UNITED STATES
DEPARTMENT OF AGRICULTURE
RURAL DEVELOPMENT

RURAL UTILITIES SERVICE

SUMMARY OF
ITEMS OF ENGINEERING INTEREST
SEPTEMBER 2005

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ABBREVIATIONS

AAAC	All Aluminum Alloy Conductor
AAC	All Aluminum Conductor
ACCC	Aluminum Conductor Composite Core
ACHP	Advisory Council on Historic Preservation
ACSR	Aluminum Conductor Steel Reinforced
ACSR/AW/TW	Aluminum-clad steel reinforced Trapezoidal-shaped Aluminum Strands
ACSR/SD	Aluminum Conductor Steel Reinforced Self-Damping
ACSR/TW	Aluminum Conductor Steel Reinforced Trapezoidal-shaped Aluminum Strands
ANSI	American National Standards Institute
APLIC	Avian Power Line Interaction Committee
ASCE	American Society of Civil Engineers
ASTM	American Society for Testing and Materials
AW	Aluminum-clad Steel Core
BIL	Basic Impulse Level
BPL	Broadband Over Powerline
BSSC	Building Seismic Safety Council
CATV	Cable Television
CP	Change Proposal
EC	Electric Cooperative
ECA	Electric Cooperative Association
EEI	Edison Electric Institute
EMC	Electric Membership Corporation
EMF	Electric and Magnetic Fields
ESD	Electric Staff Division
FEMA	Federal Emergency Management Agency
FY	Fiscal Year
IBC	International Building Code
ICSSC	Interagency Committee on Seismic Safety in Construction
IEEE	Institute of Electrical and Electronics Engineers
kV	Kilovolt
NEHRP	National Earthquake Hazards Reduction Program
NESC	National Electrical Safety Code
NEPA	National Environmental Policy Act
NFPA	National Fire Protection Agency
NHPA	National Historic Preservation Act
NIST	National Institute of Standards and Technology
NMAP	New Mexico Avian Protection
NRECA	National Rural Electric Cooperative Association
MOA	Memorandum of Agreement
RBS	Rural Business-Cooperative Service
REA	Rural Electrification Administration or Rural Electric Association
RE ACT	Rural Electrification Act
RD	Rural Development
RHS	Rural Housing Service
RTB	Rural Telephone Bank
RUS	Rural Utilities Service
SAIDI	System Average Interruption Duration Index
SHPO	State Historic Preservation Officer
T2	Twisted Pair
T&D	Transmission & Distribution
T&DEC	Transmission & Distribution Engineering Committee
USFWS	U.S. Fish and Wildlife Service
VR	Vibration Resistant
XLP	Cross-linked Polyethylene
XLP-TR	Cross-linked Polyethylene with Tree Retardant

ENGINEERING

2007 Edition of the National Electrical Safety Code

As mentioned in the previous editions of our Items of Engineering Interest, the various Institute of Electrical and Electronics Engineers (IEEE) National Electrical Safety Code (NESC) subcommittees are working to revise the 2002 Edition of the NESC and create the 2007 Edition. Although the subcommittees will meet September 26 through October 20, 2005, to assess public comments and make appropriate adjustments and changes, all opportunity for public participation is completed.

A Proposed 2007 NESC version, prepared after considering the public comments will be submitted to the NESC Main Committee for Ballot and to ANSI for concurrent public review on January 15, 2006. The NESC Main Committee approved revision of the NESC will be sent to the American National Standards Institute (ANSI) for consideration as an ANSI standard on May 15, 2006. The new code will be published and available on August 1, 2006.

For information concerning change proposals to the NESC, see the website:

http://standards.ieee.org/nesc/index.html

If you would like more information or have any questions, please contact Donald Heald, Transmission Branch at (202) 720-9102, or at Don.Heald@wdc.usda.gov.

An Update to Changes to Sections 26 and 27 of the 2002 NESC
(Revisited from the 2003 and 2004 Items of Engineering Interest)

The 2003 and 2004 Summary of Items of Engineering Interest discussed the development of the 2007 Edition of the National Electrical Safety Code. We discussed the importance of the National Electrical Safety Code (NESC) and the Institute of Electrical and Electronics Engineers (IEEE) Secretariat that is charged with writing the NESC. Please refer to the 2003 and 2004 editions of the Items of Engineering Interest for the specifics on these details. You will find these editions on the RUS Web at:

http://www.usda.gov/rus/electric/engineering/2003/en-in-03.pdf

and

http://www.usda.gov/rus/electric/engineering/2004/en-in-04.pdf

Subcommittee 5 received over 600 comments to the change proposals. This subcommittee is responsible for sections 24, 25, 26 and 27 of the NESC. The number of comments per change proposal is found in Exhibit 1 of this document. Also, a brief summary of the top ten change proposals which were commented on is included in the appendix for convenience.

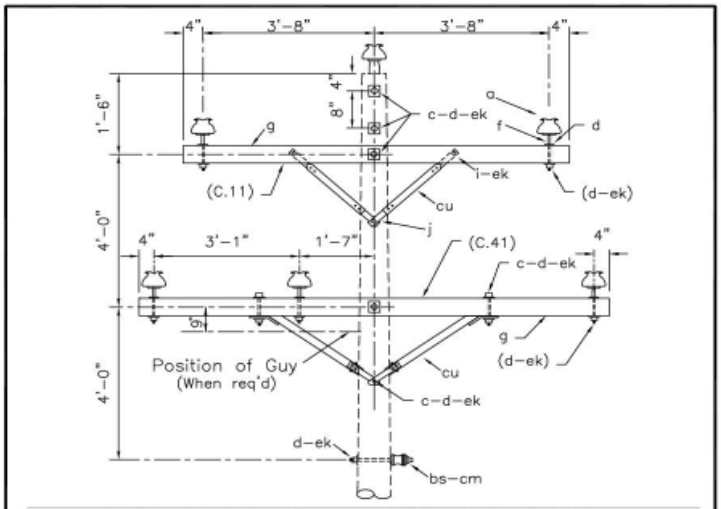
Because of the number of comments, which Subcommittee 5 must consider, the subcommittee met for a week in August and will meet for a week in September. If you would like more information or have any questions, please contact Donald Heald, Transmission Branch, at (202) 720-9102, or at Don.Heald@wdc.usda.gov.

For other information concerning change proposals to the NESC, see the following web site:

http://standards.ieee.org/nesc/index.html

Double Circuit Alternatives for 12.47/7.2 kV Distribution Construction

In Section D of new Bulletin 1728F-804, "Specifications and Drawings for 12.47/7.2 kV Line Construction" are several assemblies depicting one "style" for double-circuit construction. The assemblies of the style shown in Bulletin 1728F-804 are used to install the two 3-phase circuits on opposite sides of the pole. Some RUS Borrowers have expressed a desire or a need to construct the two circuits above one another. This requested "over-under" alternative style can be constructed using standard RUS subassemblies and standard RUS 4-foot vertical spacing as shown on the following guide drawings "D1.84G" and "D1.85G":



THREE-PHASE ASSEMBLIES NEEDED FOR "STYLE 2" DOUBLE-CIRCUIT ASSEMBLIES

LINE ANGLES	(Arms)	(Type)	PRIMARY ASSEMBLY	PLUS	PRIMARY ASSEMBLY	LESS	NEUTRAL ASSEMBLY
Tangent	(single)	(pin)	C1.11 or C1.12	+	C1.41	-	1 x N1.11
Tangent	(single)	(post)	C1.11P or C1.12P	+	C1.41P	-	1 x N1.11
Tangent	(single)	(large)	C1.11L or C1.12L	+	C1.41L	-	1 x N1.11
Tangent (Grade B)	(double)	(pin)	C2.24 or C2.25	+	C2.52	-	1 x N2.11
Tangent (Grade B)	(double)	(post)	C2.24P or C2.25P	+	C2.52P	-	1 x N2.11
Table I	(single)	(pin)	C1.13	+	C1.41	-	1 x N1.11
Table II	(single)	(post)	C1.13P	+	C1.41P	-	1 x N1.11
Table III	(single)	(large)	C1.13L	+	C1.41L	-	1 x N1.11
Table III	(double)	(pin)	C2.21	+	C2.51	-	2 x N1.11
Table IV	(double)	(post)	C2.21P	+	C2.51P	-	2 x N1.11
Table III	(double)	(large)	C2.21L	+	C2.51L	-	2 x N1.11

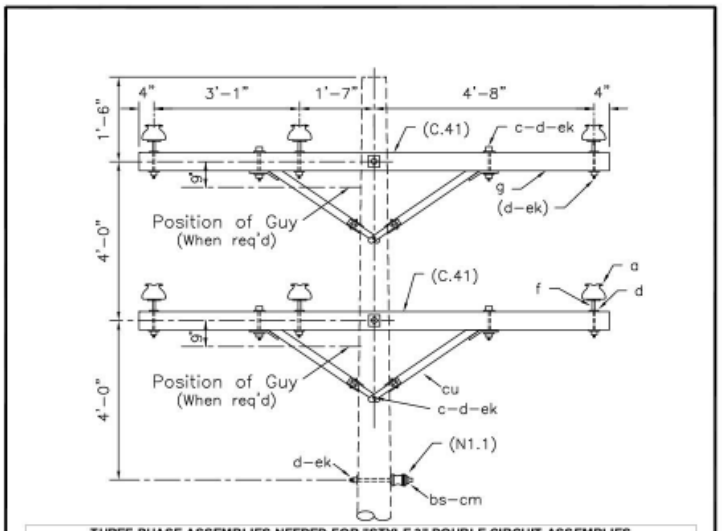
Types: pin = pin-type insulators; post = post-type insulators; large = clamp-type pins
Note: N1.11 assembly materials = 1 pin (item "f") & 1 insulator (item "a")

DESIGN PARAMETERS:

See Design Parameters for Primary Assemblies Above

DOUBLE CIRCUIT GUIDE (ALTERNATIVE STYLE 2)

RUS | DOUBLE CIRCUIT PRIMARY 12.47/7.2 kV | D1.84G



THREE-PHASE ASSEMBLIES NEEDED FOR "STYLE 3" DOUBLE-CIRCUIT ASSEMBLIES

LINE ANGLES	(Arms)	(Type)	PRIMARY ASSEMBLY	PLUS	NEUTRAL ASSEMBLY	LESS	NEUTRAL ASSEMBLY
Tangent	(single)	(pin)	2 x C1.41	+	N1.1	-	2 x N1.11
Tangent	(single)	(post)	2 x C1.41P	+	N1.1	-	2 x N1.11
Tangent	(single)	(large)	2 x C1.41L	+	N1.1	-	2 x N1.11
Tangent (Grade B)	(double)	(pin)	2 x C2.52	+	N1.1	-	2 x N2.1
Tangent (Grade B)	(double)	(post)	2 x C2.52P	+	N1.1	-	2 x N2.1
Table II	(single)	(pin)	2 x C1.41	+	N2.1	-	2 x N1.1
Table II	(single)	(post)	2 x C1.41P	+	N2.1	-	2 x N1.1
Table III	(single)	(large)	2 x C1.41L	+	N2.1L	-	2 x N1.1
Table IV	(double)	(pin)	2 x C2.52			-	N2.1
Table IV	(double)	(post)	2 x C2.52P			-	N2.1
Table V	(double)	(large)	2 x C2.52L			-	N2.1L

Types: pin = pin-type insulators; post = post-type insulators; large = clamp-type pins
Note: N1.11 assembly materials = 1 pin (item "f") & 1 insulator (item "a")

DESIGN PARAMETERS:

See Design Parameters for Primary Assemblies Above

DOUBLE CIRCUIT GUIDE (ALTERNATIVE STYLE 3)

RUS | DOUBLE CIRCUIT PRIMARY 12.47/7.2 kV | D1.85G

Borrowers may create assemblies as needed, without additional approval from RUS, for the alternative styles shown on these 2 guide drawings provided that they use the spacing and materials of the subassemblies as shown on the drawings.

