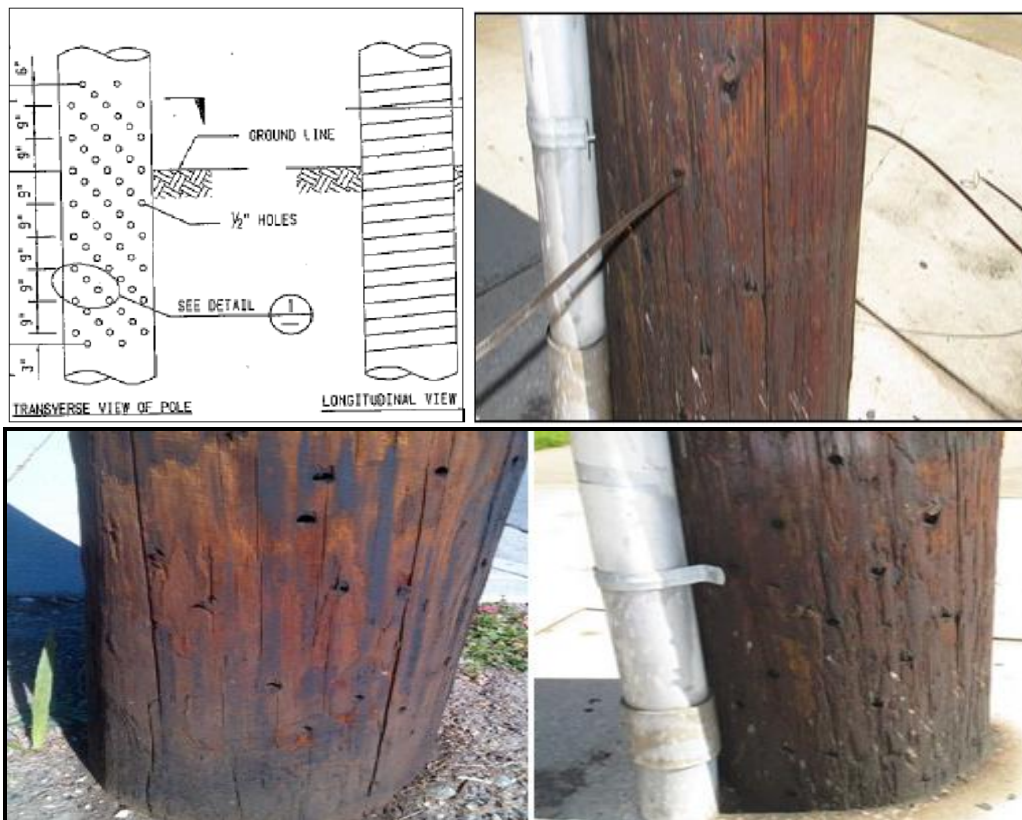
1. Treat all borings (new or old) with CuB 20 (Product Order No.: 13542 (IT)).

5.2 “THROUGH-BORING” POLE INSPECTION (IAC 7A)

5.2.1 GENERAL NOTES FOR THROUGH-BORING POLE INSPECTION

- A. To determine whether the pole is through-bored, a pattern of 1/2-inch holes usually extending 18"–24" above ground line will be visible (See Photos below). The holes will be drilled in a diagonal pattern that extends through the pole.

## SPECIALIZED POLES



- B. Southern California Edison has purchased poles with the Through-boring pattern from:
  - 1. 1992 to 1995
  - 2. 2004 to current
- C. The pattern has only been used on poles 40 to 120 feet in length.
- D. Through-bored poles are always Douglas fir.
- E. These holes are not to be considered damage to the pole.

### 5.2.2 INSPECTION METHODOLOGY

- A. Pole shall be horizontally bored with 9/16-inch auger bit 6 inches above the top of the Through-boring pattern.
  - 1. Inspection boring must pass 2/3 the diameter of the pole, but not closer than 2 inches from the opposite side.

