Inspection Item	Work to be Performed
ROW Reliability	1. **Trees**: Identify the amount of trees, species, and location (under or outside phases) that are 20' from the conductors or closer as well as distance to phase and phase height (see patrol report). 2. Identify brush in tower if it is causing problems to the integrity of the tower or foundation. (Spray herbicides under and around structures as needed). 3. Remove vines off structure and spray as needed.
ROW Access	1. Only identify areas that are inaccessible - identify type (i.e. Brush, mesquite, etc), thickness and height 2. Identify the crossings that need to be worked or installed to access a structure if there are no other means of access. Pick the type of work required on the patrol report. 3. Check for ruts/erosion in ROW caused by vehicles, equipment, or runoff. Repair damage with hand shovels if possible, otherwise report damage to schedule repairs.
Gates	1. Inspect gates/locks for damage and make any necessary repairs (gate re-hangs, adjustment, etc). Only identify issues that will not last until the next patrol. 2. Identify new fence crossings that do not have gates and the type of gate needed. 3. Spray herbicides around the existing gate and fence. 4. Make sure all gates are accessible. 5. Check crossings and identify work needed (i.e. reshape, new installation, need material, etc).
Encroachments	1. Identify and note encroachments (i.e. Permanent structures, Combustible materials, newly installed Ponds, channels, septic systems, Spoils and storage of cut/fill materials, Certain grading, earth-retaining systems, excavations, newly planted trees, billboards, signs, light poles, habitable structures such as residential, commercial and industrial buildings, recreational and playground equipment such as basketball goals, volleyball nets, above and below-ground swimming pools, diving boards and decks) and note on the on Field Log form and forward to Real Estate Services. 2. Note any construction work going on in the easement.
Miscellaneous	1. Note any conditions that could cause problems with property owners. 2. Note where landowners want notification prior to any necessary maintenance activities (*fill out Field Log and send to Real Estate Services*). 3. Immediately correct, if possible, any problems that are identified as hazardous or could affect the safe operation of the line. 4. Check/remove any trash from ROW. 5. Document road crossings and access to all structures and enter in the appropriate file in the following location: *I:\COMMON\Transmission_Services\TFO\SRM\Line_Maintenance\Line & ROW Access*

LOWER COLORADO RIVER AUTHORITY
LINE PATROL REPORT

DATE: _____ DISTRICT: _____ PREPARED BY: _____

T-NUMBER: _____ LINE DESCRIPTION: _____

LENGTH: _____ DOUBLE CIRCUITS: _____

Location:	Failure:	Problem:	Cause:	Vegetation & Tree Quantity:	Vegetation & Tree Height:	Tree Location	Tree to Phase Distance:	Phase Height:	Comments:

Table D1. Transmission Line Patrol Report (Example).

2.0 Ten Year Inspection Procedures

Inspection Item	Work to be Performed
Line Clearance	1. Refer to Table D2 for acceptable clearances, observing the practices for ecological and economical ROW management, [redacted]
Ground wire	1. Tighten all ground connections. 2. Check footings for secure grounds except on towers with footings not designed for grounds. 3. Replace missing staples and tighten loose staples, spacing staples approx 18" apart. 4. If ground rods are replaced, install new 8-foot ground rods and attach to existing ground wire above soil surface. 5. For broken ground wires, splice with connectors located above the soil surface (*use proper PPE*). 6. Test resistance of grounds and note action required if ohm reading is greater than 20.
Structure Numbers	1. Check that each structure is numbered correctly. 2. Check that number signs are installed approx. 7 feet above ground and attached to same side of structure throughout the line. At road crossings, signs must be visible from road. 3. Replace missing signs, damaged signs, and/or signs that cannot be read. Check that existing signs are securely fastened. 4. Verify structures with multiple lines have multiple line identification numbers attached.
Danger Signs	1. Each structure should have two danger signs attached (Ref Figure D1). 2. Check that danger signs are installed on both sides of structure and mounted such that sign can be viewed when standing under line(s). 3. Replace missing signs, damaged signs, and/or signs that cannot be read. Check that existing signs are securely fastened.
Bolts/Hardware	1. Check all bolts and hardware for tightness. Loose connections can be identified by listening for rattles when tapping towers with rubber mallet. 2. Replace lock nuts, bolts, and other hardware that are missing, rusted, or damaged. 3. Inspect towers for loose anchor bolts.
Insulators	1. Identify and wash contaminated insulators, paying special attention to V-strings. Wash insulators on energized 69kV and 138kV lines with high-pressure de-ionized water, starting from the conductor end and slowly spraying towards the structure end. All 345kV insulators should be washed while de-energized. 2. Replace all broken, chipped, scorched, or damaged insulators. 3. Replace insulators that have rusted or worn hardware. 4. Verify that insulator strings contain correct number of insulator bells (Ref Table D2). 5. Inspect or install, if necessary, buzzard guards above insulators or deterrents on crossarms. 6. Inspect and test, if necessary, all line arrestors installed.
Cotter keys/pins	1. Replace broken, missing, or worn cotter keys. 2. Replace rusted or worn clevis pins, dead-end shoe pins, and suspension shoe pins. Pins that have backed out and are wearing against cotter key should be repaired by hammering pin back in and replacing cotter key if necessary. 3. Repair or replace damaged insulator keys; hammer in keys that have worked loose.

Inspection Item	Work to be Performed
Conductor	1. Check for broken strands and burned conductors. Repair with a pre-form repair sleeve or a compression repair sleeve. If wire is damaged beyond repair, splice in new wire. 2. Visually check conductors for appropriate sag and verify that all phases sag similarly. 3. Check splices for damage. 4. Check aerial marker balls for damage. 5. Check insulator string-to-structure angles; severe angles indicate improper tension and sag. 6. Replace missing or broken dampers. 7. Check for signs of conductor vibration. 8. Check vertically bundled conductors for proper spacing. 9. Replace missing or broken spacers. Check line for conductor wear at spacer points. 10. Inspect nuts on suspension shoes, dead-end shoes, PG clamps, and dampers for tightness. 11. Replace all 3-bolt PG clamps with U-bolt PG clamps. Apply Penetrox to connections. 12. Check condition of vibration dampers.
Shield Wire	1. Check for broken, worn, rusted or burned shield wires. Repair with a pre-form repair sleeve or a compression repair sleeve. If wire is damaged beyond repair, splice in new wire. 2. Check sag of shield wire; all shield wires should be level with each other. 3. Replace missing or broken dampers. 4. Check for signs of vibration. 5. Tighten nuts on suspension shoes, dead-end shoes, and jumper connection clamps. 6. Check for worn or rusted shield wire in suspensions shoes. Splice if beyond repair, otherwise, repair with pre-form splice or armor rod. 7. Note for replacement all wrap-on dead end performs with bolt-on DE shoes. 8. Repair broken ground leads on OPGW. 9. Verify that ground wire is not directly connected to the shield wire. The ground wire should be connected to the bayonet or static arm. NOTE: Take precautions when removing connector clamp from shield wire; shield wire may be rusted and can break when loosening clamp.
Guy Wires	1. Check for broken, worn, loose, rusted, or burned guy wires. Repair damaged wires with pre-form splice; or if beyond repair, replace with new wire. 2. Tighten all 3-bolt and 4-bolt clamps. 3. Check that all tail-wire strands are wrapped with aluminum wire to reduce fraying. 4. When using a pre-form splice to repair guy wires, the splice should be located at least 10 feet above ground so that livestock cannot interfere with splice. 5. Install a guy guard on guy wires located in public areas (e.g. parks, play grounds, etc.). 6. Remove dirt and other debris from guy wires and anchors. 7. Install guy insulators on all down guys 10-15' above the ground.
Anchor Rods	1. Remove dirt and debris from eye of anchor rod and add extensions where necessary. 2. Dig down 18 inches below soil surface to check for rusted anchor rods; replace anchor rod if badly rusted. 3. Remove ground wires connected to guy wires; copper ground wire will rust steel anchor rods and steel guy wires. Verify that structure is properly grounded.