If you would like more information or have any questions, please contact Jim Bohlk, Distribution Branch, at (202) 720-1967, or at Jim.Bohlk@wdc.usda.gov.

Changes in 12.47/7.2 kV Line Construction Specifications

At first glance, it is obvious that new RUS Bulletin 1728F-804, "Specifications and Drawings for 12.47/7.2 kV Line Construction" has more assemblies and different looking drawings than its predecessor, REA Bulletin 50-3. The new and amended specifications in the new bulletin are not so obvious. RUS regulations require borrowers to construct their new distribution facilities

according to both the assembly drawings and the specifications as published in Bulletin 1728F-804. Listed below are some of the more significant specification additions and changes quoted directly from new Bulletin 1728F-804.

Borrowers may develop some certain types of their own assemblies:
Sometimes it may be prudent or necessary to modify RUS standard distribution assemblies to solve encountered construction problems. For example, a standard VC6.1 assembly may need to be modified with heavy-duty crossarm braces (assembly W3.2) to support large conductors. RUS has not produced the scores of new assemblies like the example because the resulting bulletin would be quite unwieldy. Therefore, borrowers themselves may develop and use assemblies similar to the example without additional RUS approval. Borrowers' assemblies not specifically approved by RUS shall not have component spacing less than, or permitted longitudinal loads (strengths) greater than those on correlated RUS standard assemblies. Borrowers need to properly account for the new assembly material and assign assembly numbers recognizably different than RUS standard assembly numbers. Furthermore, RUS approval and assembly number changes are not required to add the following types of information to RUS assembly drawings: material inventory numbers, bolt lengths, jumper wire sizes, types of connectors, armor rods, etc.

New washer requirements:
A 3 inch by 3 inch (minimum), square, curved washer (item "d") shall be used abutting the pole when installing primary deadend, neutral deadend and guy assemblies directly to the pole. These washers mitigate the crushing of wood fibers and facilitate the permitted longitudinal loads shown on the construction drawings. Also, a 2 ¼ inch (minimum) square washer shall be placed under the shoulder of 7.2 kV crossarm insulator pins whose surface area abutting the crossarm is less than 4 square inches. These washers mitigate the crushing of wood fibers and facilitate the permitted transverse loading shown in the maximum line angle tables in Exhibit 1 at the end of the bulletin.

Large and extra large conductors:
Primary pole top assemblies identified as "large conductors" in the drawing titles shall be used to support large and extra large conductors. Large conductor assemblies may also be used for small conductors. Furthermore, large and extra large conductors may be installed on assemblies not designated as large conductors provided that the expected transverse or longitudinal loads (multiplied by the appropriate NESC overload factors) do not exceed the permitted loads or tensions shown on the design parameters of the drawings. For any conductor size, the horizontal, vertical or transverse loads shall not exceed the permitted strength of crossarms, crossarm pins, insulators, or insulator bracket assemblies. Usually, extra large conductors require that pin type and post type insulators have a "C" neck for conductor sizes up through 477.0 (18/1) ACSR and "J" necks for conductor sizes up to 795 kcmil, depending on the armor rods selected.

Spacing between energized conductors and guys:
If the separation on the pole between any guy attachment bolt or hardware and any phase conductor attachment bolt is less than 15 inches, then a guy strain insulator assembly (E5.1) shall be installed at the top of the guy and the guy wire shall be effectively grounded below the

insulator by bonding the guy wire to the system neutral and the pole ground if present. Alternatively, an insulated extension link (item "eu") shall be installed in the primary conductor tap, deadend, or suspension angle subassembly where it attaches to the pole. The purpose of this specification is to maintain minimum basic insulation impulse levels (BIL) and to increase clearances for line workers. *[Note: RUS recommends but does not require a 300 kV BIL for pole top assemblies.]*

Grounding and insulating down guys:
Down guy and overhead guy wires shall be effectively grounded in accordance with Rule 215C2 of the NESC and in accordance with the RUS assembly drawings. Effectively grounded guy wires provide a direct path to ground and thus decrease the chances of electric shock, serious injury and even death to a person standing on the ground and making contact with a guy wire that has accidentally become energized by means of contact with a primary, secondary, service or neutral conductor. Furthermore, effectively grounded guy wires bonded to anchor rods decrease the overall system impedance to ground and improve the chances of primary overcurrent protection devices to operate as designed.

Down guy and overhead guy wires may be insulated in portions of a borrower's service area if all 5 of the following conditions are met:

- The borrower: (1) has records documenting that anchors or anchor rods have failed due to corrosion after less than 20 years of service, or (2) has performed and documented a study that has determined that insulating down guy wires is an adequate and economical method to mitigate predicted premature corrosion of anchors and anchor rods in the service area covered by the study. Such studies or records shall be made available for RUS review upon request;
- Insulated down guys and their component parts shall be in compliance with all of the applicable rules of the NESC;
- Only fiberglass guy strain insulators (item "w") shall be used to insulate guy wires and the insulators shall be installed at the top of the guy wire as depicted in assembly drawing E1.5;
- RUS required bonding clamps are securely installed between the anchor rod and the guy wire attached to the anchor rod; and
- The borrower has a special regimented maintenance program in place that periodically (as experience indicates) checks the insulation integrity of installed guy insulators.

Surge protection of pole-mounted transformers:
The construction drawings for single-phase conventional transformer assemblies show surge arresters mounted directly on the transformer tank which maximizes transformer surge protection. Except for single-phase conventional transformers with open link fused cutouts (assemblies "VG1.7" and "VG1.8"), the arrester may be mounted on a crossarm, on a bracket (item "fn") adjacent to the cutout, or a combination cutout/arrester (item "ax") may be used. The choice of using any of these acceptable mounting arrangements is left to the design engineer.

Tank-mounted arresters provide maximum surge protection to transformers because of the arresters' minimum lead lengths. However, when arresters are mounted directly on transformer tanks, the fused cutouts have less surge protection and are subject to more frequent operations. Nuisance operations on fused cutouts with minimal surge protection can be lessened with the use of dual-element fuses.

Requirements for driven ground rods:
Borrowers shall install effectively grounded driven ground rods (assembly H1.1) or trench type grounding assemblies (assembly H2.1) a maximum of 1,320 feet (433 meters) apart on overhead distribution lines. Customer-owned or other installed electric service grounds shall not be counted in the above minimum grounding assembly requirement.

Whereas under certain circumstances, plate type and wrap-around type grounding improvement assemblies (assemblies H5.1 and H5.2, respectively) may meet the grounding electrode requirements of Rule 094B4 of the NESC, RUS does not allow these types of grounding assemblies to be used to meet the NESC requirement of 4 grounds per mile because the effectiveness of these types of grounds in "disturbed" earth is often questionable. However, RUS encourages the installation of these grounding improvement assemblies to augment and improve the overall grounding of the distribution system that in turn generally improves the performance of line protection devices and improves safety.

Conditional use of stirrups:
Stirrups may be used to connect tap conductors (jumper wires) to primary conductors if the following criteria are met:

- The stirrup and hot line clamp are sized to meet or exceed the current carrying capacity of the tap conductor or equipment jumper;
- All stirrup conductors are made of copper or bronze;
- All stirrup conductors are made of #2 copper equivalent conductivity or larger;
- All-purpose or aluminum hot line clamps are not used with stirrups;
- All stirrups, connectors, and clamps are installed in accordance with the manufacturer's specifications;
- Stirrups with two compression connectors are not used in areas prone to aeolian vibration;
- Stirrups are not used to connect main lines together or to connect heavily loaded tap lines to main lines.

Stirrups are not recommended to be used to connect reclosers, autotransformers, or line regulators to primary conductors. Stirrups and hot line clamps shall not be used for sectionalizing taps nor taps for main lines for operational or maintenance purposes. Permanent compression or bolted type connectors shall be used because of their better current carrying capabilities and reliability. Line switches, fused cutouts, or solid blade cutouts should be used at line locations where occasional line sectionalizing may be required.

If you would like more information or have any questions, please contact Jim Bohlk, Distribution Branch, at (202) 720-1967, or at Jim.Bohlk@wdc.usda.gov.

Horizontal Separation Between Direct-Buried Cable and Other Underground Structures

RUS would like to remind all borrowers to follow the RUS Bulletin 1728F-806 (D-806), "Specifications and Drawings for Underground Electric Distribution". RUS requires the borrowers to comply with all applicable provisions of the most current and accepted criteria of the National Electrical Safety Code (NESC) and all applicable and current electrical and safety requirements of any State or local government entity.

RUS requires the borrowers to ensure that underground cable splices must be of the pre-molded rubber, heat-shrink, or cold-shrink type, of the correct voltage rating. It is the responsibility of the borrower to ensure that a suitable inhibiting compound must be used with all secondary and service connections. All secondary cable connections located below grade or in secondary pedestals must be made with pre-insulated secondary connector blocks. Insulating boots or moisture barriers that depend solely on tape are not acceptable.

In the 2002 NESC, Rule 354A on page 207 requires the minimum horizontal separation of 300 mm (12 inches) between direct-buried cable and other underground structures. RUS requires the minimum horizontal separation of 300 (12 inches) as stated in Rule 354A.

RUS is always open to any new information that is presented to us. RUS hopes borrowers will accept and follow this important requirement so that we can all be assured that the standards and specifications that are established will provide rural Americans with reliable and safe electric service.

If you have any questions or need additional information, please contact Trung Hiu at (202) 720-1877 or at Trung.Hiu@wdc.usda.gov.

Use of Standoff Brackets

RUS has accepted full round cable riser shields in RUS Informational Publication 202-1, "List of Materials Acceptable for Use on Systems of RUS Electrification Borrowers." RUS recommends these shields, as well as riser conduits, be mounted directly to the surface of the pole with no standoff brackets. This will prevent climbing by unauthorized persons. It also complies with the 2002 NESC Rule 217A2 regarding "climbing" and "steps", respectively. RUS believes that this is an important requirement to protect the public from possible hazard and prevent unnecessary litigation.

Recently, RUS has received several requests to use standoff brackets. On a case-by-case, RUS have granted exceptions. We are in the process of drafting construction standard for standoff brackets. We hope to include a workable drawing in the next revision of RUS Bulletin 1728F-806 (D-806) "Specification and Drawings for Underground Electric Distribution".

If you would like more information or have any questions, please contact Trung Hiu at (202) 720-1877 or at Trung.Hiu@wdc.usda.gov.