## SPECIALIZED POLES

- B. Holes shall be probed with a shell gauge to determine the presence and extent of void(s).
- C. The RSM shall be determined.
- D. If the calculated RSM  $\geq 100\%$ , the pole passes RAC 10.
  - 1. Treat Inspection boring only
- E. If a void is detected resulting in a RSM  $< 100\%$ , bore a second 9/16-inch horizontal hole 90 degrees from the first hole bored, slightly above the height of the first boring.
  - 1. Caution shall be taken to avoid intersecting the first boring.
- F. The RSM shall be determined for the second boring.
- G. Record the lesser of the two (2) RSM values for the above ground line boring(s).
  - 1. If the calculated RSM  $\geq 88\%$ , the pole passes RAC 10.
    - a. Treat Inspection boring only
  - 2. If the lesser of the two (2) RSM values is  $< 88\%$ , proceed to Table 6-1 and apply the appropriate RAC based on RSM values.

**Note: No borings shall be made within the through-bore pattern. If borings are accidentally made in the through-bored zone, notification must be made to the program manager and the SCE Wood Product specialists.**

### 5.3 TEMPORARY WOOD STUB INSPECTION

Designate all temporary wood pole stubs as Recommended Action RAC 2, unless higher priority is identified as a result of Intrusive inspection.

The temporary wood pole stub shall get a partial dig (IAC 2A) inspection if set in dirt or a Sound and Bore (IAC 5A) inspection if set in asphalt or concrete.

END OF SECTION 5

## **SECTION 6**

### **POLES WITH DETERIORATION**

#### **6.1 GENERAL NOTES AND REQUIREMENTS FOR POLES WITH DETERIORATION**

- A. All poles with a calculated RSM value < 50% shall be candidates for replacement.
- B. All poles with the lowest calculated RSM value  $\geq$  88% pass. Proceed to Section 8 – Pole Treatment.
- C. Inspector shall use the lowest RSM value from the current Edison-approved “deteriorated pole” software for the purpose of determining the Recommended Action Code priority for replacement. Inspector shall report all RSM values calculated.
- D. Inspector shall identify all poles with exterior decay pocket(s) larger than 1-inch in width located at GL or below groundline (BGL) level, with an average shell thickness < 0.5 inches (on the same plane, at two (2) separate quadrants) as a RAC 1 (Priority 1) pole replacement.
- E. Inspector shall follow procedure “Instructions for Reporting RAC 1 poles” in the Statement of Work.

#### **6.2 METHODOLOGY**

- A. If evidence of voids and/or insect damage is detected during sounding; suspect areas shall be intrusively inspected with a 9/16-inch diameter boring.
  - 1. Inspection boring must pass 2/3 the diameter of the pole, but not closer than 2 inches from the opposite side.
- B. If sounding detects no evidence of voids, or if boring is free of a void, identify and tag the pole as a replacement candidate with a Recommended Action Code based on the lesser of the BGL or GL inspection as identified in Table 6-1, Remaining Section Modulus (RSM) and Recommended Action Code (RAC).
- C. If void is detected, identify and tag the pole as a replacement candidate with the lowest Recommended Action Code based on all of the inspections performed (e.g., sounding boring, BGL or GL inspections) as identified in Table 6-1, Remaining Section Modulus (RSM) and Recommended Action Code (RAC).

## POLES WITH DETERIORATION

- D. Place R2 tag on the road-side of the pole, approximately 7 to 8 feet above groundline.

**TABLE 6-1**  
**REMAINING SECTION MODULUS (RSM) AND RECOMMENDED ACTION CODE (RAC)**  
**NON-REPAIRED POLES ONLY**

POLE LENGTH (FEET)	RAC 1 REPLACE (72 HOURS)	RAC 2 REPLACE (1 YEAR)	RAC 3 REPLACE (2 YEARS)	RAC 4 REPLACE (3 YEARS)	RAC 5 REPAIR (3 YEARS)
25 – 35	≤ 34%	35% – 79%	80% to 100% with void	—	—
40 – 120	≤ 23%	24% – 36%	37% – 45%	> 46% – 50%	≥ 50% – 87%

- E. If the smallest recorded RSM value at GL or BGL is still greater than or equal to 50% and is less than 88%, the wood pole has Moderate Degradation.
1. If the pole is one of the following structure types listed below (with a void), reject the pole as “Moderate Degradation” with a Recommended Action Code 4 (3 year replacement). If not a prohibited structure type, proceed to Section 6.2.1 – Pole Repair Methodology.
    - i. All freeway and railroad crossing poles
    - ii. All push poles (Brace structure only)
    - iii. All Penta-Cellon and Dow-Penta treated poles
    - iv. All poles with PTX
    - v. All poles located within a public or private school
    - vi. All dead-end poles without a guy wire
    - vii. All poles greater than or equal to 90 feet in length

### 6.3 POLE REPAIR METHODOLOGY

Poles with “Moderate Degradation” and identified as “Steel Stub” candidates (“S” tag) with a Recommended Action Code 5, shall be inspected utilizing the Methodology listed below:

- A. All above groundline (AGL) borings shall be drilled horizontally and not drilled on an angle.
- B. All borings shall be plugged with Edison-approved plastic plugs regardless of location of drilled hole.