Inspection Item	Work to be Performed
Poles	Wood Poles: 1. Figures D2, D3, and D4 show acceptable pole conditions. 2. Inspect poles for rotten wood, hollow interior, and woodpecker damage. 3. Inspect around ground line check for ground line decay. Probe with screwdriver or other tool to determine wood soundness; Remove decay and treat with fungicide if possible. 4. Inspect pole for buckling at the ground line and for any unusual angle that could indicate pole is rotted or broken. 5. Check pole for hollow interior by tapping pole with a hammer starting at the groundline and continuing upwards around the pole to a height of approximately 6 feet. If a hollow or dull sound is detected, drill pole to determine if the core is rotten. If core is rotten note the pole for replacement. If core is good, insert treated rods and plug holes. 6. If pole has woodpecker damage, estimate the amount of damaged area. If damaged area is less than 50% of the pole's cross-section, note pole to be fitted with hardware cloth. Also, drill from pole's exterior into bottom of hole to provide a drainage path to prevent further rotting. If damaged area is more than 50% of pole's cross-section, note the pole for replacement. NOTE: Repair pole with a pole splice or stub if pole damage is significant enough to be considered an immediate hazard; note pole for replacement during next overhaul. In areas containing poles with significant damage, all poles in the area should be fitted with hardware cloth. Cloth should be fitted from a point ten feet above ground to top of pole. **Concrete Poles:** 1. Inspect pole for cracks, chips, etc. 2. Check pole at ground line for overlying dirt, debris or erosion. **Steel Poles:** 1. Inspect pole for damage, rust, discoloration, etc. 2. Check pole at ground line for overlying dirt, debris or erosion. 3. For direct embedded poles check the coating for gouges, nicks, damage, etc and use touch-up kit to apply coating if needed.
Cross-arms	1. Figure D5 shows acceptable cross-arm conditions. 2. Inspect cross-arms for rot, woodpecker damage, cracks, and splitting. 3. Cross-arms with woodpecker holes that are 40% or less of the arm's cross-section should be noted so that they can be covered with a polyvinyl shield. Arms with woodpecker holes larger than 40% of the arm's cross-section should be noted for replacement. 4. Cross-arms that contain more than 3/8" of rot should be noted for replacement. NOTE: Weathering of wood may result in damage to cross-arm surfaces. Although the arm may appear bad, the arm is usually good and can be easily checked with the aid of a screwdriver. Rotten wood on the ends of cross-arms can be cut-off with a chain saw if there is no weight bearing hardware. Apply preservatives to newly exposed surfaces to limit further decay. Often, good judgment must be exercised when determining the amount of damage to the cross-arms. Good judgment is critical when the cross-arm is not supported by a knee brace. The length of the span and the size of the conductor are also factors in determining the cross-arm's condition. 5. Use three-foot pole splices or bands if cross-arm damage poses a hazard. Note x-arm for replacement during next overhaul. 6. Inspect or install, if necessary, buzzard guards above insulators.
X-braces	1. Figure D6 shows acceptable x-brace conditions. 2. Inspect x-braces for rot, cracks, splitting and woodpecker damage. 3. X-braces with woodpecker holes that are 50% or less of the brace's cross-section should be noted so that they can be covered with a polyvinyl shield. Braces with woodpecker holes larger than 50% of the brace's cross-section should be noted for replacement. 4. X-braces that contain more than 3/8" of rot should be noted for replacement. NOTE: Weathering of wood may result in damage to x-brace surfaces. Although the brace may appear bad, the brace is usually good and can be easily checked with the aid of a screwdriver. Bolt holes on the ends of x-braces should be carefully inspected for rot and noted for replacement if damaged.

Inspection Item	Work to be Performed
Knee-braces and other wood braces	1. Inspect knee-braces for rot and woodpecker damage. 2. Knee-braces with woodpecker holes that are 50% or less of the brace's cross-section should be noted so that they can be covered with a polyvinyl shield. Braces with woodpecker holes larger than 50% of the brace's cross-section should be noted for replacement. 3. Knee-braces that contain more than 3/8" of rot should be noted for replacement. NOTE: Weathering of wood may result in damage to knee-brace surfaces. Although the brace may appear bad, the brace is usually good and can be easily checked with the aid of a screwdriver. Bolt holes on the ends of knee-braces should be carefully inspected for rot and noted for replacement if damaged.
Steel	1. Tighten all loose steel components. 2. Replace and/or repair bent, rusted, weakened, or missing steel. 3. Steel with minor rusting should be painted with cold galvanizing paint.
Tower Footings and Caps	1. Check for rusting tower legs and note any towers/footings requiring repair or replacement. 2. Check footing areas for soil erosion and washout and perform minor repairs where possible. Note areas where significant repairs are needed. 3. Check all tower legs for overlaid soil or other debris. Also, note footings in areas where soil build-up is likely to occur in the future due to erosion. Clean all steel surfaces and footing tops. 4. Clean all rust from metal surfaces and replace rusted bolts. 5. Inspect footings for rusted areas that have significantly weakened the steel; chip into concrete and weld new plates to provide reinforcement. 6. Sandblast rusted areas. Pay special attention to lapped splices where moisture easily accumulates and causes rust. Contain and remove all sand blasting debris (sand, rust, paint, etc.) from site. 7. Seal edges of all lapped splices with a silicone caulk. Check that moisture is not present before adding the caulk. 8. Paint surfaces of concrete and steel with epoxy paint (e.g. Brut EM-13 or EM-17). 9. If footing is significantly damaged or if top of footing is too close to soil level, pour new concrete cap. Check that the new cap is higher than the surrounding soil and that the top is shaped to shed water.
ROW Clearing	NOTE: Refer to the latest revision of the Electric Transmission Line Right of Way Management Plan. 1. Inspect gates/locks for damage and make any necessary repairs. 2. Check for ruts/erosion in ROW caused by vehicles, equipment, or runoff. Repair damage with hand shovels if possible, otherwise report damage to schedule repairs. 3. Check ROW for encroachments from buildings, poles, etc. Report any encroachments. 4. Check/remove any trash from ROW. 5. Apply herbicide treatment to entire ROW for vegetation control.

