

SPECIFICATION

RETROFITTING EXISTING FACILITIES FOR AVIAN PROTECTION

1. SCOPE:

1.1 The purpose of this document is to provide detailed guidelines for both internal and contracted persons performing staking and construction duties for retrofitting existing facilities to improve avian protection that are not defined within other internal PRECorp documents or which are in excess of RUS standards.

2. DOCUMENTS:

- 2.1 RUS Bulletin 1728F-803 24.9/14.4 KV Construction
- 2.2 Suggested Practices for Avian Protection On Power Lines: The State of the Art in 2006
- 2.3 PRECorp avian safety construction standards:
 - 2.3.1.1 VC1.11MA-1 24.9/14.4kV 3-PHASE SINGLE SUPPORT ON CROSSARM (TANGENT) AVIAN SAFETY RETROFIT
 - 2.3.1.2 VC1.41MA-1 24.9/14.4kV 3-PHASE SINGLE SUPPORT, NEUTRAL ON CROSSARM AVIAN SAFETY RETROFIT
 - 2.3.1.3 VC5MA-1 24.9/14.4kV 3-PHASE SINGLE DEADEND ON CROSSARMS AVIAN SAFETY RETROFIT
 - 2.3.1.4 VC5TMA-1 24.9/14.4kV 3-PHASE TAKEOFF ARM – AVIAN SAFETY RETROFIT
 - 2.3.1.5 VC6MA-1 24.9/14.4kV 3-PHASE DOUBLE DEADEND ON CROSSARMS AVIAN SAFETY RETROFIT
 - 2.3.1.6 VG2MAG-1 24.9/14.4kV 2-PHASE TRANSFORMER BANK AVIAN/GROUSE RETROFIT
 - 2.3.1.7 VG3MAG-1 24.9/14.4kV 3-PHASE TRANSFORMER BANK AVIAN/GROUSE RETROFIT
 - 2.3.1.8 VP1.3MA-1 GANGED ARRESTOR ASSEMBLY FOR AVIAN SAFETY RETROFIT
 - 2.3.1.9 VS1.3MA-1 CUTOUTS (THREE SINGLE-PHASE) AVIAN SAFETY RETROFIT

3. EQUIPMENT:

3.1 Figure 1 provides a listing of specific equipment and materials for avian protection retrofitting work.


4. MATERIALS:

4.1 Figure 1 provides a listing of specific equipment and materials for avian protection retrofitting work.

5. STAKING NOTES:

- 5.1 Evaluation of condition of existing facilities:
 - 5.1.1 Existing poles that are forty years or older as identified by pole brands or other data shall be retired and replaced with a new pole and current construction assemblies.
 - 5.1.2 If the condition of the pole is non-serviceable or is at risk for reduced system reliability then the pole shall be retired and replaced with a new pole and current construction assemblies.
 - 5.1.3 If existing assembly units exhibit damage or extreme wear, they shall be retired and replaced with current construction assemblies.
- 5.2 Non-current styles of arrestors and cutouts will be retired and replaced with present configurations.
- 5.3 All gapped arrestors will be retired and replaced with arrestors of current configuration.
- 5.4 All retrofit standards are developed with the assumption that the existing jumpers shall be replaced.
- 5.5 All retrofit standards assume that only insulated ground wires are carried above the neutral conductor.
- 5.6 Vertical clearance between energized lines or an energized line and ground must be equal to or greater than 40 inches.