Special Conductors for Transmission Lines

Recent transmission line designs submitted to RUS from borrowers have specified conductors other than conventional ACSR conductors. These designs were for both new lines and reconductoring/upgrading projects intended to improve reliability or to increase line capacity. Type ACSR/TW has been selected for some line upgrade projects. ACSR/TW stands for trapezoidal-shaped aluminum wires and ACSR/AW/TW includes strands of aluminum-clad steel core wires (AW) in the ACSR. According to ASTM B-779, ACSR/TW conductors use a "type" designation rather than designating the conductor by the number of strands as with conventional ACSR. Compared with conventional ACSR with the same aluminum area, an equivalent ACSR/TW is approximately 10% smaller in diameter. This reduced diameter translates into a reduction in the transverse wind load on the conductors. ACSR/TW is also available with a conductor diameter equal to conventional ACSR. In this case, an equal diameter ACSR/TW gains a 20-25% increase in aluminum area, which gives the conductor a significant decrease in resistance resulting in an increase in the current-carrying capacity of the line. Ground clearance and strength of the existing structures and line components are usually analyzed or checked based on the diameter, weight, and sag tension of the ACSR/TW conductor. The RUS List of Materials, IP 202-1, currently includes, on a conditional basis, two suppliers of ACSR/TW conductors in various sizes up to 795 kcmil, 26/7 stranding, (Type 16).

Another use of TW type conductor is to reduce the affects of aeolian vibration by self damping. ACSR/SD, Aluminum Conductor Steel Reinforced Self-Damping are constructed of core steel wires surrounded by layers of trapezoidal-shaped aluminum wires, designed to maintain a small annular gap between the layers under conductor tension. Internal damping results from interaction of the different natural vibration frequencies of the steel core and aluminum layers and movement within the gap. The damping permits a design at higher conductor tension under loaded and unloaded conditions without damper devices or additional vibration protection. Generally, ACSR/SD is applicable for the larger transmission conductor sizes and has the disadvantage of increased conductor handling and installation costs.

Twisted-pair conductors (also known as type T2, VR, and Duplex) may be used in areas prone to conductor galloping. Twisted-pair conductors are included on the Conditional List for Item av in the RUS List of Materials. The conductor sizes are limited to standard ACSR and AAAC conductors in the RUS preferred sizes (AAC conductor is not included in the RUS List of Materials). With the increase of experience using this conductor, installation cost premium has decreased from the initial 15 to 20% down to 5 to 10% over conventional ACSR conductors.

A new type of conductor under experimental use is ACCC (Aluminum Conductor Composite Core). The development of the ACCC represents the first major change in overhead conductors since ACSR was introduced two decades ago. This promising conductor can provide transmission capacities up to three times greater than existing conductors. ACCC can replace existing conductor, without tower modifications or additions. ACCC is lightweight, strong, with low electrical resistance, and handles corrosive environments well.

ACCC has the following advantages over other conductor like ACSR:

- more aluminum content therefore, reduces the line losses by up to 28%
- higher operating temperature without significant line sag
- no ferromagnetic core, therefore, less electromagnetic field (EMF)
- double juicing power when compared to ACSR
- no environmental degradation
- high strength and lightweight
- excellent fatigue resistance
- standard sizes and lengths (round or compact construction)

This new conductor can help solve transmission bottleneck problems in an urban area. It also can help with transmission problems in rural areas. ACCC conductor can be utilized in mountainous areas, national parks, and river or lake crossing applications. ACCC cables make new transmission lines more efficient by reducing electrical line losses. This will improve utilities' return on investment.

If you would like more information or have any questions, please contact Theodore V. Pejman, Transmission Branch, at (202) 720-0999 or at Ted.Pejman@wdc.usda.gov.

OPERATIONS AND MAINTENANCE

Substation Periodic Visual Inspections

Each substation and the individual items of equipment contained therein should be periodically inspected. The recommended frequency of these inspections is monthly.

Visual inspections should encompass the total substation area including the site, the control house and all equipment and structures. This inspection should be made with the substation energized. Therefore, all inspections should be made from ground level, to assure adequate safety clearances from energized parts. Binoculars should be used to view buses and other equipment located on structures.

Special care should be used when ground connections are checked, since a high voltage could develop across any gap created between a ground cable and a piece of equipment, particularly under fault conditions. For this reason, ground connections should not be removed for any reason while the substation is energized.

The following describes details of visual inspection:

Power Transformers

- Inspect control cabinet, control relays, contactors, indicators, and the operating mechanism.
- Look for loose, contaminated, or damaged bushings, loose terminals, and oil leaks.
- Check oil levels in main tanks, tap changer compartment, and bushings.
- Inspect inert gas system (where applicable) for leakage, proper pressure, etc.
- Read and record operations counter indicator associated with load tap changer.
- Observe oil temperature. The oil temperature should not exceed the sum of the maximum winding temperature as stated on the nameplate plus the ambient temperature (not to exceed 40°C) plus 10°C. Generally, oil temperature does not exceed 95°C and 105°C for 55°C and 65°C winding temperature rise units, respectively, since the ambient temperature rarely exceeds 30°C for periods of time long enough to cause an oil temperature rise above these points.

Voltage Regulators

- Perform the same inspections as listed for power transformers (as applicable).
- Place regulator control in manual position and operate regulator over small range only.
- Return control to automatic and verify that the regulator functions properly.
- Read and record operations counter indicator.

Oil, Vacuum, SF6 and Air Blast Circuit Breakers

- Check for loose, contaminated, or damaged bushings, loose terminals, oil leaks, and proper gas pressures.
- Check oil level in bushings and main tank (as applicable).
- Check anti-condensation heaters.
- Read and record the number of operations indicator. If breaker has not operated during the preceding year, bypass the breaker or otherwise remove the breaker from the circuit for testing. Test the breaker by simulating relay action by placing a jumper across the tripping contact studs on the back of the relay. Allow breaker to go through its sequence to check its operation.
- Inspect contact areas on main plug-in assembly for signs of overheating or arcing.
- Read and record compressor operating hours indicator.

Fuses

- Observe condition of contact surface of fuse clips.
- Check for broken or cracked supporting insulators and for contamination.

Surge Arresters

- Check for cracked, contaminated or broken porcelain, loose connections to line or ground terminals and corrosion on the cap or base.
- Check for pitted or blackened exhaust parts or other evidence of pressure relief.
- If discharge counters are provided, check connections and record the number of operations.

Buses and Shield Wire

- Inspect bus supports for damaged porcelain and loose bolts, clamps or connections.
- Observe condition of flexible buses and shield wires.
- Inspect suspension insulators for damaged porcelain (include line entrances).

Capacitors (Series and Shunt)

- Observe condition of fuses.
- Inspect for damaged tanks and bushings and for leakage of the dielectric.

Reactors (Oil Filled and Air Core)

- Observe condition of paint and varnish.
- Inspect bushings for cracks and contamination.
- Check valves and gaskets for oil leaks (as applicable).

Disconnects and Other Switches

- Check for cracked, contaminated, or broken porcelain, loose connections and corrosion to metal parts.
- Observe condition of contact surfaces and area around them.
- Observe condition of arcing horns on air break switches (where applicable).
- Inspect operating mechanism.
- Inspect all live parts for scarring, gouging, or sharp points that could contribute to radio noise or corona.
- Inspect flexible braids or slip-ring contacts used for grounding for corrosion, wear or broken strands.
- Check gearboxes for signs of moisture and corrosion.
- Check corona balls and rings for damage.

Control and Metering Equipment

- Check current and potential transformers for damage to cases, bushings, terminals, and fuses. Verify the integrity of the connections, both primary and secondary.
- Observe the condition of control, transfer, and other switch contacts, indicating lamps, test blocks and other devices located in or on control cabinets, panels, switchgear, etc. Look for signs of condensation in these locations.
- Examine meters and instruments externally to check for loose connections and damage to cases and covers. Note whether the instruments are reading or registering.
- Open and close each potential switch on the test block to determine whether the speed of the meter disk is affected. Repeat the process with the current switches. Changes of speed should be approximately the same for each meter element.
- Check status of relay targets (where applicable).
- Make an external examination of relays, looking for damaged cases and covers or loose connections.
- Check station battery for loose connections and the battery cells for low electrolyte level and low specific gravity of the electrolyte.
- Inspect station battery charger. Check charging current and voltage. Observe ground detector lamps for an indication of an undesirable ground on the dc system.
- Check annunciator panel lights.

Structures

- Inspect all structures for loose or missing bolts and nuts.
- Check for damaged paint, galvanizing, and signs of corrosion.
- Inspect for deterioration, buckling, and cracking.

Grounding System

- Check all above grade ground connections at equipment, structures, fences, switch operators' platforms (mats), etc.
- Observe the condition of any flexible type connections.

Cable

- Inspect exposed sections of cable for physical damage.
- Inspect the insulation or jacket for signs of deterioration.
- Check for cable displacement or movement.
- Check for loose connections.
- Inspect shield grounding (where applicable), cable support, and termination.

Foundations

- Inspect for signs of settlement, cracks, spalling, honeycombing, exposed reinforcing steel, and anchor bolt corrosion.

Substation Area (General)

- Verify existence of appropriate safety signs (*i.e.,* danger and warning signs, as applicable).
- Check indoor and outdoor lighting systems for burned-out lamps or other component failures.
- Verify that there is an adequate supply of spare parts and fuses.
- Observe the condition of hook sticks.
- Inspect the fire protection system and the provision for drainage in the event of leaking oil.
- Check for bird nests or other foreign materials in the vicinity of energized equipment, buses, or fans.
- Observe the general condition of the substation yard, noting the overall cleanliness and the existence of low spots that may have developed.
- Observe the position of all circuit breakers in the auxiliary power system and verify the correctness of this position.
- Inspect the area for weed growth, debris, and only minor material associated with the maintenance of the substation equipment stored in the yard.

Substation Fences

- Check for minimal gap under the fence and gate. Normally the gap should not exceed 2 inches (5 cm) under the fence and 4 inches (10 cm) under the gate.
- Check that the fence fabric is intact with no rust.
- Check that the barbed wire is taut.
- Check that the gate latches are operable.

- Check that flexible braid type connections are intact.
- Verify that no wire fences are tied directly to the substation fence.

If you would like more information or have any questions, please contact Mike Eskandary, Transmission Branch, at (202) 720-9098 or at Mike.Eskandary@wdc.usda.gov.

ENVIRONMENTAL

Engineering and Environmental Staff

The Engineering and Environmental Staff of the Water and Waste Water Division currently support the environmental activities of the electric, telecommunications and water and waste water programs of the Rural Development - Utilities Programs. A staff listing of the Engineering and Environmental Staff telephone numbers and e-mail addresses are found in Appendix B.

Environmental staff specialists and areas of environmental review responsibilities for the electric program include:

- Nurul Islam – AK, HI, IA, ID, MN, MT, ND, OR, SD, WA, WY, IL, IN, WI and the Pacific Islands
- Dennis Rankin – AZ, CA, CO, KS, NE, NV, NM, OK, TX, UT, CT, MA, ME, MI, NH, NJ, NY, PA, RI and VT
- Stephanie Strength – AL, AR, FL, GA, LA, MO, MS, NC, SC, TN, DE, KY, MD, OH, VA, WV and Puerto Rico

The mailing address is Environmental & Engineering Staff, 1400 Independence Avenue, SW, Stop 1571, Room 2234, Washington, DC 20250-1571. The fax number is (202) 720-0820.