		NESC Minimum (Ft.) 2002 Edition				LCRA Minimum (Typically NESC plus 2 Ft.)				LCRA Design			
		Up to 35 kV	69 kV	138 kV	345 kV	Up to 35 kV	69 kV	138 kV	345 kV	Up to 35 kV	69 kV	138 kV	345 kV
Nature of surface underneath wires, conductors, or cables													
1	Tracks of Railroads (except electrified railroads using overhead trolley conductors)	26.5	27.1	28.6	32.7	28.5	29.1	30.6	34.7	30	35	35	40
2	Roads, streets, and other areas subject to truck traffic. (A truck is any vehicle over 8 ft.)	18.5	19.1	20.6	24.7	20.5	21.1	22.6	26.7	22	30	30	35
3	Driveways, parking lots, and alleys (A truck is any vehicle over 8 ft.)	18.5	19.1	20.6	24.7	20.5	21.1	22.6	26.7	22	30	30	35
4	Other land traversed by vehicles, such as cultivated, grazing, forest, orchards, etc. (To accommodate an oversized vehicle increase the height by the difference between the oversized vehicle and 14 Ft.)	18.5	19.1	20.6	24.7	20.5	21.1	22.6	26.7	22	30	30	35
5	Spaces and ways subject to pedestrians or restricted traffic only. (Spaces where riders on horses or other large animals, vehicles, or other mobile units exceeding a total height of 8 Ft. are prohibited by regulation or permanent terrain configuration, or are otherwise not normally encountered or reasonably anticipated.)	14.5	15.1	16.6	20.7	16.5	17.1	18.6	22.7	22	30	30	35
6	Water areas not suitable for sail boating or where sail boating is prohibited.	17	17.6	19.1	23.2	19	19.6	21.1	25.2	22	30	30	35
7	Water areas suitable for sail boating including lakes, ponds, reservoirs, tidal waters, rivers, streams, and canals with an unobstructed surface area of												
	a. less than 20 acres	20.5	21.1	22.6	26.7	22.5	23.1	24.6	28.7	25	30	30	35
	b. 20 to 200 acres	28.5	29.1	30.6	34.7	30.5	31.1	32.6	36.7	33	33	33	38
	c. 200 to 2000 acres	34.5	35.1	36.6	40.7	36.5	37.1	38.6	42.7	39	39	39	44
	d. over 2000 acres	40.5	41.1	42.6	46.7	42.5	43.1	44.6	48.7	45	45	45	50
8	Established boat ramps and associated rigging areas: areas posted with sign(s) for rigging or launching sail boats.	Add 5 ft. to values in 7 above.				Add 5 ft. to values in 7 above.				Add 5 ft. to values in 7 above.			

Table D2. Minimum Vertical Line Clearance

Table D2. Minimum Vertical Line Clearances (Continued)

		NESC Minimum (Ft.) 2002 Edition				LCRA Minimum (Typically NESC plus 2 Ft.)				LCRA Design			
		Up to 35 kV	69 kV	138 kV	345 kV	Up to 35 kV	69 kV	138 kV	345 kV	Up to 35 kV	69 kV	138 kV	345 kV
Where wires, conductors, or cables run along and within the limits of highways or other road rights-of-way but do not overhang the roadway.													
1	Roads, streets, or alleys	18.5	19.1	20.6	24.7	20.5	21.1	22.6	26.7	22	30	30	35
2	Roads in rural districts where it is unlikely that vehicles will be crossing under the line.	16.5	17.1	18.6	22.7	18.5	19.1	20.6	24.7	22	30	30	35
Vertical Clearances Between Wires Carried on Different Supporting Structures (LCRA design values are governed by Texas Health and Safety Code and OSHA Requirements.)													
1	Effectively Grounded Supply Guy Wires and Neutral Conductors	2	2.6	4.1	8.2	4	4.6	6.1	10.2	15	15	15	20
2	Effectively Grounded Communications Guy Wires and Communications Cables	5	5.6	7.1	11.2	7	7.6	9.1	13.2	15	15	15	20
3	Distribution Supply Conductors	2	2.6	4.1	8.2	4	4.6	6.1	10.2	15	15	15	20
4	Trolley and electrified railroad contact conductors	6	6.6	8.1	12.2	8	8.6	10.1	14.2	15	15	15	20
5	Transmission Lines												
	69 kV	-	3.2	4.7	8.9	-	5.2	6.7	10.9	-	15	15	20
	138 kV	-	-	6.1	10.3	-	-	8.1	12.3	-	-	15	20
	345 kV	-	-	-	14.5	-	-	-	16.5	-	-	-	25

Table D2. Minimum Vertical Line Clearances (Continued)

		NESC Minimum (Ft.) 2002 Edition				LCRA Minimum (Typically NESC plus 2 Ft.)				LCRA Design			
		Up to 35 kV	69 kV	138 kV	Up to 35 kV	69 kV	138 kV	Up to 35 kV	69 kV	138 kV	Up to 35 kV	69 kV	138 kV
Clearance of Wires, Conductors, Cables, and Unguarded Rigid Live Parts Adjacent but Not Attached to Buildings and Other Installations Except Bridges, Grain Bins and Pool Areas.													
1	Buildings												
	Horizontal (no wind)	7.5	8.1	9.6	13.7	9.5	10.1	11.6	15.7	15	15	15	20
	Horizontal (with wind)	4.5	5.1	6.6	10.7	6.5	7.1	8.6	12.7	10	10	10	-
	Vertical												
	Over or under roofs or projections not accessible to pedestrians	12.5	13.1	14.6	18.7	14.5	15.1	20	25	20	20	25	-
	Over or Under roofs or projections accessible to pedestrians	13.5	14.1	15.6	19.7	15.5	16.1	22	27	20	20	25	-
	Over roofs accessible to vehicles but not trucks	13.5	14.1	15.6	19.7	15.5	16.1	23	28	20	20	25	-
	Over roofs accessible to trucks	18.5	19.1	20.6	24.7	20.5	21.1	23	28	22	25	28	-
2	Signs, chimneys, billboards, radio and TV antennas, tanks and other buildings not classified as buildings or bridges												
	Horizontal (no wind)	7.5	8.1	9.6	13.7	9.5	10.1	11.6	15.7	15	15	15	20
	Horizontal (with wind)	4.5	5.1	6.6	10.7	6.5	7.1	8.6	12.7	10	10	10	-
	Vertical												
	Over surfaces accessible to pedestrians	13.5	14.1	15.6	19.7	15.5	16.1	17.6	21.7	20	20	20	-
	Over or under other portions.	8	8.6	10.1	14.2	10	10.6	15	16.2	20	20	20	-
Clearance of Wires, Conductors, Cables, and Unguarded Rigid Live Parts from Light Supports, Traffic Signals, Dist. Or Trans. Poles. (Rule 234B)													
	Horizontal (No wind)	5.0	5.0	6.1	10.3	7	7	8.1	12.3	15	15	15	15
	Horizontal (with wind)	4.5	5.2	6.6	10.7	6.5	7.2	8.6	12.7	15	15	15	15
	Vertical	5.5	5.5	6.6	10.8	7.5	7.5	8.6	12.8	20	20	20	-