## POLES WITH DETERIORATION

- C. Candidates shall have continuous 1/3 (120 degrees) of the pole unobstructed. The unobstructed sections shall have a minimum 6 inches of clearance suitable to set truss.

6.3.1 POLE REPAIR CRITERIA

A. General

1. All AGL borings shall be drilled horizontally between 3 and 4 inches to the right or left of the largest check.
2. 9/16-inch diameter boring shall pass 2/3 of the diameter of the pole, but not closer than 2 inches from the opposite side.
3. The Remaining “**Shell Thickness**” shall be determined.
4. All borings shall be plugged with Edison-approved plastic plugs regardless of location of drilled hole.

B. 24-inch AGL Inspection Boring

1. If boring is free of a void, proceed to 6.3.1C: 54-inch AGL Inspection Boring.
2. If void is detected with a shell thickness less than ( $<$ ) 3 inches on either side of the pole, reject the pole with a RAC 4. Place one “R2” tag on the road side of the pole. No other borings or treatment are necessary.
3. If void is detected with a shell thickness greater than or equal to ( $\geq$ ) 3 inches on both sides of the pole, drill a second 9/16-inch boring 90 degrees to the right or the left. Drill cautiously to avoid existing borings.
  - a. If shell thickness is  $\geq$  3 inches, proceed to 6.3.1C: 54-inch AGL Inspection Boring.
  - b. If shell thickness is  $<$  3 inches, reject pole with a “Moderate Degradation” with a Recommended Action Code 4. Place one “R2” tag on the road side of the pole. No other borings or treatment are necessary.

POLES WITH DETERIORATION

C. 54-inch AGL Inspection Boring

1. If the boring at 54 inches AGL is free of void, the pole is a candidate for a “Steel Stub” (RAC 5). Place one “S” tag on the road side of the pole. Proceed to Section 8 – Pole Treatment.
2. If void is detected, reject the pole with a “Moderate Degradation” with a RAC 4. Place one “R2” tag on the road side of the pole. No other borings or treatment are necessary.

END OF SECTION 6



## SECTION 7

### INSPECTION MARKINGS

#### 7.1 POLE TAGS, REPLACE POLE

##### 7.1.1 GENERAL NOTES AND REQUIREMENTS FOR REPLACE POLE TAGS

- A. Only R1 and R2 Tags are currently being utilized as determined by Table 6-1. RAC1 requires an R1 tag and RACs 2-5 require an R2 tag.
- B. Poles meeting the requirement to be steel stubbed (RAC 5) shall receive an "S" tag placed on the road side of the pole, 7 to 8 feet above groundline.
- C. Place one (1) tag on the road side of the pole approximately 7 to 8 feet above groundline.
- D. Edison will furnish all tags.
- E. If pole already has an "R," "X," or "SAM" tag (see figures below), remove the previous tag. The only tag remaining on the pole should reflect the most recent inspection results.

Figure 1 (IM-4): M/C 815-01124



Note(s):  
1. Fiberglass Wrap — Yellow with "F" Letter

Figure 2 (IM-4): M/C 815-01132



Note(s):  
1. Steel Stub — Yellow with "S" Letter

Figure 3 (IM-4): M/C 815-01140



Note(s):  
1. Replace — Yellow with "R" Letter — For Reference Only

Figure 4 (IM-4): M/C 815-01207



Note(s):  
1. Structured Assessment Methodology — Yellow with Black "SAM"

Figure 5 (IM-4): M/C 815-00035



Note(s):  
1. Replace — Priority 1 — Yellow with Black "R1"

Figure 6 (IM-4): M/C 815-00209



Note(s):  
1. Replace — Priority 2 — Yellow with Black "R2"

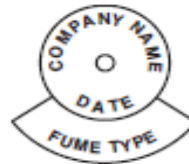
## INSPECTION MARKINGS

7.2 POLE TAGS, INSPECTION, AND TREATMENT TYPE (BUTTERFLY TAGS)

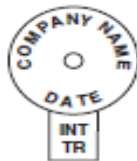
- A. Inspection tags (see figures below) shall be minimum of 1-inch in diameter, round in shape and include the following:
1. Contractor's Name.
  2. Year of Inspection.
  3. If only a visual inspection is performed, a tag with the word "Visual" shall be attached below the inspection disk.
- B. Treatment tags shall include the following, where applicable:
1. Inspector's Name.
  2. Year treated.
  3. Type of fumigant and insecticide.
  4. Type of internal treatment.