If you would like more information or have any questions, please contact Dennis Rankin, Engineering and Environmental Staff at (202) 720-1953 or at Dennis.Rankin@wdc.usda.gov.

Revised Environmental Regulations

The Under Secretary directed that a joint regulation for environmental policies and procedures be developed for the Rural Development (RD) agencies. This regulation, designated 7 CFR Part 1970, will replace the current Rural Housing Service (RHS)/Rural Business-Cooperative Service (RBS) environmental regulation (7 CFR Part 1940-G, and its proposed replacement, 7 CFR Part 1940-S) as well as the Rural Utilities Service (RUS) environmental regulation (7 CFR Part 1794). This proposed rule is a collaborative effort between the RHS, Program Support Staff (which also provides environmental support to RBS) and the RUS, Engineering and Environmental Staff.

The proposed rule will implement the National Environmental Policy Act (NEPA) by supplementing the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act and integrating all other environmental statutes, regulations and Executive Orders applicable to RD programs. The rule will improve both the efficiency and the effectiveness of the environmental review process for RD and accommodate changes to agency programs and environmental statutes, regulations and Executive Orders.

Subparts A through G classify Agency actions into levels of environmental review (i.e., Categorical Exclusions, Environmental Assessments, and Environmental Impact Statements) and establish policies and procedures for RD's environmental review process. Separate Subparts H through O and exhibits are being developed to assist applicants and RD staff to comply with specific procedures (e.g. preparing public notices, preparing environmental documents, and conducting public scoping) and will be forthcoming at a later date.

Subpart C, Classification of Proposals, has been restructured to make RD's classification of actions more efficient and user-friendly. The proposed rule includes three classes of Categorical Exclusions (no documentation required and those with and without environmental documentation) and a single class for Environmental Assessments. Only certain Business and Electric Program proposals will normally require the preparation of an Environmental Impact Statement.

The revision group is currently incorporating internal comments into the preliminary draft and finishing drafting Subparts H through O. it is anticipated that the proposed draft rule would be published in the Federal Register in the second quarter of fiscal year (FY) 2006. The proposed rule will be available for public review and comment. The estimated timeline has the Final Rule being published in the Federal Register in the fourth quarter of FY 2006. The new regulations would become effective 30 days after publication.

If you would like more information or have any questions, please contact Dennis Rankin, Engineering and Environmental Staff at (202) 720-1953 or at Dennis.Rankin@wdc.usda.gov.

Section 106 Review: Consultation With Indian Tribes for Projects Off Indian Lands

The following guidance is for projects not located on Native American lands. The National Historic Preservation Act requires Federal agencies to make a good faith effort to identify Indian tribes that may have been located in the project in order to determine if there are any religious or cultural significance sites that may be affected by the project. Information regarding tribes that historically inhabited an area may be obtained from the State Historic Preservation Officer.

Initiation of the Section 106 Process.

If the undertaking will not occur on or affect historic properties on tribal lands, is the Federal agency required to consult with Indian tribes?

- Yes, Section 101(d)(6)(B) of NHPA requires consultation with Indian tribes that attach religious and cultural significance to historic properties (hereinafter "relevant Indian tribes"). The Federal agency must make a reasonable and good faith effort to identify such Indian tribes and invite them to be consulting parties. If such Indian tribes have not been invited by the agency to consult, the tribes may request in writing to be consulting parties and must be considered as such by the agency.

Identification of Historic Properties.

In the initial information gathering steps, does the Federal agency consult with Indian tribes?

- The Federal agency consults with the SHPO to determine and document the area of potential effects, review existing information, seek information from consulting parties, and gather information from Indian tribes to assist in identifying historic properties that may be of religious and cultural significance.

Does the Federal agency consult with Indian tribes to carry out identification and evaluation of historic properties?

- Yes, the Federal agency consults with the SHPO *and* relevant Indian tribes to carry out identification and to evaluate the National Register eligibility of identified historic properties.

Does the Federal agency need to obtain a relevant Indian tribe's concurrence with eligibility findings?

- No, but the Federal agency must acknowledge that Indian tribes possess special expertise in assessing the eligibility of historic properties that may be of significance to them. Also, if an Indian tribe disagrees with an agency's determination of eligibility, the Indian tribe may ask ACHP to request the agency to obtain a determination from the Keeper of the National Register. However, ACHP retains the discretion as to whether or not it should make the request of the Federal agency.

Does an agency consult with a relevant Indian tribe in determining if there are historic properties affected?

- No, but the agency does provide notification of the finding to relevant Indian tribes and makes the documentation available for public inspection.

What happens when the Federal agency finds that there are historic properties which may be affected by the undertaking?

- The agency notifies relevant Indian tribes, invites their views on the effects, and proceeds to assess adverse effects, if any.

Assessment of Adverse Effects. Which parties does the Federal agency consult with to apply the *Criteria of Adverse Effect* to historic properties within the areas of potential effect?

- The agency consults with the SHPO and relevant Indian tribes to apply the Criteria of Adverse Effect to historic properties within the areas of potential effect.

When proposing a finding of "no adverse effect," does the agency consult with Indian tribes?

- No, the agency consults with the SHPO in reaching a finding of "no adverse effect" and notifies consulting parties including relevant Indian tribes and provides them with documentation.

What happens if a relevant Indian tribe disagrees with a finding of no adverse effect?

- If a relevant Indian tribe disagrees with a finding of no adverse effect, it must specify in writing the reasons within the 30-day review period. When a timely filing of disagreement is received, the Federal agency must either resolve the disagreement or request ACHP to review the "no adverse effect" finding. Relevant Indian tribes can also request ACHP to review an agency's finding. The agency should seek the concurrence of Indian tribes that attach religious and cultural significance to the historic property subject to the finding. This means that the agency is encouraged, but not legally required, to obtain such concurrence. If the relevant Indian tribe does not concur and disagrees with the proposed finding, it can refer the matter directly to ACHP for resolution.

Resolution of Adverse Effects.

Which parties does the Federal agency consult with to develop and evaluate alternatives or modifications to the undertakings to avoid, minimize, or mitigate adverse effects?

- The Federal agency consults with the SHPO, relevant Indian tribes, and other consulting parties. The Federal agency must provide project documentation to all consulting parties at the beginning of consultation. Any consulting party may request ACHP to participate in consultation.

What happens if agreement is reached?

- If agreement is reached, the Federal agency and consulting parties, including relevant Indian tribes, develop an MOA outlining how the adverse effects will be addressed.

Is the Federal agency obligated to invite a relevant Indian tribe to sign or concur with the MOA?

- No, the agency may, but is not required to, invite the relevant Indian tribe to sign or concur. An Indian tribe that signs the MOA has the same rights with regard to seeking amendment or termination of the agreement as the other signatories. Refusal by a relevant Indian tribe to sign or concur, however, does not invalidate the MOA.

What happens if agreement is not reached?

- If agreement is not reached, the Federal agency, SHPO, or ACHP, if participating, may terminate consultation. Other consulting parties, including relevant Indian tribes, may decline to participate but they cannot terminate consultation. After consultation is terminated, ACHP issues its formal comments to the agency head.

Additional information and guidance is available on the following website:

http://environmental.transportation.org/center.asp.

If you have any questions, please contact Dennis Rankin, Engineering and Environmental Staff at (202) 720-1953 or at Dennis.Rankin@wdc.usda.gov.

New Mexico Avian Protection Working Group

The New Mexico Avian Protection Working Group (NMAP) was formed in February 2002. The purpose of NMAP is to:

- Address avian mortalities and inquiries due to electrocution and collision with power lines in New Mexico.
- Work with electric utilities to heighten the awareness of avian issues.
- Develop an affordable framework for a statewide avian protection plan.

The founding members include Hawks Aloft, Inc., New Mexico Department of Fish and Game, Public Service Company of New Mexico, Rural Utilities Service, U.S. Fish and Wildlife Service and The New Mexico Falconer's Association. Other participants in the working group have included Excel Energy, The Hurd Museum, Forest Service, Bureau of Land Management, Bureau of Indian Affairs and Florida Power and Light.

Each year, the U.S. Fish and Wildlife Service (USFWS) and NMAP present an award(s) to utilities for their work in aviation protection. Previous winners of the award include:

USFWS Avian Conservation Award

Central New Mexico Electric Cooperation (2003)

- The award was presented for prompt response to a USFWS request to save a corvid species from electrocution near a dairy in Moriarty, New Mexico.

Northern Rio Aribba County Electric cooperative (2004)

- The award was presented for the construction of nesting platforms for osprey and helping this species throughout their service territory.

Navajo Tribal Utility Authority (2004)

- The award was presented for retro fitting a distribution line used by golden eagles.

Public Service of New Mexico Foundation (2005)

- The award was presented for its outstanding contributions to conservation through avian protection, environmental education, and habitat environment.

NMAP Golden Eagle Award

Socorro Electric Cooperative, Inc. and Bosque Del Apache National Wildlife Refuge (2005)

- The award was presented in recognition of their joint partnership with the U.S. fish and Wildlife Service to remove electric lines crossing the Bosque Del Apache National Wildlife Refuge.

Farmers' Electric Cooperative, Inc. of New Mexico (2005)

- The award was presented in recognition of their proactive efforts for bird protection through the development and implementation of an Avian Protection Plan.

Springer Electric Cooperative, Inc. (2005)

- The award was presented in recognition of their proactive efforts for bird protection through the development and implementation of an Avian Protection Plan.

Central Valley Electric Cooperative, Inc. (2005)

- The award was presented in recognition of their proactive efforts for bird protection through the installation of devices and deterrents to protect birds.

If you would like more information or have any questions, please contact Dennis Rankin, Engineering and Environmental Staff at (202) 720-1953 or at Dennis.Rankin@wdc.usda.gov.

New Mexico Avian Protection Working Group Workshops

The New Mexico Avian Protection Working Group (NMAP) holds an annual workshop to increase awareness of avian problems in New Mexico, provide state of the art knowledge of raptor protection measures and promote collaboration between Federal, State and local agencies and the industry. It is anticipated that the next workshop will be held in March 2006 in Albuquerque, New Mexico. Attendees include representatives of Federal, state and local agencies, investor owned utilities, cooperatives, engineering consultants and conservation organizations.

Agenda topics have included:

- Overview of avian interaction issues
- Laws, mandates and liabilities
- Avian collisions with utility structures
- Concrete and steel poles
- Problem structures and retrofits
- Avian protection plans
- Wind energy
- Permits
- Factors influencing electrocutions and collisions
- Live bird demonstrations

Workshop products have included:

- Bird Identification Guide (raptors)
- Feather Identification Guide (raptors)
- New Mexico Avian Concentration Map
- Skull/Bones Identification Guide (raptors)
- List of New Mexico Wildlife Rehabilitators
- Procedures For What To Do When Finding An Injured Bird

If you would like more information or have any questions, please contact Dennis Rankin, Engineering and Environmental Staff at (202) 720-1953 or at Dennis.Rankin@wdc.usda.gov.