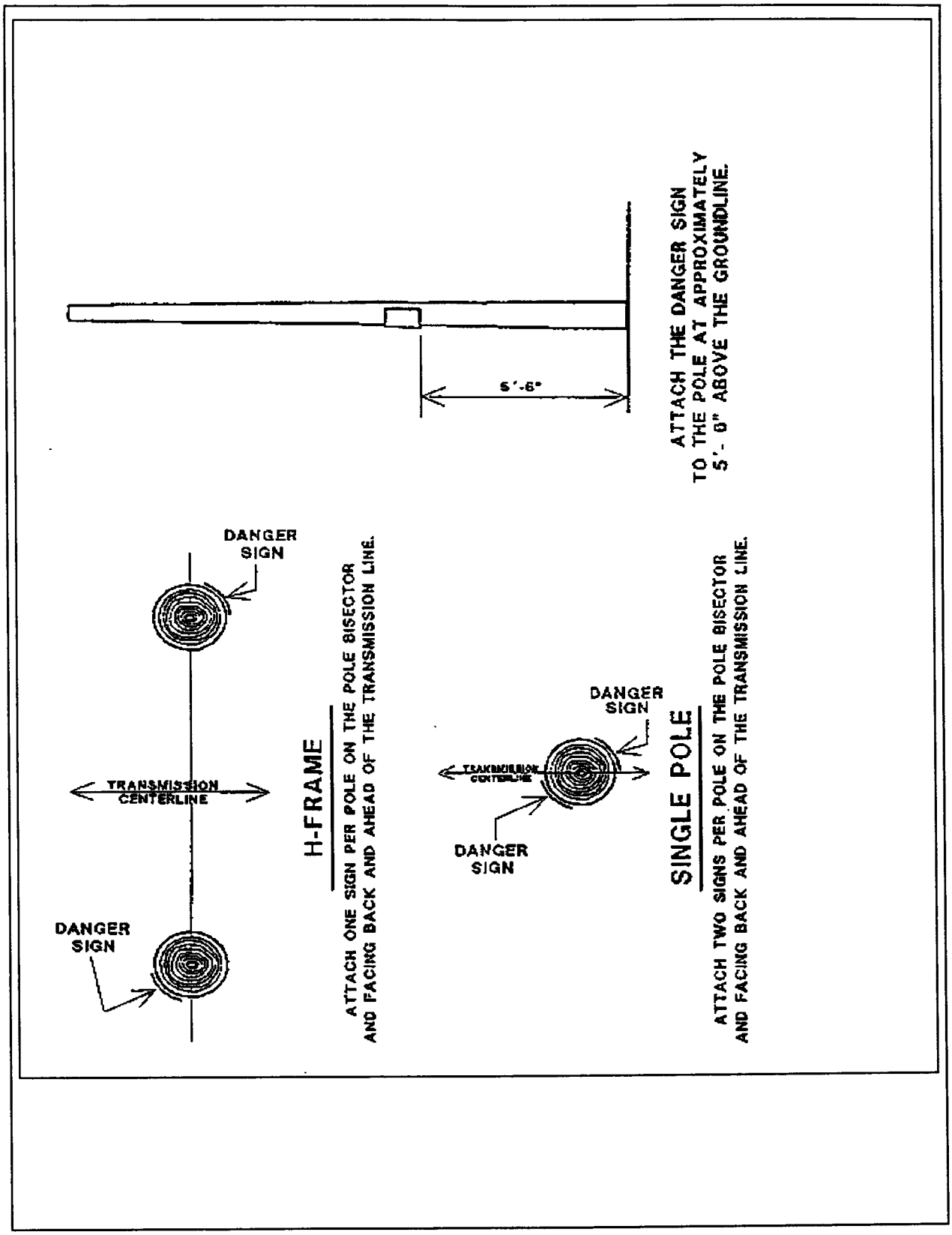


Figure D1. Acceptable Attachment of Danger Signs

Table D3. Number of Insulator Bells per Insulator String

Type	Wood Structure	Steel Structure
Tangent		
69 kV	5	7
138 kV	9	11
Angle		
69 kV	6	8
138 kV	10	12
Dead-end		
69 kV	7	9
138 kV	11	13