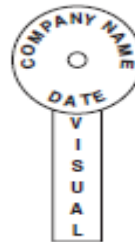
**External Groundline Treatment**  
Contractor shall install on poles that have been bored, sounded, and externally treated in accordance with SCE Specifications.



**Fumigant Treatment**  
Contractor shall install on poles that have been internally treated with fumigants in accordance with SCE Specifications.



**External Groundline Treatment plus Internally Treated with a Preservative Solution.**  
Contractor shall install on poles that have been bored, sounded and externally treated as well as internally treated with a preservative solution in accordance with SCE Specifications.



**Visual Inspection — No Test or Treatment Applied**  
Contractor shall install on poles visibly inspected (sites visited and reported) no test or treatment applied in accordance with SCE Specifications.

END OF SECTION 7

## **SECTION 8**

### **POLE TREATMENT**

#### **8.1 GENERAL**

- A. All new treatment borings are calculated based on circumference at point of treatment hole.
- B. A 9/16-inch diameter boring shall be drilled downward at a 45-degree angle past the center of the pole to the specified depths listed in Table 8-1, Boring Requirements at 45 degrees.
- C. Care shall be taken to avoid going through the pole or seasoning checks. If a check is crossed, then an additional boring shall be made in sound wood for application of the preservative.

**TABLE 8-1**  
**BORING REQUIREMENTS AT 45 DEGREES**

<b>POLE CIRCUMFERENCE (INCHES)</b>	<b>RECOMMENDED AUGER BIT LENGTH (INCHES)</b>	<b>BORING DEPTH REQUIREMENT (INCHES)</b>	<b>TOP TREATMENT BORING AGL (FEET)</b>
25-27	12	8.50	2
28-29	12	9.25	2
30-32	12	11.25	2
33-36	18	11.75	2
37-40	18	13.75	2
41-44	18	14.50	2
45-50	18	16.50	2
51-66	18	17.50	2
Greater than 66	18	17.50	2

- D. For poles set in dirt, the first treatment borings shall be 8+ inches below groundline. This includes the inspection boring and any additional borings exposed during the 20-inch excavation.
- E. Poles set in concrete/asphalt, the first treatment borings shall be at groundline.

## POLE TREATMENT

This includes the new inspection borings and all past treatment borings.

- F. "Steel Stub Candidates" and poles that pass with a void (> 88%) shall be treated.
  - 1. Flood the void with the approved internal treatment (not to exceed 1 gallon).
  - 2. Take precaution to ensure the Chemical is contained within the pole.
  - 3. Maximum-drilled internal treatment holes will not exceed 2 feet AGL, see Table 8-1, Boring Requirements at 45 degrees.
- G. Above groundline treatment borings shall be re-used if present. Borings shall be in 1-foot increments, spiraling up the pole (90 degrees apart). Maximum-drilled internal treatment holes will not exceed 2 feet AGL, see Table 8-1, Boring Requirements at 45 degrees.
- H. Boron Rods or Cobra Rods found when re-treating existing treatment borings shall be crushed, maximizing the area for new preservative injection.
- I. Granular Fumigant found when re-treating existing treatment borings shall be broken up using a suitable probe and hammer permitting the injection applicator to pass through.

## 8.2 DETAILS

### 8.2.1 INTERNAL TREATMENT (FOR "PASS" CANDIDATES ONLY)

- A. Approved Fumigants and Insecticides:
  - 1. CuB 20  
Product Order No.: 13542 (IT)
- B. Injection Application
  - 1. Vendors will be responsible for developing and getting the injection applicator.
    - a. The injection applicator needs to be able to inject the preservative cleanly from the bottom of boring to 1-1/4 inch from top without excessive air pockets on un-obstructed borings.