RUS APLIC Membership

This past year, the Rural Utilities Service (RUS) became a member of the Avian Power Line Interaction Committee (APLIC). APLIC's mission is to lead the electric utility industry in the protection of avian resources while enhancing reliable energy delivery. RUS recommends that borrowers and all the many businesses which work with or for RUS borrowers visit the APLIC Web site for a more detailed presentation of APLIC's functions and offerings. The APLIC site can be visited at:

http://www.aplic.org/

One of APLIC's many valuable resources for electric utilities is its publication, "Suggested Practices for Raptor Protection of Power Lines: The State of the Art in 1996" (Suggested Practices). Suggested Practices summarizes the history and relative success of more than two decades of work on bird electrocution problems related to electric lines. The document covers the bird electrocution issue, biological aspects of raptor electrocution, and provides insight on problem electric structure types as well as provides recommended measures to use in new designs and modifications of existing designs to make facilities safer to raptors and other birds. 7 CFR 1724.52 of RUS' regulations, provide RUS borrowers with the authority to deviate from RUS standards to provide an extra measure of safety to electric structures in areas frequented by birds that could come into contact with energized line hardware. The regulation conditions the authority on several provisions, one of which is that the structure used in lieu of a standard RUS structure be compliant with the APLIC Suggested Practices document.

With becoming a member of APLIC, RUS has volunteered and is assisting APLIC and many other electric utility APLIC members in revising the Suggested Practices publication to bring the document up-to-date with improved designs and materials available today.

If you would like more information or have any questions, please contact Dennis Rankin, Engineering and Environmental Staff at (202) 720-1953 or at Dennis.Rankin@wdc.usda.gov.

Avian Power Line Interaction Committee

The Avian Power Line Interaction Committee (APLIC) was formed in the late 1980s to deal with crane collisions with power lines in southern Colorado. It was originally composed of ten utilities nationwide, the Edison Electric Institute (EEI), the U.S. Fish and Wildlife Service (USFWS) and the Audubon Society. Today it includes 23 utilities, Edison Electric Institute, U.S. Fish and Wildlife Service, Bonneville Power Administration, National Rural Electric Cooperative Association, Rural Utilities Service, Western Area Power Administration and the Electric Power Research Institute.

APLIC is a leader in the electric utility industry in the protection of avian resources while enhancing energy delivery. It works in partnership with utilities, resource agencies and the public to:

- Develop and provide educational resources
- Identify and fund research
- Develop and provide cost-effective management options
- Serve as a focal point for avian interaction utility issues

APLIC meets twice a year and deals with avian interactions with utility structures to include electrocution and collision issues. APLIC has produced:

- Training videos
- State-of-the art manuals on bird collisions and raptor electrocutions
- Short course on collision and electrocution issues
- Other educational materials

Current APLIC activities include:

- Research
- Web site development
- Spanish translation of raptor protection manual
- Short courses
- Guidance and advice to other utilities

APLIC with the U.S. Fish and Wildlife Service has developed Avian Protection Plan Guidelines and is currently working on an update/revision of "Suggested Practices For Raptor Protection On Power Lines: The State Of The Art In 1996." The revised document should be available in the fall of 2005.

If you would like more information or have any questions, please contact Dennis Rankin, Engineering and Environmental Staff at (202) 720-1953 or at Dennis.Rankin@wdc.usda.gov.

New Avian Protection Plan Guidelines

New guidelines have been developed by the U.S. Fish and Wildlife Service (USFWS) in partnership with the Avian Power Line Interaction Committee. The guidelines are designed to help utilities to prepare an Avian Protection Plan to reduce avian mortalities with electric facilities. Refer to the news release below.

> *"The U.S. Fish and Wildlife Service in partnership with the Avian Power Line Interaction Committee (APLIC) recently released voluntary guidelines designed to help electrical utilities protect and conserve migratory birds. Working with the*

guidelines, a utility can use the latest technology and science to tailor a voluntary Avian Protection Plan that meets specific utility needs at its facilities.

"The voluntary guidelines for protecting birds from electrocution and collisions with power lines will improve safeguards for migratory birds," said Acting Service Director Matt Hogan. "We value our partnership with APLIC and the electric utility industry, and encourage electric power companies to take advantage of the new guidelines."

An Avian Protection Plan is utility-specific and is designed to reduce avian and operational risks that result from avian interactions with electric utility facilities.

Electrocutions are a particular threat to birds with large wingspans, such as eagles, hawks, and owls? All species protected under the Migratory Bird Treaty Act. Wire strikes are a problem for many different bird species. Birds also can cause power outages and fires, resulting in increased costs and inconvenience for electric utilities and their customers.

"Last week's signing of the Avian Protection Plan Guidelines is a shining example of what can be accomplished when industry and the Fish and Wildlife Service roll up their sleeves and work together on a project," said Florida Power & Light Principal Biologist and APLIC Chair Jim Lindsay.

The guidance document, which will be available by the week of April 18, 2005 at

http://migratorybirds.fws.gov/,

references the latest industry standards for preventing avian power line interactions.

"Voluntary industry cooperation has long been essential to our conservation efforts, and many electric power companies have already taken steps to protect migratory birds," Hogan said. "The new guidelines build on and strengthen that tradition."

The Service and APLIC have a long history of working together on avian power line issues. In 1983, an ad hoc group began addressing whooping crane collisions with power lines in the Rocky Mountains. APLIC was officially formed in 1989 as a partnership involving the Service, the National Audubon Society, and 10 electric utilities.

Today APLIC members include representatives from the Edison Electric Institute (representing the Nation's investor-owned electric utilities), the National Rural Electric Cooperative Association (which represents nearly 1,000 consumer-owned electric utilities), 23 individual electric utilities, two Federal utility agencies, the Electric Power Research Institute, the Rural Utilities Service and the U.S. Fish and Wildlife Service."

RUS has created a link on its website

http://www.usda.gov/rus/electric/engineering/index.htm

to either the National Rural Electric Association's website
http://www.nreca.coop/nreca/Policy/Regulatory/OtherEnviroissues

or the USFWS's web site

http://migratorybirds.fws.gov/

A copy of the guidelines can be obtained at these sites.

If you would like more information or have any questions, please contact Dennis Rankin, Engineering and Environmental Staff at (202) 720-1953 or at Dennis.Rankin@wdc.usda.gov.

RUS Raptor Protection Guide Drawings

Raptor electrocution continues to be one of the major wildlife concerns of the U.S. Fish and Wildlife Service (USFWS), especially in states west of the Mississippi River. However, raptor electrocutions/collisions reporting is increasing in the eastern United States. Raptors (birds of prey) are a group of birds, which includes eagles, falcons, owls, kites, hawks, osprey and vultures. These birds of prey are protected through several laws, which include the Endangered Species Act, the Eagle Protection Act and the Migratory Bird Treaty Act. Violations of these laws can result in fines and/or imprisonment. Disturbed by the continuing large numbers of raptors, particularly eagles, electrocuted along power lines, the USFWS is continuing to step up enforcement of these laws.

RUS has been receiving requests for guide drawings for raptor electrocution prevention measures/designs for standard RUS distribution structures. In accordance with 7 CFR 1724.52 of the Code of Federal Regulations Borrowers are permitted to use structures designed for raptor protection that are in accordance with "Suggested Practices for Raptor Protection on Power Lines – The State of the Art in 1996," (Suggested Practices), published by the Edison Electric Institute/Raptor Research Foundation. Suggested Practices is currently being revised by the Avian Power Line Interaction Committee. Such structures must be in accordance with the National Electrical Safety Code unless a specific waiver has been granted by the authority having jurisdiction in the area where the structure is located.

Any deviation from the RUS construction standards for the purpose of raptor protection, which is not in accordance with Suggested Practices, must be approved by RUS prior to construction."

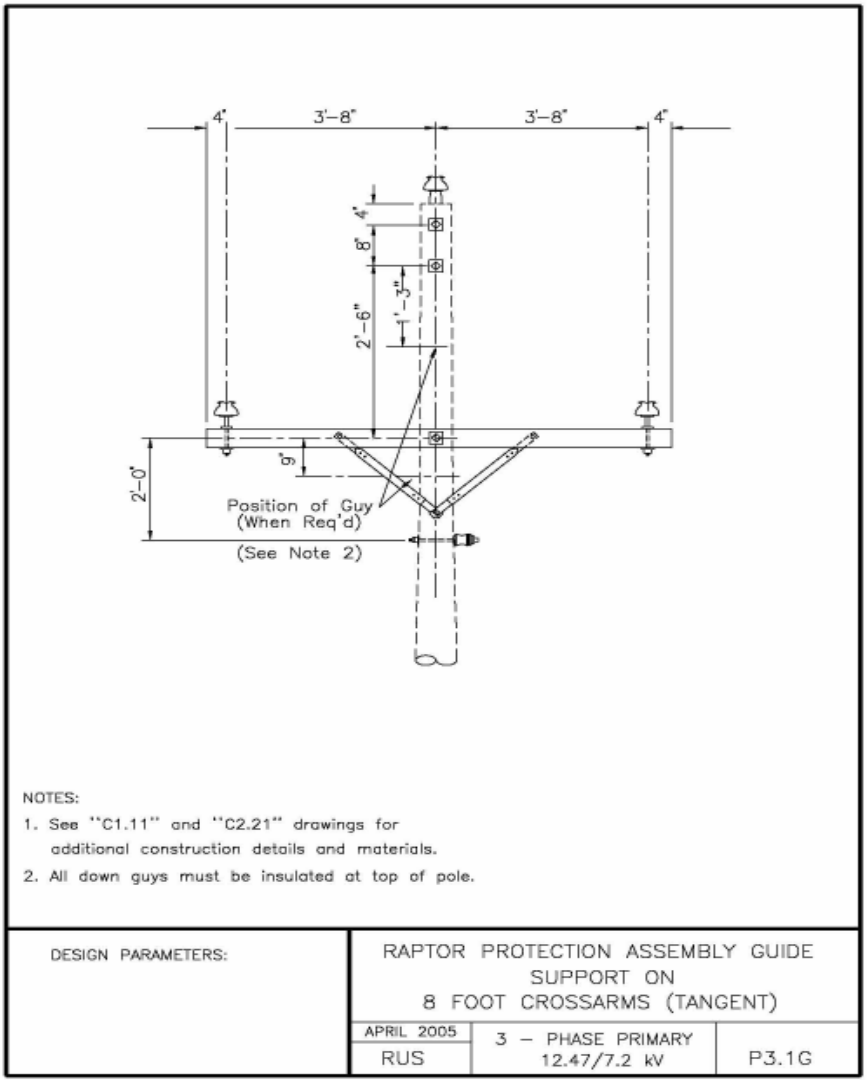
Suggested Practices advocates the following measures to curtail raptor electrocutions on distribution pole top structures:

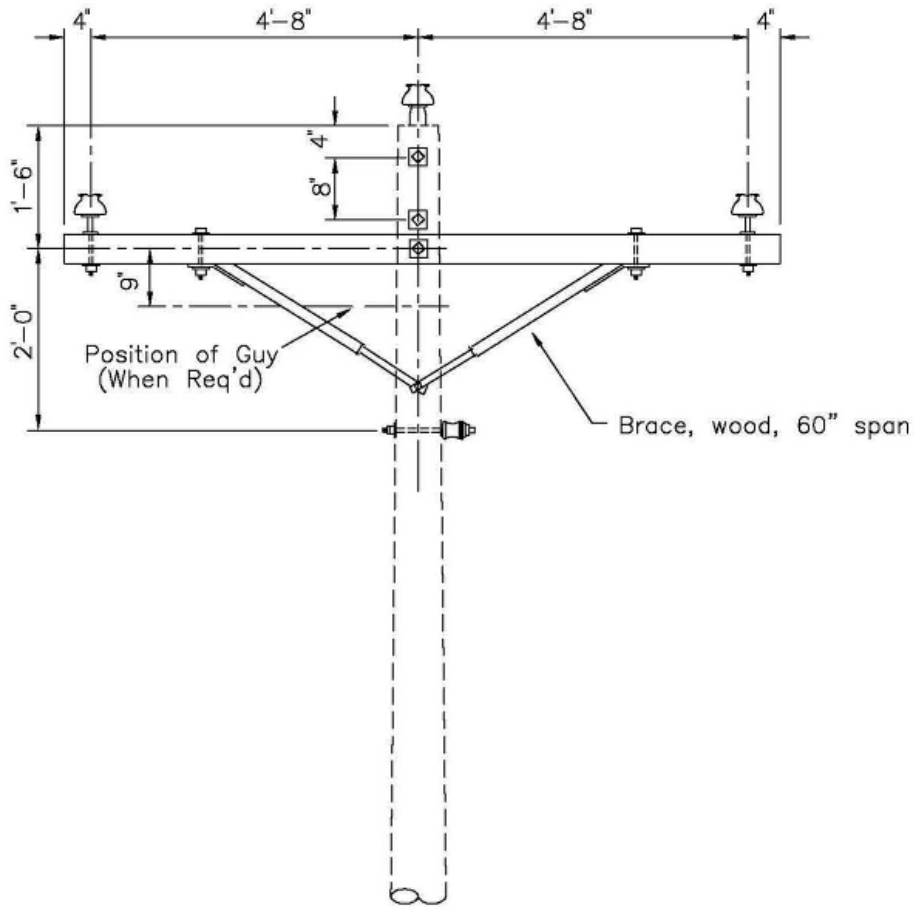
- A minimum of 60 inch horizontal and 12 inch vertical separation of conductors;
- The use of covered/insulated coverings over bare conductors at structure;
- The use of armless construction or undergrounding lines when the above measures are not feasible.

Suggested Practices states that "95 percent of all eagle electrocutions could be eliminated by correcting 2 percent of all the poles". Of particular concern are "preferred poles" which are poles frequently used by eagles as perches for hunting. These poles, more than any others, need to be identified and modified to be made raptor safe.

Standard raptor protection drawings have been incorporated into RUS Bulletins 1728F-803 and 804, "Specifications and Drawings for 24.9/14.4 kV Line Construction, and14.4/12.45 kV Line Construction." The recommended assemblies in these revised bulletins are attached. It is noted that the materials used for these modified assemblies are virtually the same as the corresponding standard assemblies. The choice of which modification to employ is an economic decision, based on such factors as ground clearances, age of facilities and cost of materials and labor.

Installing distribution lines underground for the purpose of raptor protection is an economic decision that must be studied and justified by the borrower. The use of armless construction, which may be more costly and less reliable than RUS's preferred standard crossarm construction, is discouraged.

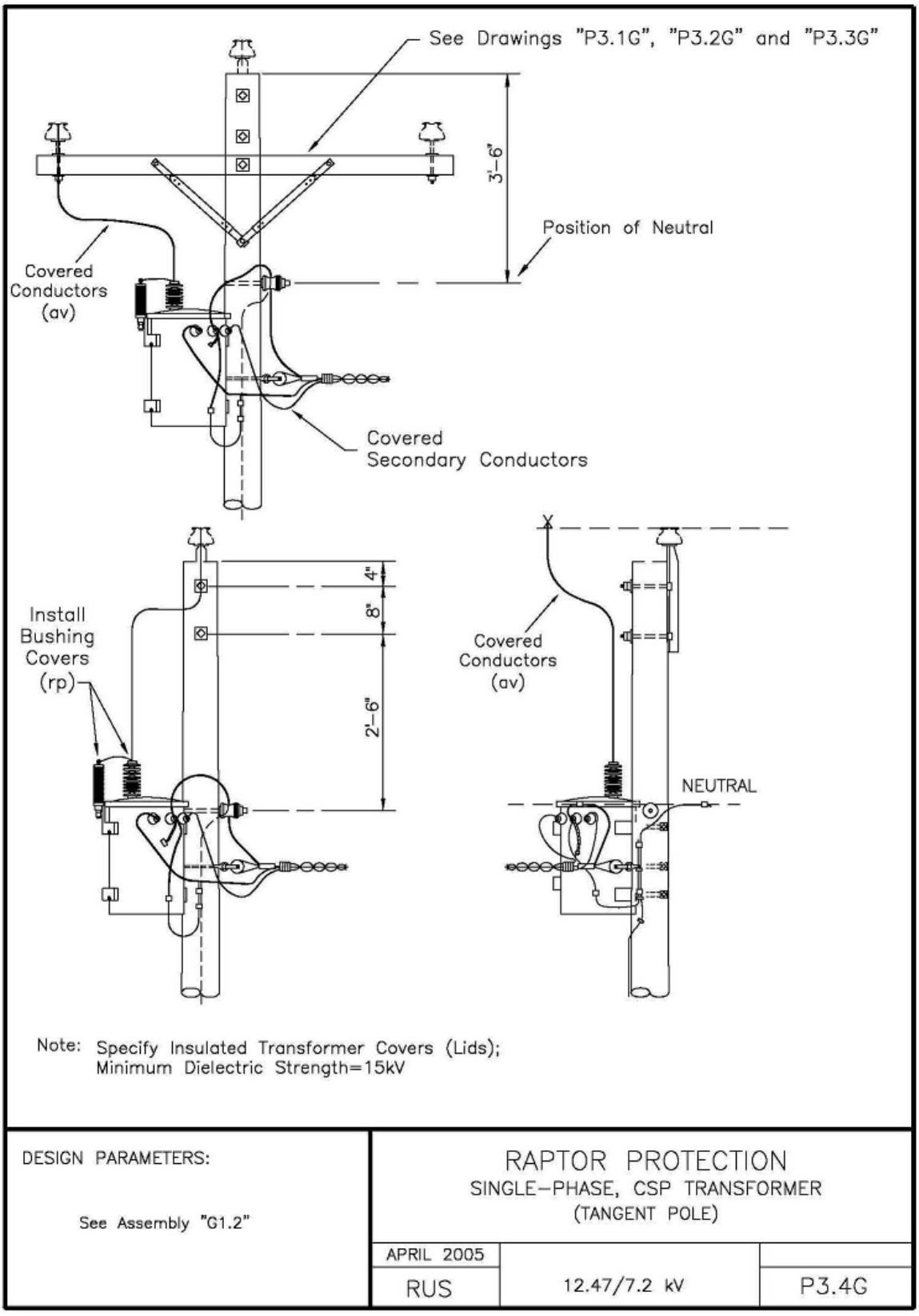


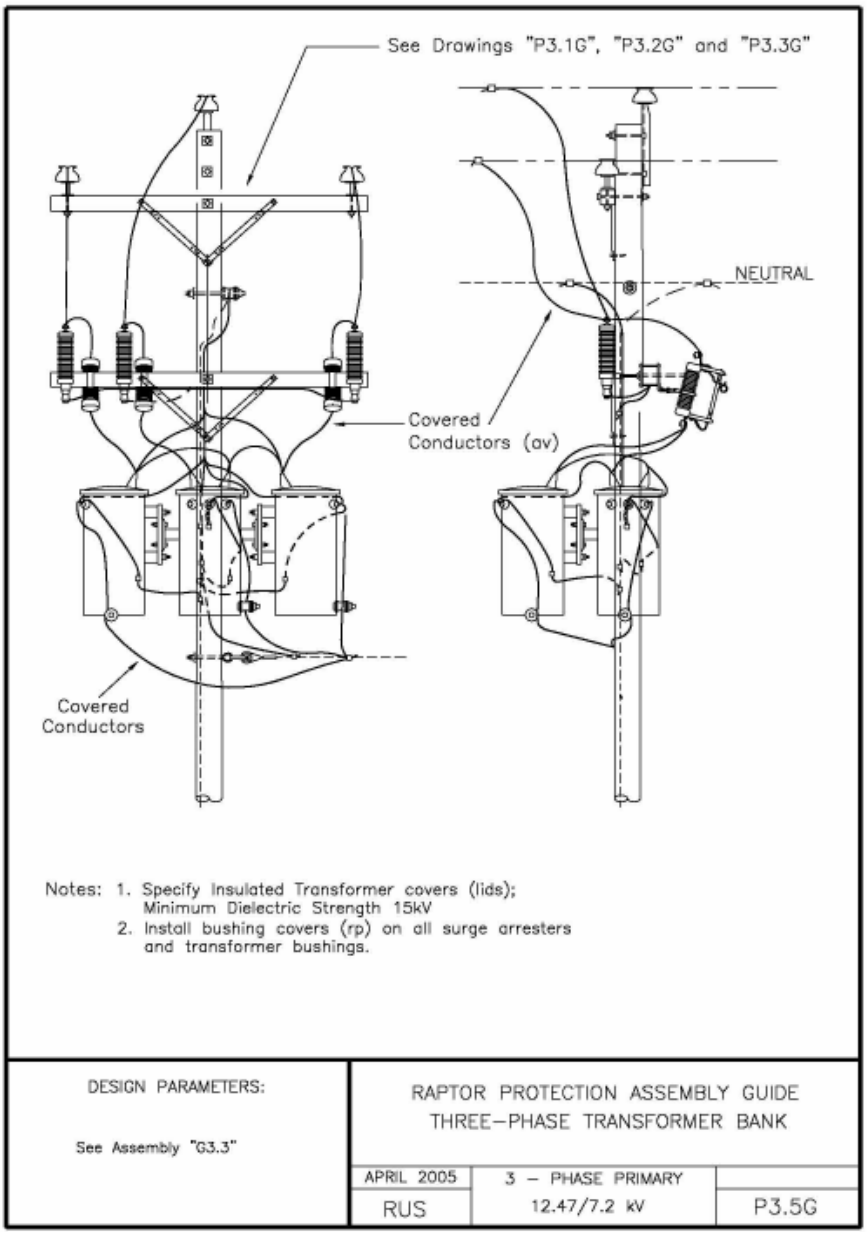


NOTE:

1. See "C1.11" and "C2.21" drawings for additional construction details and materials.

DESIGN PARAMETERS:	RAPTOR PROTECTION ASSEMBLY GUIDE SUPPORT ON 10 FOOT CROSSARMS (TANGENT)		
	APRIL 2005 RUS	3 – PHASE PRIMARY 12.47/7.2 kV	P3.2G


See Drawings "P3.1G", "P3.2G" and "P3.3G"
3'-6"
Position of Neutral
Covered Conductors (av)
Covered Secondary Conductors
Install Bushing Covers (rp)
4"
8"
2'-6"
Covered Conductors (av)
NEUTRAL
Note: Specify Insulated Transformer Covers (Lids); Minimum Dielectric Strength=15kV
DESIGN PARAMETERS:
See Assembly "G1.2"
RAPTOR PROTECTION
SINGLE-PHASE, CSP TRANSFORMER
(TANGENT POLE)
APRIL 2005
RUS
12.47/7.2 kV
P3.4G



If you would like more information or have any questions, please contact Dennis Rankin, Engineering and Environmental Staff at (202) 720-1953 or at Dennis.Rankin@wdc.usda.gov.