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- 5.7 Horizontal/diagonal clearance between energized lines or an energized line and ground must be equal to or greater than 60 inches.
- 5.8 Where an extension link/epoxillator combination is utilized on deadends or double deadends, there must be a 36" minimum clearance maintained from the crossarm face to the energized line.
- 5.9 When the assembly is in a grouse protected area and perch deterrents are utilized, their placement shall be such that a maximum of 5 inches of horizontal space is allowed on surfaces where birds may perch.
- 5.9.1 Perch deterrent extenders shall be used over line insulators on crossarms to discourage perching.
- 5.9.2 Pole top pin insulators shall have pole top perch deterrents installed over the insulator to discourage perching.
- 5.9.3 A pole without a pole top pin shall have a cap installed on the pole top.
- 5.10 The individual material assemblies given in Figure 1 may be used to document the necessary changes to an existing structure.
- 5.11 Construction standards are available for retrofitting existing structures that exhibit the most significant number of raptor mortalities on PRECorp's system. These construction standards are identified by a suffix being added to the assembly's normal designation as follows:
- 5.11.1 'M' – The first character in the suffix that designates that the assembly has been modified after its initial construction to improve avian safety or discourage perching.
- 5.11.2 'A' – The second character in the suffix that designates that the modification of the assembly has improved the avian safety of the structure.
- 5.11.2.1 This character may be omitted if the modified assembly was originally avian safe.
- 5.11.3 'G' – The second or third character in the suffix that designates that the modification of the assembly has perch deterred the original assembly in an effort to protect sage-grouse.
- 5.11.3.1 This character may be omitted if the modified assembly does not include perch deterrents.
- 5.11.4 The last character is to indicate a revision number to define a modification of type. (i.e. a 8'cross arm vs. a 10'crossarm)
- 5.12 OVERHEAD TRANSFORMER BANKS:
- 5.12.1 Perch deterrents shall be added to all lower crossarms to encourage perching on the safer upper arms.
- 5.12.2 Protective caps shall be installed on all primary bushing covers, arrestors, and cutouts.
- 5.12.3 The following standards are available for retrofitting existing transformer structures:
- 5.12.3.1 VG2MAG-1 24.9/14.4kV 2-PHASE TRANSFORMER BANK AVIAN/GROUSE RETROFIT
- 5.12.3.2 VG3MAG-1 24.9/14.4kV 3-PHASE TRANSFORMER BANK AVIAN/GROUSE RETROFIT
- 5.13 INLINE OVERHEAD ARRESTOR BANKS:
- 5.13.1 The following standard is available to modify existing arrestor structures:
- 5.13.1.1 VP1.3MA-1 GANGED ARRESTOR ASSEMBLY FOR AVIAN SAFETY RETROFIT
- 5.14 THREE-PHASE TAPS:
- 5.14.1 All three phases need to have extension links and epoxillators installed to extend 36" away from the crossarm face.
- 5.14.2 The following standards are available to modify tap structures:
- 5.14.2.1 VC5TMA-1 24.9/14.4kV 3-PHASE TAKEOFF ARM – AVIAN SAFETY RETROFIT
- 5.15 THREE-PHASE DEADENDS:
- 5.15.1 All three phases need to have extension links and epoxillators installed to extend 36" away from the crossarm face.
- 5.15.2 The following standards are available for single and double-deadend structures:

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- 5.15.2.1 VC5MA-1 24.9/14.4kV 3-PHASE SINGLE DEADEND ON CROSSARMS AVIAN SAFETY RETROFIT
- 5.15.2.2 VC6MA-1 24.9/14.4kV 3-PHASE DOUBLE DEADEND ON CROSSARMS AVIAN SAFETY RETROFIT

5.16 THREE-PHASE TANGENTS:

5.16.1 The following tangent structure is available for modification of three-phase tangent structures:

- 5.16.1.1 VC1.11MA-1 24.9/14.4kV 3-PHASE SINGLE SUPPORT ON CROSSARM (TANGENT) AVIAN SAFETY RETROFIT

5.17 OTHER ASSEMBLIES:

- 5.17.1.1 VC1.41MA-1 24.9/14.4kV 3-PHASE SINGLE SUPPORT, NEUTRAL ON CROSSARM AVIAN SAFETY RETROFIT
- 5.17.1.2 VS1.3MA-1 CUTOUTS (THREE SINGLE-PHASE) AVIAN SAFETY RETROFIT

6. INSTALLATION NOTES:

6.1 Jumpers should be inspected on all assemblies.

6.1.1 All energized jumpers must be insulated.

6.1.2 Jumpers with inadequate insulation coverage to a point within bushing or other covers shall be replaced or reworked.