## POLE TREATMENT

- b. Care shall be taken to maintain a clean and safe application process.

8.2.2 EXTERNAL TREATMENT

Externally treat any gas pole set in dirt that passes both the external and intrusive inspections.

A. Acceptable Preservatives1. **CuB 20**

Product Order No.: 13403

B. Preservative Application

1. Soil shall be removed from around pole to a depth of 20 inches. Soil shall be placed on a tarpaulin during removal.
2. Inspector shall clean the surface of the wood exposed in the excavation by brushing or scraping the pole with a broom, wire brush, shovel, or scraping bar. Axes will not be used to scrape soil away from the pole.
3. Pole surface shall be treated from groundline to a minimum of 20 inches below groundline. Preservative wrap applications shall be used as recommended by the Manufacturer.
4. The external wrap will not extend more than 2 inches above groundline.

8.2.3 THINNING INSTRUCTIONS FOR GENICS CUB PRODUCTS

As with most water based chemicals, surface interactions on the exposed chemical can occur and this may cause the product to thicken up over time due to vapor loss. If the product is too thick to apply internally or externally then it is possible to thin the product out with the addition of water in order bring it back to a consistency that allows for easier application. Applicator needs to exercise caution during this process and should never exceed a maximum of **10 ounces** of added water per 21 pound bag.

- A. Based off the thickness and volume of the product, start with **2 fluid ounces (1/4 cup)** of water and mix the water into the product thoroughly

POLE TREATMENT

for a minimum of 2 minutes.

1. Incrementally increase the volume of water by 2 ounces at a time and mix thoroughly at each addition in order to work the water into the chemical. Continue to mix until a desired consistency is achieved.
- B. The maximum recommended volume of water to be added is **10 ounces per 21 pound bag**.

END OF SECTION 8

## APPENDICES

## APPENDIX 1

### DEFINITIONS

Abandoned Facilities – Structures with no Edison conductors or equipment.

AGL – Above Groundline.

BGL – Below Groundline.

Boring – The process of using a manual or power drill to breach the exterior of a pole primarily to provide access for the internal examination of the pole and secondarily to create a reservoir for remedial chemical application.

Boring Clearances – A minimum clearance of 1 foot shall be required to perform the intrusive inspection on a minimum of two (2) quadrants of the pole.

Brand or Medallion – Poles set between approximately 1950 and 1980 are physically branded (burned). Typically, poles set after 1980 are marked with a metal medallion. Brand or medallion is commonly located on the gain side of the pole.

The following information is included in both the brand and the medallion:

- Manufacturer
- Manufacturer's Location
- Original Treatment and Date
- Pole Length
- Pole Class
- Wood Species

Check – (See Radial Check)

Compression Wood – Abnormal wood formed on the lower side of branches and inclined trunks of softwood trees. It is identified by its relatively wide annual rings, sometimes more than 50 percent of the width of the annual rings in which it occurs. Compression wood excessively shrinks lengthwise. Refer to examples in Section 3.2.

Critical Attachment – Examples include guy fixture, cross-arm through-bolt, insulator through-bolt, or equipment through-bolt. Pole damage near these attachments may mandate pole replacement (see Section 3.2).



## APPENDIX 1 – DEFINITIONS

Fumigant/Insecticide – A chemical that resists or prevents the further attack from decay fungi or insects. Shall be applied internally in a wood pole.

Gain – A cut in a round pole to allow a square crossarm to fit snugly.

Gas Pole – Pole marked with “Penta-Cellon” [brand mark G] or “Penta-Dow” [brand mark MP or PD].

GL – Groundline – Point where the pole penetrates the soil, concrete, or asphalt.

High Stress Area – 18 inches above and/or below the point of attachment of equipment, primary or secondary conductors, communication lines, guying attachment point, etc. Does not include service drops.

Inspection Cycles –     Cycle 1 – Poles intrusively inspected 1984 to 2006  
                                  Cycle 2 – Poles intrusively inspected 2007 to current

Internal Rot – Degradation of the inner portion of a wood pole caused by decay, fungi, or insect attack.

Mechanical Damage – Exterior damage caused by an outside force such as vehicles and farm equipment.

Push Poles – Poles that are supporting another structure.

Radial Check or Check – A longitudinal separation of wood fiber along the grain that develops as a pole dries, which may expose the inner wood to insects or fungus attack. The presence of fecal matter/frass in a check shall not be considered for a replacement candidate.