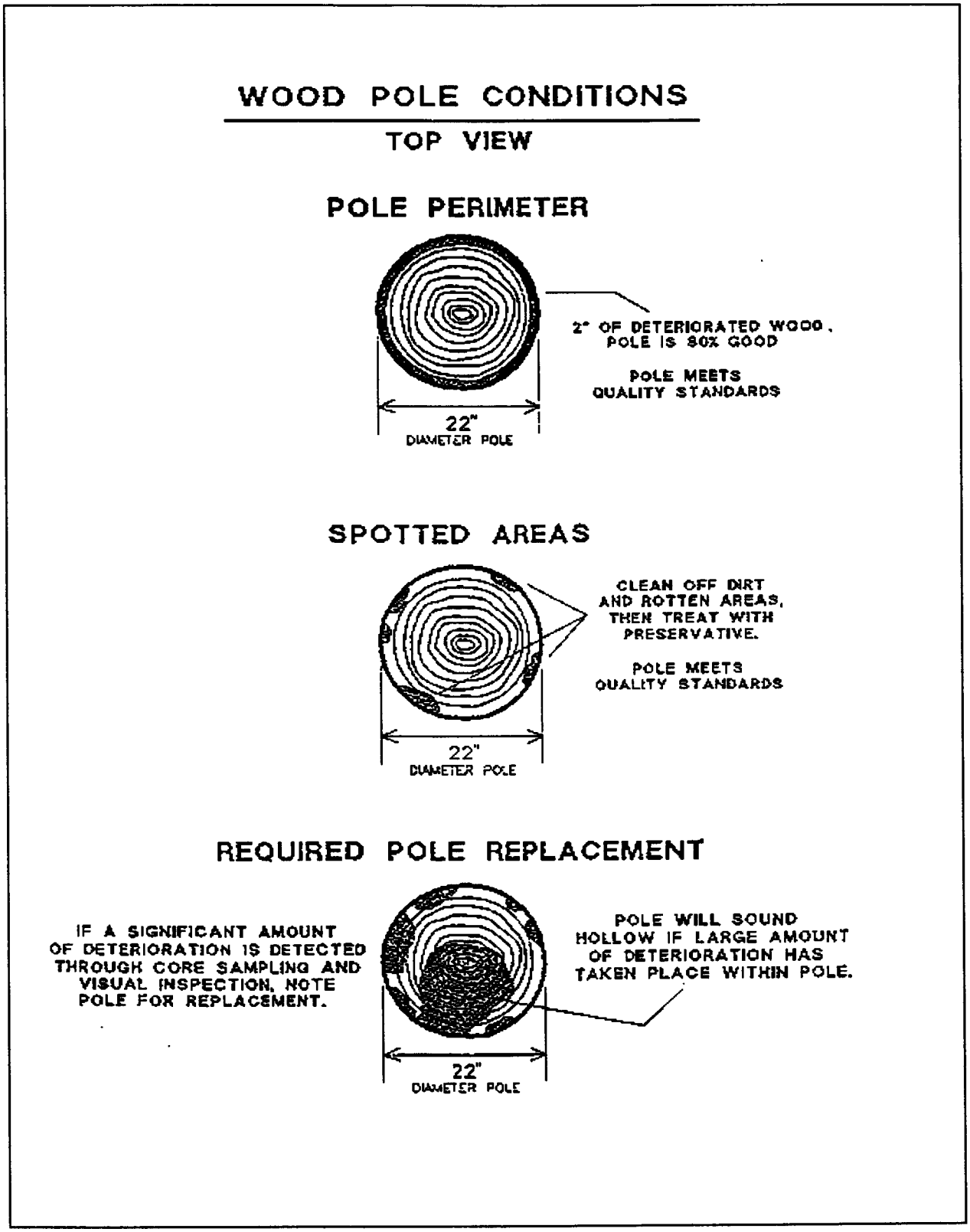


Figure D2. Acceptable Pole Damage Due to Deterioration

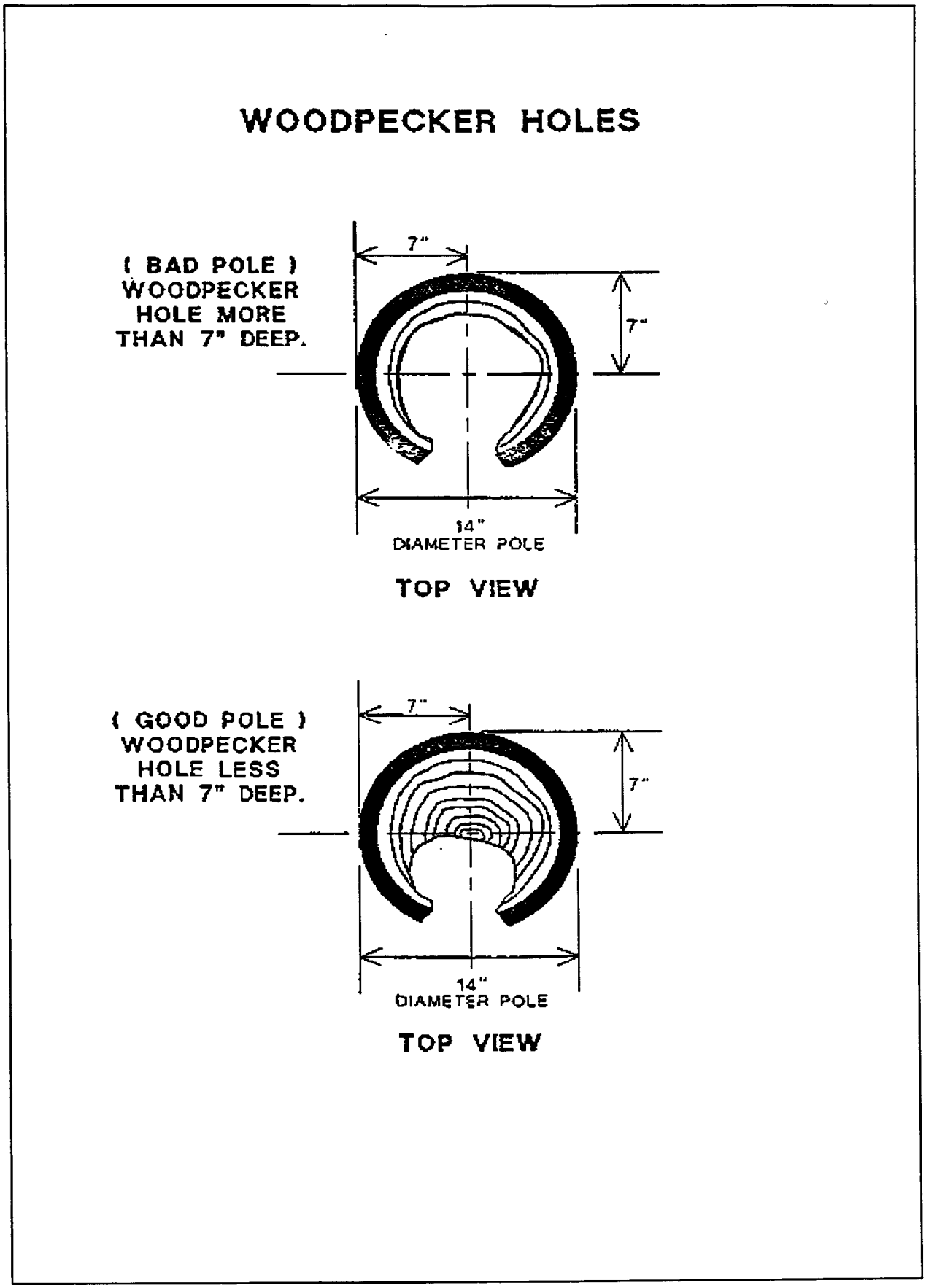


Figure D3. Acceptable Pole Damage Due to Woodpecker Holes

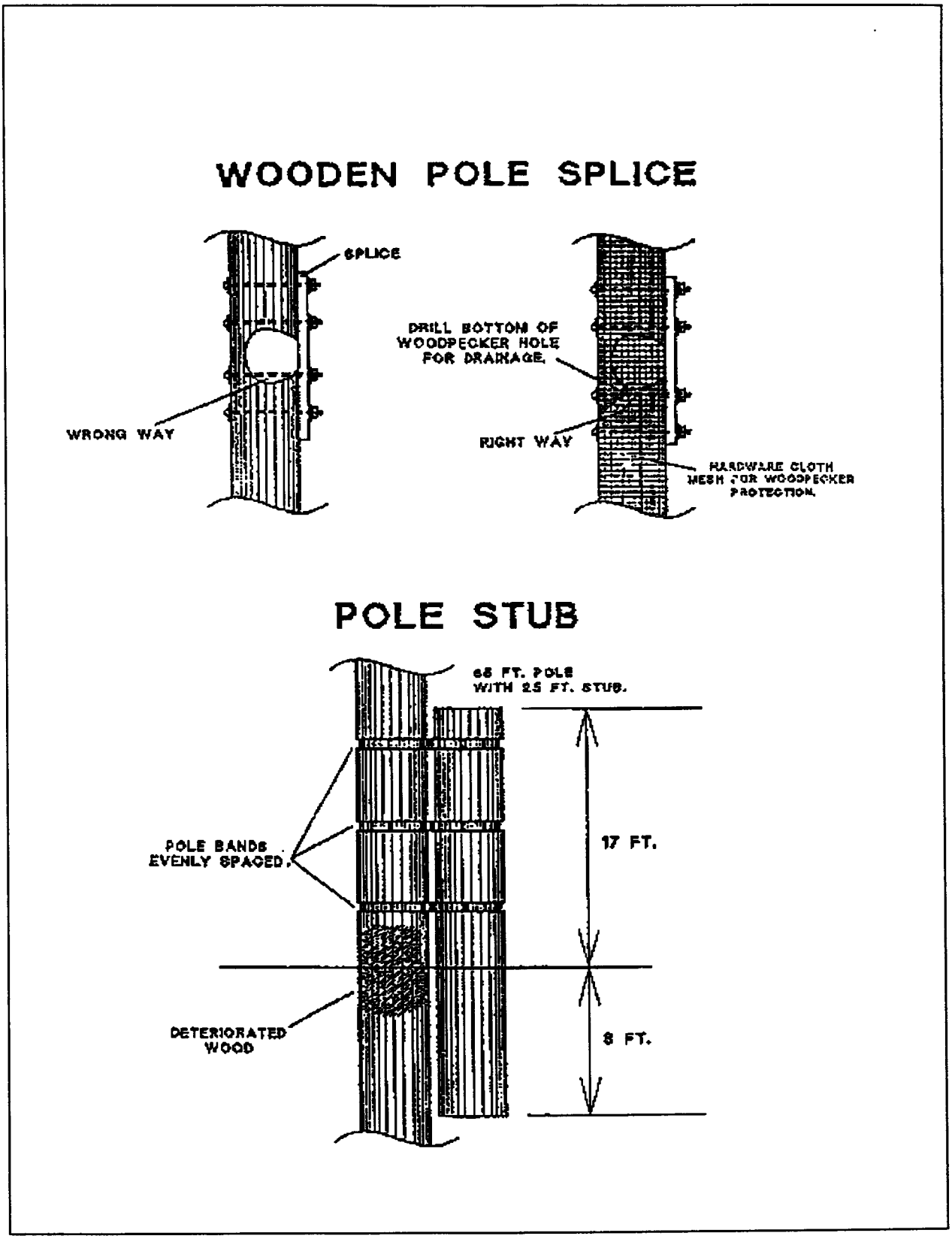


Figure D4. Example of Acceptable Pole Bracing Practices