International Migratory Bird Day

International Migratory Bird Day is held annually on the second Saturday in May. It is an invitation to celebrate and support migratory bird conservation. International Migratory Bird Day focuses on a specific theme. In the past, themes have included importance of wetland

habitats, the effects of home owners on bird conservation, the peregrine falcon and its recovery, important bird areas and colonial bird conservation issues. The theme of the 2005 International Migratory Bird Day was Collisions: Clear the Way for Birds. Materials focused on human-created obstacles that birds may encounter including: communication towers, power lines, wind turbines and buildings and glass windows. Ways that agencies, industries and citizens may use to minimize the impacts these obstacles have on bird populations were explored. Information on the 2005 International Migratory Bird Day activities may be found at

http://birds.fws.gov/imbd

or

http://www.BirdDay.org.

If you would like more information or have any questions, please contact Dennis Rankin, Engineering and Environmental Staff at (202) 720-1953 or at Dennis.Rankin@wdc.usda.gov.

Raptor Protection Mitigation Website

The California Energy Commission - Public Interest Energy Research Program (PIER) in partnership with the Santa Cruz Predatory Bird Research Group and EDM International, Inc. have developed an interactive web site to address raptor electrocutions on distribution power lines. This project was conducted as part of the PIER Avian-Transmission System Mitigation Program.

This site describes typical problems associated with avian electrocution and provides potential solutions and products. These solutions include various options such as perch management, isolation and insulation. For each retrofit a list of products are provided along with photos and interactive links to manufacturers. The web site also includes a product selector where 172 products are provided along with photos and vendor information. Feedback on various products is included along with installation tips and common misapplications.

The list of mitigating products will be updated at regular intervals as new products become available. The web site also has a secure section for utility testimonials on the effectiveness of particular product. You are encouraged to share your knowledge on various products. Additionally if you are having problems with a pole configuration not shown, please submit it for future inclusion.

The secure web site is located at

http://bems.edmlink.com

If you would like more information or have any questions, please contact Dennis Rankin, Engineering and Environmental Staff at (202) 720-1953 or at Dennis.Rankin@wdc.usda.gov.

NRECA T&D ENGINEERING COMMITTEE

Transmission and Distribution Engineering Committee

In 1991, the National Rural Electric Cooperative Association (NRECA) Board of Directors established the Transmission and Distribution Engineering Committee (T&DEC) to assist RUS in the development, analysis, and updating of RUS standards, guidelines and specifications. The T&DEC also was tasked with watching the engineering and operational standards of national standards organizations to further help electric co-ops keep abreast of code changes and new designs involving the T&D engineering and supply chain management fields.

The T&DEC created seven subcommittees as follows: Materials, Overhead Distribution Lines, Substations, System Planning, Power Quality, Transmission Lines, and Underground Distribution. Membership on the Executive Committee and the various subcommittees consists of more than 80 volunteer engineers, operational and materials managers that are part of the engineering, operational, and materials professionals of electric cooperative staffs, NRECA and engineering consultants that work with electric co-ops. The Executive Committee consists of the chair of the T&DEC, chairs of the seven subcommittees, two NRECA Staff members, and the Director of RUS Electric Staff Division.

NRECA Pole Attachment Toolkit

The National Rural Electric Cooperative Association (NRECA) has developed and published a "toolkit" designed to guide electric cooperatives in addressing various issues associated with pole attachments and joint use agreements with telecommunications companies. The toolkit was developed as a team effort that involved employees from various departments of NRECA, the Transmission and Distribution Engineering Overhead Lines Subcommittee, the law firm of Keller and Heckman, and others.

The toolkit includes the following sections:

- Political and member relations issues
- Engineering and operations issues
- Rate methodologies
- Legal and regulatory issues
- Sample license agreement
- Results of pole attachments survey.

This is a valuable resource for rural electric cooperatives to learn about and help resolve pole attachment and joint use issues. The toolkit is a very good resource and reference for electric cooperatives to develop (with the assistance of the cooperative's attorney) equitable joint use rates and agreements (contracts). RUS has no objections if its borrowers use this guideline in

developing their own joint use agreements provided that they conform to applicable RUS requirements and regulations published elsewhere.

NRECA has indicated that they will make the "Pole Attachment Toolkit" available on a compact disc, free of charge, to RUS electric borrowers. Please contact Michael Pehosh, NRECA at the address below for additional information:

Michael C Pehosh, P.E., C.E.M.
Principal Engineer, Research & Technical Services
National Rural Electric Cooperative Association
4301 Wilson Blvd.
Mail Code SS9-204
Arlington, VA 22203-1860
Phone: 703-907-5862
Fax: 703-907-5518
Cell: 703-283-5077
michael.pehosh@nreca.coop

Note that RUS Bulletin 1726A-125 "Joint Use Agreement with CATV Companies" (dated 9/17/93) expired in 2000 and RUS intends to rescind this bulletin instead of revising and updating it.

If you would like more information or have any questions, please contact Jim Bohlk, Distribution Branch, at (202) 720-1967, or at Jim.Bohlk@wdc.usda.gov.

ADMINISTRATIVE and OTHER

RUS Publications Availability

Because of a substantially reduced Rural Development budget this Government Fiscal Year, the Rural Utilities Service (RUS) has had to curtail printing and mail distribution of new RUS publications. In lieu of printing, RUS is providing new publications (as well as older publications) on its Internet Website at the following addresses:

Regulations: http://www.usda.gov/rus/electric/regs/index.htm

Bulletins: http://www.usda.gov/rus/electric/bulletins.htm

Forms: http://www.usda.gov/rus/electric/forms/index.htm

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If you would like more information or have any questions, please contact Adam Miller, Program Accounting and Regulatory Analysis at (202) 720-8674, or at Adam.Miller@wdc.usda.gov.

Rural Broadband Access Loan and Loan Guarantee Program

Electric borrowers may be in a position to help bring broadband telecommunications services to their service area where such services are either not available or they are unreliable. The following provides details on a RUS Telecommunications Program activity that perhaps electric borrowers could use for the advantages of people in their service areas.

On May 13, 2002, the "Farm Security and Rural Investment Act of 2002" (Farm Bill) was signed into law by President Bush. Section 601 of the Farm Bill amended the Rural Electrification Act of 1936, and establishes the Rural Broadband Access Loan and Loan Guarantee Programs. The Rural Broadband Access Loan and Loan Guarantee Program is designed to provide loans for funding the costs of construction, improvement and acquisition of facilities and equipment to provide broadband services to eligible rural communities. The goal of this program is to ensure that rural consumers enjoy the same quality and range of telecommunications services that are available in urban and suburban communities.

Applicant Eligibility (7 CFR 1738.16)

RUS makes broadband loans and loan guarantees to legally organized entities providing, or proposing to provide, broadband services in eligible rural communities. Eligible entities include: cooperative, nonprofit, limited dividend or mutual associations, limited liability companies,

Indian tribes and tribal organizations as defined in 25 U.S.C. 450(b) and (c) and commercial organizations. Individuals or partnerships of individuals are not eligible entities.

Eligible Loan Purposes (7 CFR 1738.10 and 1738.19)

RUS makes broadband loans and loan guarantees to:

- Finance the construction, improvement, and acquisition of facilities and equipment to provide broadband service in eligible rural communities; (It should be noted that Broadband Over Powerline (BPL) facilities are eligible for funding)
- Finance broadband facilities leased under the terms of a capital lease, as defined in generally accepted accounting principals; financing will be limited to 2 years of lease costs;
- Finance the acquisition by an eligible entity of another system, lines or facilities if the acquisition is necessary and incidental to furnishing or improving rural broadband service; and,
- Refinance an outstanding obligation on another telecommunications loan made under the RE ACT. The refinancing cannot exceed 40 percent of the loan amount.

Points of Contact: BROADBAND TEAM

Prospective applicants should contact a Broadband Team member prior to submitting an application:

1. Kenneth Kuchno, Director, Broadband Division, at Kenneth.Kuchno@wdc.usda.gov
2. Farwa Naqvi, Engineering Branch Chief, Broadband Division, at Farwa.Naqvi@wdc.usda.gov
3. Wanda Lloyd, Southern Operations Branch Chief, Broadband Division, at Wanda.Lloyd@wdc.usda.gov
4. Deb Jackson, Northern Operations Branch Chief, Broadband Division, at Deborah.Jackson@wdc.usda.gov

If you would like more information or have any questions, please contact one of the people listed above or call (202) 690-4673.

Using the Revised Form 790 for "Labor Only" Contracts

RUS has received a number of inquiries concerning the revised RUS Form 790, "Electric System Construction Contract – Non-Site Specific Construction." This form is written as a "labor and materials" contract form. When this form is to be used for a "labor only" contract, the intent of the contract should be clarified. This can be done by either or both of the following:

- Making a statement on a cover letter (or elsewhere) that since the contract scope does not include materials, references in the contract form to contractor supplied materials are not applicable, and/or,
- Deleting those provisions in the contract form that relate solely to contractor furnished materials (e.g., Proposal, Article I, Section 2.) For contracts that have no owner furnished material nor contractor furnished material (such as right-of-way clearing), the provisions that relate solely to owner furnished materials (e.g., Notice and Instructions to Bidders, Item 2, and Proposal, Article I, Section 3) can also be deleted.

The provisions related to "Buy American" (Proposal, Article VI, Section 2) and "Patent Infringement" (Proposal, Article VI, Section 3) should be retained since these provisions are unlikely to cause any confusion regarding the intent of the contract.

Borrowers may also change the way "owner furnished material" is handled in "labor only" contracts using RUS Form 790. See RUS letter dated April 14, 2004, "Permitted Modification of RUS Form 790," to all electric borrowers, which is summarized as follows:

If RUS Form 790 is used as a "labor only" contract, i.e., the borrower supplies all materials and equipment, and the contract is to be accounted for under RUS Bulletin 1767B-2, "Work Order Procedures – Electric Program," a borrower may choose to eliminate the cost of owner furnished materials from the unit prices, and modify RUS Form 790 as follows:

- Notice & Instructions to Bidders, Item 2 – Delete this item.
- Proposal, Article I, Section 3, Paragraph 2 – Delete the first three sentences of Paragraph 2. The remaining text of Paragraph 2 is retained so that it reads:

  Materials, if any, not required for the project, which have been furnished to the Bidder by the Owner or delivery of which has been accepted by the Bidder on behalf of the Owner, shall be returned to the Owner by the Bidder upon completion of construction of the project. The value of all materials not installed in the project nor returned to the Owner shall be deducted from the final payment to the Bidder.