Recommended Action Code (RAC) – Action required (Replace Pole, Steel Stub, or Pass Inspection) as a result of an Intrusive Inspection.

Restored Pole – A repair intended to extend the life of a deteriorated pole, e.g., mod pole, repole, steel stub, fiberglass wrap.

Repaired Pole Inspection (RPIN) – Inspection of all poles with Steel Stub or Fiberglass Wrap restoration systems only.

Shell Gauge/Shell Thickness Indicator – Tool approved by Edison Wood Products Specialist to measure shell thickness of a wood pole to calculate RSM. All shell gauges shall have increment values every 1/2-inch up to the 3-inch scale mark.

## APPENDIX 1 – DEFINITIONS

Shell Rot – Degradation of the outer shell of a wood pole. This usually occurs below groundline.

Shell Thickness – The measurement of “solid/good” wood from the outer surface of a wood pole to the outer edge of an internal void, if one exists.

Sounding – The act of striking a hammer or other suitable device on the surface of the pole beginning at groundline on all four (4) quadrants (360 degrees) in order to identify internal decay pockets or insect damage. Sounding should continue approximately every 2 feet up to 8 feet above groundline. The inspector shall listen for evidence of internal voids and shall watch for the dislocation of material from seasoning checks.

Split – A split or a combination of two (2) single checks having one or both portions located in a vertical plane on the pole.

Starter Hole – A shallow hole created by a woodpecker or other animal/insect.

Transmission Pole – A pole with transmission facilities, with or without distribution underbuild, or a guy stub pole that supports a transmission pole. All others are distribution poles.

## APPENDIX 2

### “RULE OF THUMB”

### POLE CLASSIFICATIONS

(Do not default to “Rule of Thumb” if brand is present.  
The brand found on the pole over rides this rule.)

#### ALL POLES SET PRIOR TO 2000

LENGTH OF POLE (FEET)	CORRECT CLASS	CANNOT BE – CLASS
25	5	if class 6, 7, 8 – change to class 5
30	5	if class 6, 7, 8 – change to class 5
35	5	if class 6, 7, 8 – change to class 5
40	5	if class 6, 7, 8 – change to class 5
45	4	if class 5, 6, 7 – change to class 4
50	4	if class 5, 6, 7 – change to class 4
55	3	if class 4, 5, 6 – change to class 3
60	2	if class 3, 4, 5 – change to class 2
65	2 & 1	if class 3, 4, 5 – change to class 2
70	2 & 1	if class 3, 4, 5 – change to class 2
75	2 & 1	if class 3, 4, 5 – change to class 2
80	2 & 1	if class 3, 4, 5 – change to class 2
85	2 & 1	if class 3, 4, 5 – change to class 2
90	2 & 1	if class 3, 4, 5 – change to class 2
95	2 & 1	if class 3, 4, 5 – change to class 2
100	2 & 1	if class 3, 4, 5 – change to class 2

#### ALL POLES SET AFTER 2000: DEFAULT TO BRAND OR MEDALLION

LENGTH OF POLE (FEET)	CORRECT CLASS
25	5
30	5
35	H2, H1, 1, 2, 3, 4, or 5
40	H4, H3, H2, H1, 1, 2, 3, 4, or 5
45	H5, H4, H3, H2, H1, 1, 2, 3, or 4
50	H5, H4, H3, H2, H1, 1, 2, 3, or 4
55	H5, H4, H3, H2, H1, 1, 2, or 3
60	H6, H5, H4, H3, H2, H1, 1, or 2
65	H6, H5, H4, H3, H2, H1, 1, or 2
70	H6, H5, H4, H3, H2, H1, 1, or 2
75	H6, H5, H4, H3, H2, H1, 1, or 2
80	H6, H5, H4, H3, H2, H1, 1, or 2
85	H6, H5, H4, H3, H2, H1, 1, or 2
90	H6, H5, H4, H3, H2, H1, 1, or 2
95	H6, H5, H4, H3, H2, H1, 1, or 2
100	H6, H5, H4, H3, H2, H1, 1, or 2