6.1.3 Jumpers exhibiting cracked or crazing insulation shall be replaced.

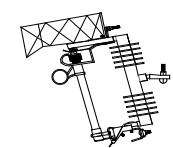
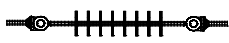
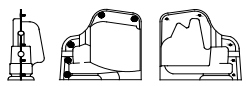


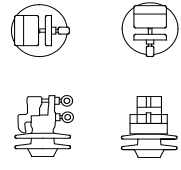
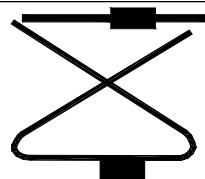
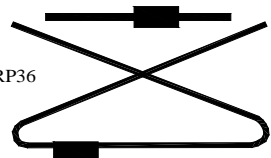

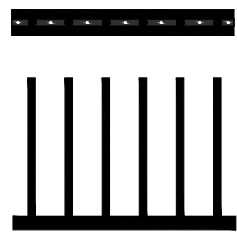

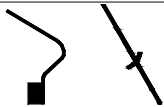

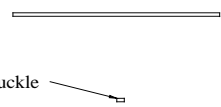

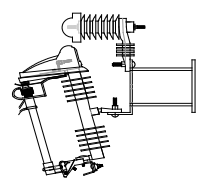



6.2 All pole top grounds should be removed to the height of the neutral conductor.

6.3 Any ground wire or neutral jumper required above the neutral connection shall be insulated and of sufficient gauge.

7. ENVIRONMENTAL AND SAFETY:

7.1 None.

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AP- SC 5/8 AP- SC 3/4		AP-LBCC 	AP-RPEX  AP-RPLC 
AP- IW # AP- IW # 2 AP- IW 2 AP- IW 4 AP-IW 350		AP-RP18 	AP-RP12 
AP- ICT 		AP-RP24 	AP-RP36 
AP- SBC 		AP-RPZ 	AP-RPE  AP-RPTP 
AP- LBC 		1"x1/2" buckle 	AP-RPCC  AP-CC 
AP- RPAC 		AP-RPCT-7 AP-RPCT-8 AP-RPCT-9	
AP- RPFL 			

Assembly #	MATERIAL	Part#	Assembly #	MATERIAL	Part#
AP- SC 5/8	Salisbury Cover up (5/8" x 50' length)	4711	AP-RPCC	Cutout Combo Coverup (does not include arrestor cover)	4730
AP- SC 3/4	Salisbury Cover up (3/4" x 25' length)	4715	AP-RP12	12" Perch Deterrent	4760
AP- IW #	Insulated Tap Wire, # 4	3113	AP-RP18	18" Perch Deterrent	4762
AP- IW # 2	Insulated Tap Wire, # 2	3114	AP-RP24	24" Perch Deterrent	4764
AP- IW 2	Insulated Tap Wire, 2/0	3115	AP-RP36	36" Perch Deterrent	4766
AP- IW 4	Insulated Tap Wire, 4/0	3116	AP-RPE	Perch Guard Extender	4769
AP-IW 350	Insulated Tap Wire, 350	3117	AP-RPZ	30" Zena Spikes, buckle(2) straps(2)	Mult.
AP- ICT	Insulator, Clamp Top 25kV	4311	AP-RPCT-7	Pole Top Cone -7-1/4"	4740
AP- SBC	Small Bushing Cover	4705	AP-RPCT-8	Pole Top Cone -8-3/8"	4743
AP- LBC	Large Bushing Cover	4708	AP-RPCT-9	Pole Top Cone -9-1/2"	4747
AP- RPAC	Arrestor Cover	4720	AP-RPTP	Pole Top Pin	4772
AP- RPFL	Fiberglass Extension Link	4281	AP-LBCC	Load Break Cutout Cover	4130
AP-RPEX	18.75" Enoxillator	4280	AP-RPLC	Load Break Cutout Cover	4730
AP-CC	Cutout Combo w\ Covers	Mult.			

Figure 1 – Individual Material Assemblies for Avian Protection Retrofitting