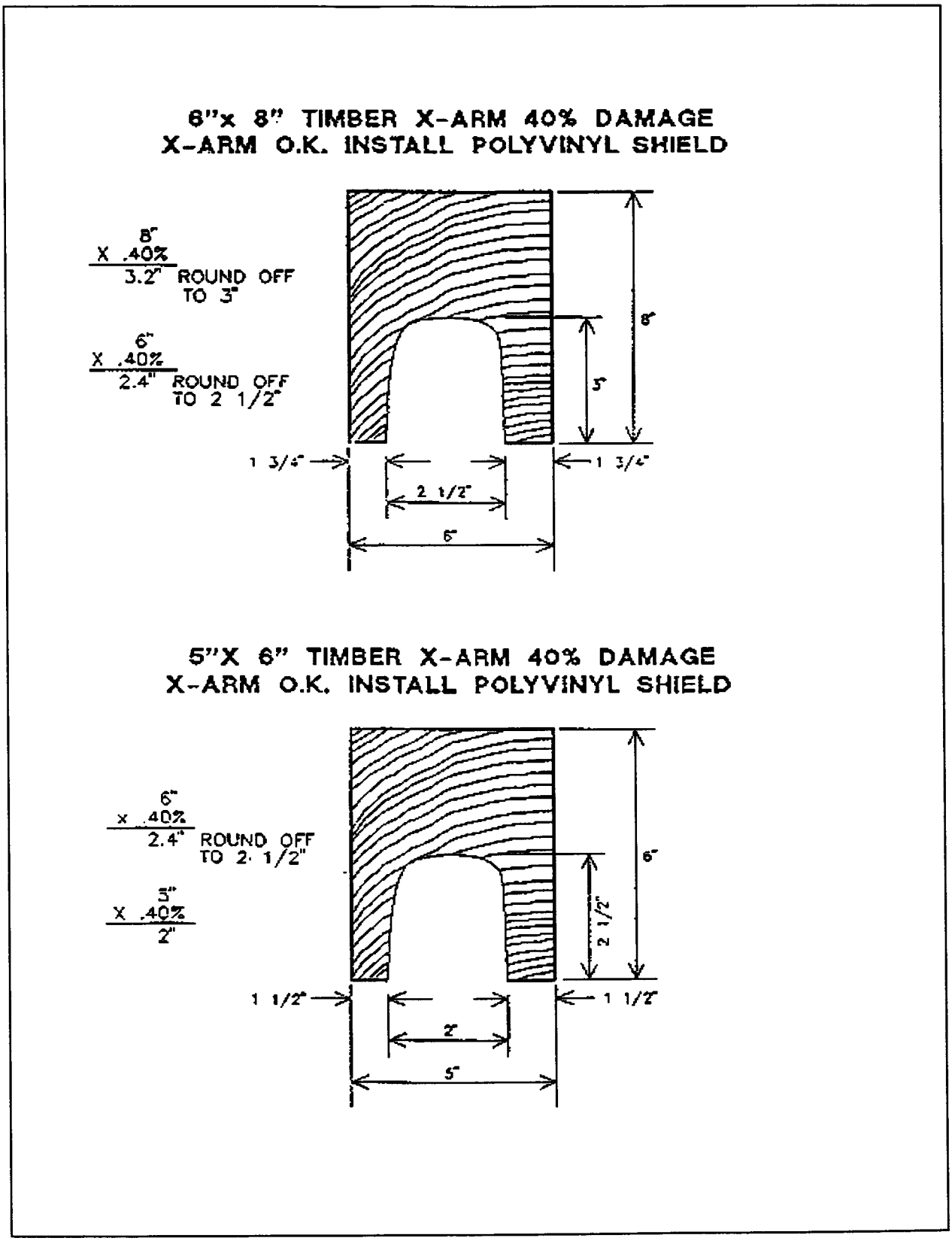


Figure D5. Acceptable Cross-arm Damage Due to Woodpecker Holes

3 1/4"X 5 1/4" X-BRACE AND KNEE BRACE
X-BRACE AND KNEE BRACE O.K. INSTALL POLYVINYL SHIELD

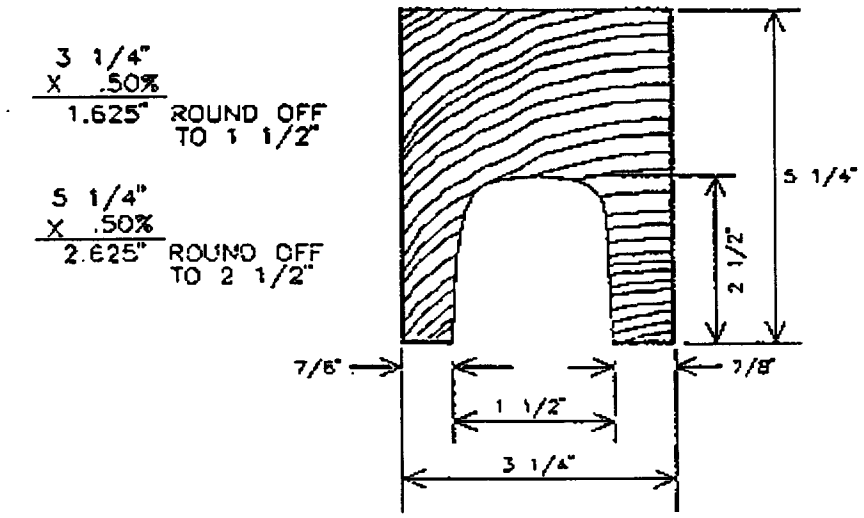
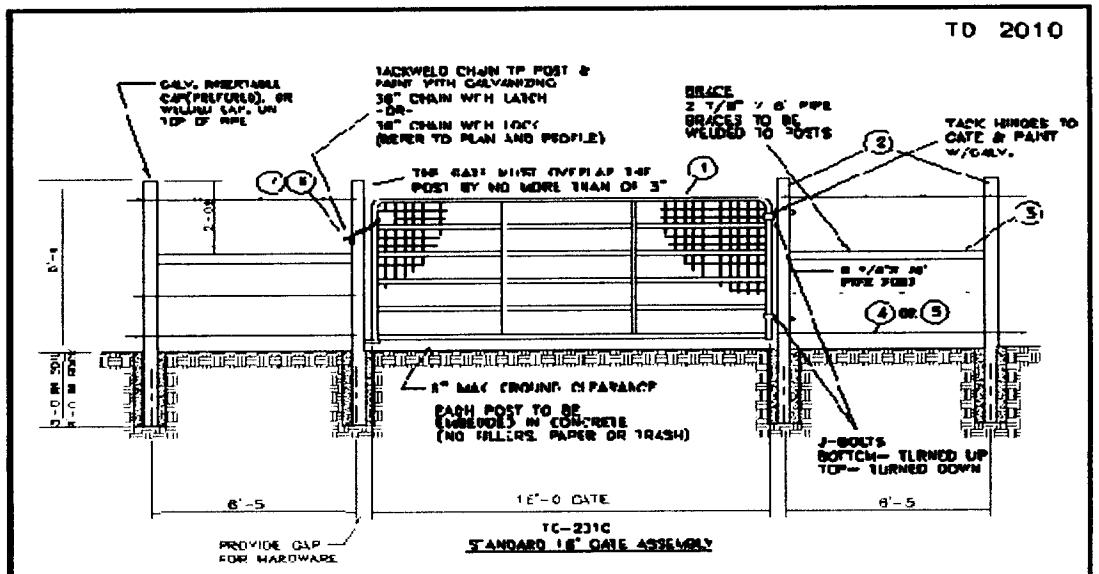