### APPENDIX 3

#### APPROVED TRUSSES AND RATED STRENGTH CAPACITIES

**Approved Trusses and Rated Strength Capacities***Based on angular deviation from preferred orientation*

LWS Section	Steel Yield Stress-psi	Truss Width Inch	Plate Thickness Inch	0 to 10 degree rotation		11 to 25 degrees rotation		26 to 45 degrees rotation		Min. Pole Circumf. - in
				Single Truss	Dbl. Truss	Single Truss	Dbl. Truss	Single Truss	Dbl. Truss	
8-L-4BSCE	80,000	8	1/4	75,325	150,650	55,745	111,490	41,930	83,855	34
8-L-5BSCE	80,000	8	5/16	94,830	189,655	70,360	140,720	52,900	105,795	34
9-L-4BSCE	80,000	9	1/4	88,060	176,115	65,330	130,660	48,115	96,225	38
9-L-5BSCE	80,000	9	5/16	110,765	221,525	82,380	164,760	60,670	121,335	38
9-L-6BSCE	80,000	9	3/8	133,750	267,500	99,725	199,445	73,440	146,875	38
10-L-5BSCE	80,000	10	5/16	127,485	254,970	95,150	190,295	68,985	137,965	41
10-L-6BSCE	80,000	10	3/8	153,840	307,680	115,090	230,180	83,460	166,920	41
11-L-6BSCE	80,000	11	3/8	174,860	349,715	131,335	262,665	94,140	188,280	44
12-L-6BSCE	80,000	12	3/8	212,185	424,370	158,250	316,500	113,230	226,460	47
13-L-6BSCE	80,000	13	3/8	236,505	473,005	177,150	354,295	125,685	251,365	50
14-L-6BSCE	80,000	14	3/8	291,180	582,355	215,445	430,885	153,220	306,435	54
15-L-6BSCE	80,000	15	3/8	319,690	639,375	237,560	475,120	167,740	335,475	57
16-L-6BSCE	80,000	16	3/8	366,245	732,485	271,235	542,465	191,105	382,210	60
17-L-6BSCE	80,000	17	3/8	397,730	795,455	295,815	591,630	207,325	414,650	63

LWS Section	Steel Yield Stress-psi	Truss Width Inch	Plate Thickness Inch	0 to 10 degree rotation		11 to 25 degrees rotation		26 to 45 degrees rotation		Min. Pole Circumf. - in	Minimum Bands	
				Single Truss	Dbl. Truss	Single Truss	Dbl. Truss	Single Truss	Dbl. Truss		Single Truss	Dbl. Truss
PE-56	60,000	7-1/8	1/4	50,625	101,250					26	4-SGL / 4-DBL	4-SGL / 4-DBL
8-L-4	80,000	8	1/4	70,235	140,465	50,595	101,190			34	4-SGL / 4-DBL	4-SGL / 4-DBL
8-L-5	80,000	8	5/16	88,245	176,490	63,770	127,540	46,580	93,155	34	4-SGL / 4-DBL	6-SGL / 4-DBL
9-L-4	80,000	9	1/4	82,320	164,640	59,690	119,375	42,790	85,575	38	4-SGL / 4-DBL	6-SGL / 4-DBL
9-L-5	80,000	9	5/16	103,360	206,715	75,160	150,320	53,885	107,770	38	4-SGL / 4-DBL	6-SGL / 4-DBL
9-L-6	80,000	9	3/8	124,590	249,175	90,860	181,720	65,150	130,295	38	4-SGL / 4-DBL	8-SGL / 4-DBL
10-L-5	80,000	10	5/16	119,220	238,440	87,285	174,565	61,740	123,480	41	4-SGL / 4-DBL	8-SGL / 4-DBL
10-L-6	80,000	10	3/8	143,630	287,255	105,435	210,870	74,610	149,220	41	4-SGL / 4-DBL	8-SGL / 4-DBL
11-L-6	80,000	11	3/8	163,550	327,095	120,870	241,735	84,730	169,460	44	4-SGL / 4-DBL	10-SGL / 6-DBL
12-L-6	80,000	12	3/8	201,235	402,470	147,655	295,310	103,325	206,650	47	6-SGL / 4-DBL	6-DBL
13-L-6	80,000	13	3/8	224,430	448,860	165,745	331,490	115,240	230,475	50	6-SGL / 4-DBL	6-DBL
14-L-6	80,000	14	3/8	280,450	560,900	204,340	408,680	142,295	284,590	54	8-SGL / 4-DBL	8-DBL
15-L-6	80,000	15	3/8	307,835	615,665	225,675	451,345	156,300	312,595	57	8-SGL / 4-DBL	10-DBL
16-L-6	80,000	16	3/8	354,525	709,050	259,110	518,220	179,170	358,335	60	10-SGL / 6-DBL	10-DBL
17-L-6	80,000	17	3/8	384,855	769,710	282,900	565,800	194,880	389,755	63	10-SGL / 6-DBL	12-DBL