Figure D6. Acceptable X-brace Damage Due to Woodpecker Holes



GATE CONSTRUCTION NOTES:

1. GATE HINGES SHALL BE INSTALLED PERPENDICULAR TO THE GATE OPENING.
2. WHEN THE GATE OCCURS AT A ROAD, RAILROAD, ETC. INSTALL THE GATE TO OPEN INTO THE PROPERTY.
3. WHEN IN ROCK, CUT 2'-0" OFF BUTT OF FENCE POST AND EMBED 5'.
4. MINIMUM GATE SPECIFICATIONS: 1-1/8" 16 GA. (0.065") GALVANIZED PIPE. OVERALL HEIGHT OF 48", FABRICATED WITH 4" X 4" 6 GA. BELL WIRE FABRIC FILLER (16' X 44") WITH 6 8" OPENING AT THE TOP OF THE GATE. WIRE CAN EXTEND TO TOP OF GATE IF NECESSARY. MOUNTING HARDWARE SHALL CONSIST OF 2 EA 3/8" X 12" THREADED J BOLTS GALV WITH 4 EA GALV WASHERS & 4 EA GALV HEX NUTS, 2 EA 1-6/8" X 5/8" FEMALE HINGES WITH SET BOLTS, 1 EA 22" CHAIN WITH SNAP HOOK.

LIST OF MATERIAL			
ITEM	DESCRIPTION	STOCK NO.	QUAN.
1	16' ROW GATE W/ HARDWARE	308006806	1
2	PIPE GATE POST, 2 7/8" X 10' PIPE	5509024240	4
3	PIPE POST BRACE, 2 7/8" X 13' PIPE (CUT FOR 2 6' BRACES)	550902420	1
4	WIRE, BARBED, 2 POINT, 12 1/2 GA.	308016006	A/R
5	WIRE, BARBLESS, 2 PLY, 12 1/2 GA.	308016906	A/R
6	CHAIN, CRBO ALLOY, 3/8", 7100# LD LMT, SHOT-PEENED	2809007826	3 FT
7	PADLOCK, BRASS, EQUIPPED 1 1/2" SHACKLE	280704220C	1

TRANSMISSION CONSTRUCTION STANDARD							
VOLTAGE	COLOR / IDNO	WIRE SIZE	DATE	BY	CHK	APP	TYPE
-	-	-	July 2005	DS	CDS	CDS	ROW Gate
NO.	DATE	DESCRIPTION		BY	CHK	APP	DESCRIPTION
A							16' Standard Gate
CANCEL							MODULE NUMBER
D							TD-2010

Figure D7. Right-of-Way Gate Typical Drawing

Table D4. Climb Inspection Report (Example)

LOWER COLORADO RIVER AUTHORITY
TEN YEAR LINE INSPECTION REPORT

DATE: _____ DISTRICT: _____ PREPARED BY: _____

T-NUMBER: _____ LINE DESCRIPTION: _____

LENGTH: _____ CONDUCTOR: _____

STRUCTURE	DISCREPANCIES	Person who Inspected: Aerial	Ground

Appendix E: Transmission Line & Right-of-Way Maintenance Process

Line Maintenance Management Plan

ROW Assessment

Every 10 years Line Maintenance will do a comprehensive ROW assessment.

Assessments will be used to identify ROW accessibility constraints such as vegetation, gates, roads & creek crossings, and may also be used to prescribe for herbicide treatment if applicable. Assessment will also be used to identify improvements needed to meet the Line Maintenance standards as stated in the Line Maintenance Management Plan. Assessment reports will be entered into Maximo and become part of the Job Plan for the upcoming ROW enhancement and also used to plan the upcoming FY budget. This assessment should help determine if this line qualifies for a 2 year maintenance control cycle or a 5 year maintenance control cycle.

ROW Enhancement

Every 10 years Line Maintenance will do a comprehensive ROW enhancement to start 12 months following the ROW assessment.

ROW Enhancements will be a process to complete all discrepancies reported during the maintenance assessments and line patrols. All backlog work that pertains to the particular line will be completed during this process. Enhancements will also address improvements needed to meet the Line Maintenance standards as stated in the Line Maintenance Management Plan.

Line Inspection

Every 10 years, Line maintenance will do a line inspection which will began 12 months following the ROW enhancement.

Climbing inspections are performed every 10 years. This process is used to identify deterioration and broken components on the line structures and line apparatus. Inspection report will be used to plan and make estimates for CIP and regulated budgets.

Line Overhaul

Every 10 years Line Maintenance will do a line overhaul to start 12 month following the line inspection.

Line overhauls will consist of repairs needed mostly on wood pole lines but not limited to other lines that may be in need of key repairs noted from the prior year inspection report. Overhauls will be initiated by both CIP and regulated expense.

Vegetation Control Cycles

Follow up Maintenance cycle's

Every 24 or 60 months which ever is needed, ROW Maintenance will do follow up vegetation maintenance control cycle to address vegetation re-growth. These cycles will begin after the initial ROW maintenance enhancement or when a new line is acquired by Transmission Services.

Target for Herbicide

All Rights of Ways that prove a high rate of vegetation re-growth will be a prime objective to pursue the use of herbicide as a measure to achieve a five year vegetation maintenance cycle.

VEGETATION CONTROL 2 YEAR CYCLE

Vegetation control cycles will be scheduled 24 months following the ROW enhancement and may involve a re-shred and/or herbicide treatment as needed. Vegetation control cycles will continue on 24 month intervals until a 60 month interval rate is established.

VEGETATION CONTROL 5 YEAR CYCLE

Vegetation control cycles will be scheduled 60 months following the ROW enhancement if it is determined that a ROW has a tolerable vegetation re-growth rate period or when the use of herbicide is used to gain better control.

Interdepartmental Functions Required Throughout the Process

Property owner notifications should be made prior to any scheduled Line work and/or ROW work. "Notifications are not needed for ROW assessments". Notifications are generally performed by Real Estate Services when given 3 months prior to the start of the scheduled maintenance activity.

Transmission Services Compliance *(Environmental)* must be notified before the start of all vegetation & Line maintenance activities. A current environmental assessment must be reviewed in order to adequately schedule all line & ROW activities based on recommendation as stated in the pertaining assessment document.

"Transmission Line Design" will review the line inspection report. TLD may use this information to update the "Plan & Profile" where recommendations and/or modifications to the line design may be noted. TLD may also assist in planning line overhauls for the following year TSIP.

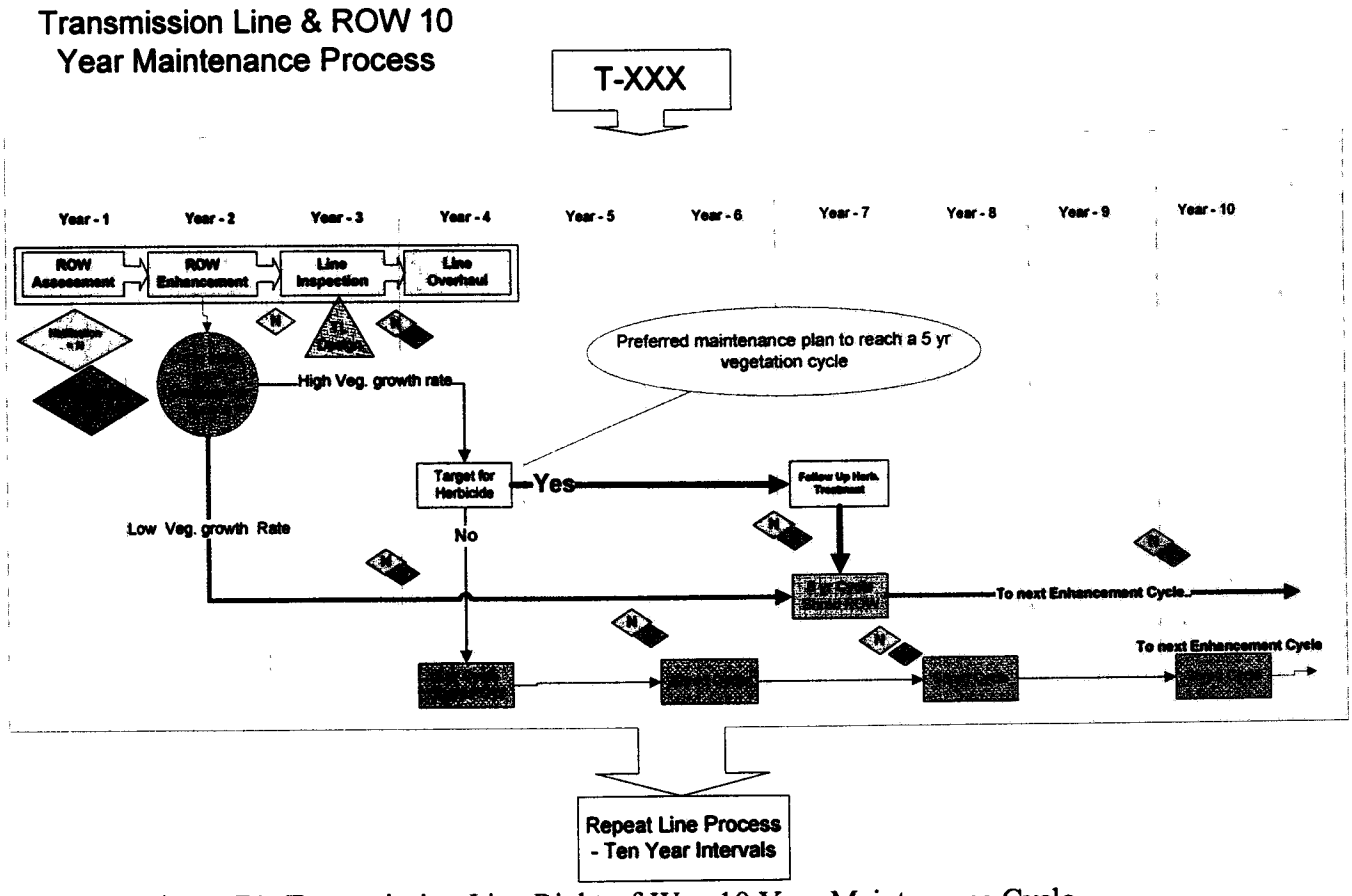


Figure E1: Transmission Line Right-of-Way 10 Year Maintenance Cycle

LCRA ENERGY • WATER • COMMUNITY SERVICES	Transmission Services Management System	**Standards for Inspection and Maintenance of LCRA TSC Equipment and Facilities Revision 4.1 – Document Change Form** **Date: 9/17/2008**

Document Change Form

Responsible Person: Peter Larkam Date: 9/17/2008

Purpose: Review and update of document with revisions to make document current with existing practices, clarify expectations, and adjust interval frequencies to obtain efficiencies.

New Document ☐ Existing Document ☒

Stakeholder Review Team (List Names)

1. Huntis Dittmar
2. Bruce Rushing
3. Chad Barcak
4. Steve Pinson
5. Jack Ryan

Attachment Documentation Rules:

New Documents:

- Are to be in black text and indicated as a new document

Additions to Existing Documents:

- are to be in color (such as **red** or **blue**) and indicated as an existing document
- Deletions are to be ~~**strikethrough**~~ or Microsoft Track Changes

Management Approval (Supervisors/Managers responsible for managing the tasks are described in the document

1 Peter Larkam 1459 Date: 9/17/2008

2. Ken Barnard 0764 Date: 9/17/08

3. Eugene Patteson 0802 Date: 9-17-08

4. Bruce Rushing 1372 Date: 9/17/2008

5. Huntis Dittmar 3855 Date: 9/17/2008

6. _____ Date: _____

Final Approval (Signature and Date Required)

Bill Hatfield 1356 Date 9/17/08
Manager Approval

Responsible Person

Peter Larkam 1459 Date 9/17/2008

Effective Date of Change: Upon Manager Approval

Communication /Change Plan
Document review and edit by listed stakeholders, representing all applicable work groups. Final review and approval by Supervisors and Managers. Final approved document will be updated in EDMS and web site. Notification of document revision will be sent to all TO employees via email. Expectation that individual work groups review sections that pertain to their work.

LCRA ENERGY • WATER • COMMUNITY SERVICES	Transmission Services Management System	**Standards for Inspection and Maintenance of LCRA TSC Equipment and Facilities Revision 4.1 – Document Change Form** **Date: 9/17/2008**

Stakeholder Review Team

The following signatures represent that an appropriate review has been performed and the Stakeholder Review Team recommends the attached changes to the Management Team for approval.

Stakeholder Review Team Signature/Date:

1. Huntis Dittmar 3855 9/17/08
2. Bruce Rushing 1372 9/17/2008
3. Chad Barcak C3452 9/18/2008
4. Steve Pinson 0957 9/30/08
5. Jack Ryan 1947 9/17/08
6. _____
7. _____
8. _____
9. _____