**Approved Trusses and Rated Strength Capacities***Based on angular deviation from preferred orientation*

<b>Osmose</b> Design	Steel Yield	Truss Width	Plate Thickness	0 to 10 degree rotation		11 to 25 degrees rotation		26 to 45 degrees rotation		Min. Pole Circumf.	Minimum Bands	
	Stress-psi	Inch	Inch	Single Truss	Dbl. Truss	Single Truss	Dbl. Truss	Single Truss	Dbl. Truss	Inch	Single Truss	Dbl. Truss
C-960	60,000	8.2	5/16	58,225	116,445	41,240	82,480			29.75	4-SGL / 4-DBL	4-SGL / 4-DBL
C-980	80,000	8.2	5/16	77,630	155,260	54,985	109,970			29.75	4-SGL / 4-DBL	4-SGL / 4-DBL
C-1080	80,000	9.3	5/16	95,715	191,425	68,190	136,380	48,055	96,105	33.75	4-SGL / 4-DBL	6-SGL / 4-DBL
C-1180	80,000	10	5/16	113,020	226,040	80,290	160,580	56,600	113,200	36.5	4-SGL / 4-DBL	6-SGL / 4-DBL
C-1280	80,000	10.8	5/16	129,460	258,920	91,935	183,865	64,815	129,630	39.25	4-SGL / 4-DBL	8-SGL / 4-DBL
C-1380	80,000	11.8	5/16	153,635	307,265	109,115	218,225	77,090	154,180	43	4-SGL / 4-DBL	10-SGL / 4-DBL
C-1480	80,000	12.5	5/16	170,260	340,520	120,775	241,550	85,440	170,875	45.25	6-SGL / 4-DBL	10-SGL / 6-DBL
C-1580	80,000	13.4	5/16	191,855	383,705	136,605	273,210	96,135	192,270	48.75	6-SGL / 4-DBL	6-DBL
C-1680	80,000	14.3	5/16	211,330	422,655	151,305	302,610	105,900	211,795	52	6-SGL / 4-DBL	6-DBL

<b>Polecare</b> Section	Steel Yield	Truss Width	Plate Thickness	0 to 10 degree rotation		11 to 25 degrees rotation		26 to 45 degrees rotation		Min. Pole Circumf. - in	Minimum Bands	
	Stress-psi	Inch	Inch	Single Truss	Dbl. Truss	Single Truss	Dbl. Truss	Single Truss	Dbl. Truss		Single Truss	Dbl. Truss
UCT 960	60,000	8	5/16	51,030	102,055					29	4-SGL / 4-DBL	4-SGL / 4-DBL
UCT 980	80,000	8	5/16	68,040	136,075	48,630	97,255			29	4-SGL / 4-DBL	4-SGL / 4-DBL
UCT 1080	80,000	9	5/16	84,710	169,415	60,490	120,980	43,525	87,045	31.5	4-SGL / 4-DBL	4-SGL / 4-DBL
UCT 1180	80,000	10	5/16	102,565	205,130	73,475	146,945	52,300	104,595	35	4-SGL / 4-DBL	6-SGL / 4-DBL
UCT 1280	80,000	11	5/16	122,245	244,490	87,650	175,295	62,290	124,575	38	4-SGL / 4-DBL	6-SGL / 4-DBL
UCT 1380	80,000	12	5/16	143,905	287,810	103,260	206,520	73,290	146,575	41	4-SGL / 4-DBL	8-SGL / 4-DBL
UCT 1480	80,000	13	5/16	160,630	321,255	115,980	231,955	82,050	164,095	44	4-SGL / 4-DBL	6-SGL / 6-DBL
UCT 1580	80,000	14	5/16	190,745	381,490	137,305	274,610	96,705	193,410	47.5	6-SGL / 4-DBL	10-SGL / 6-DBL
UCT 1680	80,000	15	5/16	212,080	424,160	153,355	306,705	107,650	215,295	50.5	6-SGL / 4-DBL	10-SGL / 6-DBL