If you would like more information or have any questions, please contact Robert Lash, Transmission Branch, at (202) 720-0486 or at Bob.Lash@wdc.usda.gov.

RUS Construction Contract Forms Correction

Subsequent to the February 2004 issuance of various revised RUS contract forms, it was discovered that an identical, incorrect, reference exists in three of the contracts. The contracts incorrectly advise that notice of any required work on energized lines is to be included in the "Notice and Instructions to Bidders" when the reference should be that such instructions are to be included in the "Project Details" section which is an attachment that the Owner adds to the contract bidding proposal.

The incorrect reference exists in Section 1a of Article IV, "Particular Undertakings of the Bidder," in the following RUS forms:

- RUS Form 198, "Equipment Contract,"
- RUS Form 790, "Electric System Construction Contract Non-Site Specific Construction," and
- RUS Form 830, "Electric System Construction Contract Project Construction."

When using these contract forms, RUS Borrowers should revise Article IV, Section 1, to read as follows:

a. *The Bidder shall at no time and under no circumstances cause or permit any employee of the Bidder to perform any work upon energized lines, or upon poles carrying energized lines, unless otherwise specified in the ~~Notice and Instructions to Bidders~~ Project Details.*

Guidance on how to assemble complete bidding contracts and the attachments to include with contracts, including the "Project Details" attachment, are included in RUS Bulletin 1726I-602, "Attachments to Electric Program Standard Contract Forms." The "Project Details" attachment is included in Exhibit A of Bulletin 1726I-602. Section 2 of the "Project Details" attachment is used to specify any expected work on energized lines to be performed under the specific contract.

If you would like more information or have any questions, please contact Sean Lockard, Northern Regional Division at (202) 720-1395, or at Sean.Lockard@wdc.usda.gov.

RUS Design Manual for High Voltage Transmission Lines is Updated

RUS Bulletin 1724E-200, Design Manual for High Voltage Transmission Lines, has been updated and is currently available on the RUS web page. The manual was updated by the Transmission Subcommittee of the NRECA Transmission and Distribution Committee. The revised bulletin is based on the requirements of the 2002 edition of the National Electrical Safety Code.

In accordance with 7 CFR Part 1724, RUS transmission lines are to be a minimum of Grade B construction as defined in the NESC. However, since the NESC is a safety code and not a design guide, additional information and design criteria are provided in this bulletin as guidance to the engineer. This guide publication is a reference of fundamental engineering guidelines and basic recommendations. The subject area includes structural and electrical aspects of transmission line design as well as explanations and illustrations. Numerous cross-references and examples should be of great benefit to engineers performing design work for RUS borrower transmission lines 230 kV and below. It should be particularly helpful to relatively inexperienced engineers beginning careers in transmission line design.

This design bulletin has been expanded to include references and some design information for steel and concrete poles. Additional design information for steel and concrete poles may be found in the appendices and commentary of these other bulletins. Many of the clearance tables in the proposed revision of the design manual for high voltage transmission lines, will reference the appropriate section of the NESC for which the clearance tables are based, as well as give an example of the clearance calculation. In addition each table will include information as to how much the RUS recommended clearance is above the minimum NESC.

The design manual, RUS bulletin 1724E-200, can be downloaded from the following website:

http://www.usda.gov/rus/electric/bulletins.htm

The file is an Adobe Acrobat portable document format (pdf) file with many links in the table of contents, list of tables, list of figures, and the index.

The following current and former members of the Transmission Subcommittee of the Transmission and Distribution (T&D) Engineering Committee of NRECA developed the revised design manual:

Ballard, Dominic, East Kentucky Power Coop., Winchester, KY
Burch, John, Florida Keys Electric Coop., Tavernier, FL
Heald, Donald, USDA, Rural Utilities Service, Washington, DC
Lukkarila, Charles, Great River Energy, Elk River, MN
McCall, Charles, Georgia Transmission Company, Tucker, GA
Mundorff, Steve, Tri-State Generation & Transmission Association, Inc., Denver, CO
Nicholson, Norris, USDA, Rural Utilities Service, Washington, DC
Oldham, Robert, Southern Maryland Electric Coop., Hughesville, MD
Smith, Art, Burns and McDonnell Engineering Co., Atlanta, GA
Turner, David, Lower Colorado River Authority, Austin, TX
Twitty, John, Alabama Electric Coop., Andalusia, AL

In February, 2005, Charles McCall from Georgia Transmission Company, Bob Saint from NRECA and Donald Heald from RUS gave a web conference on the design manual. The topics covered included: what is new in the revised manual; what has changed; benefits this manual has to the transmission line designer; benefits this manual has to the distribution line designer; and what projects the NRECA transmission subcommittee is working on.

If you would like more information or have any questions, please contact Donald Heald, Transmission Branch, at (202) 720-9102 or at Don.Heald@wdc.usda.gov.

RUS Seismic Requirements (7 CFR1792 Subpart C) are Being Updated

The Rural Utilities Service (RUS is in the process of amending its regulations to update the seismic safety requirements of the agency. These amendments will provide RUS borrowers,

grant recipients, Rural Telephone Bank (RTB) borrowers, and the public with updated rules for compliance with seismic safety requirements for new building construction.

In the mid eighties, the Federal Emergency Management Agency (FEMA) contracted the Building Seismic Safety Council (BSSC) to develop the National Earthquake Hazards Reduction Program (NEHRP) Provisions for new buildings. One of the primary goals of the program is to reduce or mitigate losses from earthquakes. The NEHRP Recommended Provisions for Seismic Regulations for New Buildings and Other Structures (commonly called the NEHRP Provisions) are recommended provisions that have been adopted in recent times by model codes and standards. The first edition of the NEHRP Provisions was dated 1985. The document is updated on a 3-year cycle. The 2000 edition of the NEHRP provisions is the fifth update of the document.

Executive Order 12699, Seismic Safety of Federal and Federally Assisted or Regulated New Building Construction, requires that all new federally owned, leased, assisted, and other regulated buildings be designed and constructed in accordance with the appropriate seismic standards. The Interagency Committee on Seismic Safety in Construction (ICSSC) has recommended the use of building codes which are substantially equivalent to the 2000 National Earthquake hazards Reduction Program Provisions for the Development of Seismic Regulations for New Buildings.

The National Institute of Standards and Technology (NIST) has contracted to evaluate the equivalency of the 2000 edition of the NEHRP Provisions and the latest editions of national building codes and standards. The building codes and standards which are substantially equivalent to, or exceed, the 2000 NEHRP Provisions, the International Building Code (IBC), 2003 edition; the NFPA 5000 Building Construction and Safety Code, 2003 edition; the International Residential Code for One-and Two-Family Dwellings, 2003 edition, and ASCE 7-02, Minimum Design Loads for Buildings and Other Structures.

For purposes of RUS, the following documents have been found to be substantially equivalent to the 2000 NEHRP: International Building Code (IBC), 2003 edition; the NFPA 5000 Building Construction and Safety Code, 2003 edition, and ASCE 7-02, Minimum Design Loads for Buildings and Other Structures. RUS is in the process of updating its seismic provisions to reflect these standards and codes to be used in the seismic design of new buildings financed by RUS.

If you would like more information or have any questions, please contact Donald Heald, Transmission Branch, at (202) 720-9102 or at Don.Heald@wdc.usda.gov.

Bulletin 1724E-220, Procurement and Application Guide for Non-Ceramic Insulators, Voltage Class 34.5 kV and Above

RUS, with the help of the NRECA Transmission Line Subcommittee, has completed and published a guide to assist utilities in the process of procuring non-ceramic insulators. RUS Bulletin 1724E-220 was created to simplify the procedure in selecting polymer insulators by

providing utilities with general information regarding key areas to look at for polymers. Some of the topics addressed in the guide are:

- Advantages and Disadvantages of Non-ceramic Insulators
- Material Makeup
- Electrical and Mechanical Considerations
- Interchangeability (with Ceramic Insulators)
- Environmental and Quality Assurance
- Testing
- Handling

The majority of the information contained within the guide is directed towards transmission suspension insulators, but post and station post insulators are also discussed. The guide also contains a sample specification to illustrate common industry format for polymer insulator procurement specifications.

This guide is the result of considerable effort of the Overhead Transmission Line Subcommittee of the NRECA T&D Engineering Committee. Committee members who worked on this bulletin include:

Dominic Ballard, East Kentucky Power Co-op., Winchester, KY
John Burch, Florida Keys Electric Coop., Tavernier, FL
Donald Heald, USDA, Rural Utilities Service, Washington, DC
Bill Hetherington, Lee County Electric Coop., North Fort Myers, FL
Robert Johnson, Arkansas Electric Coop., Little Rock, AR
Charles Lukkarila, Great River Energy, Elk River, MN
Charles McCall, Georgia Transmission Company, Tucker, GA
Steve Mundorff, Tri-State G & T Association, Inc., Denver, CO
Robert Oldham, Southern Maryland Electric Coop. (Retired), Hughesville, MD
Robert Saint, National Rural Electric Cooperative Association, Arlington, VA
Art Smith, Burns & McDonnell, Atlanta, GA
David Turner, Lower Colorado River Authority, Austin, TX
John Twitty, Alabama Electric Co-op., Andalusia, AL

For more information please contact Norris Nicholson, Transmission Branch at (202) 720-1924, or at Norris.Nicholson@wdc.usda.gov.

Update on Power Quality Bulletins

The Electric Staff Division (ESD) of RUS is revising two power quality bulletins, “Interruption Reporting and Service Continuity Objectives for Electric Distribution Systems” and “Voltage Levels on Rural Distribution Systems.” These bulletins will provide the staffs of RUS funded distribution systems with guides that reflect current practices, technology, terminology for measuring system performance and providing proper voltage levels.

ESD in conjunction with the NRECA T & DEC's Power Quality Subcommittee is near conclusion of the revision of Bulletin 1730A-119 (formerly Bulletin 161-1), "Interruption Reporting and Service Continuity Objectives for Electric Distribution Systems." The bulletin will reflect current power quality terminology as found in IEEE Standard 1366-2003, "IEEE Guide for Electric Power Distribution Reliability Indices."

Important changes include:

- System Average Interruption Duration Index (SAIDI) will be expressed in minutes, which replaces Consumer-Hours per Customer per Year as the measure of reliability. SAIDI is the preferred index of reliability in IEEE Standard 1366-2003. RUS Form 7, "Financial and Statistical Report" will be revised to reflect this change. (A discussion of why SAIDI is chosen over other reliability indices can be found in Section B3 of IEEE Std 1366-2003.)
- Major event is used in place major storm and extreme storm. Major event is a more comprehensive term which refers to any event that exceeds the reasonable system design. The previously used term, major storm, represents only those service interruptions caused by meteorological phenomena that exceeded the design assumptions for the lines.
- Major event is also a more precise term and can be declared when the daily system SAIDI exceeds $T_{MED,}$ a calculated value representing the threshold of reasonable system design. Previously, a major storm was an ambiguous term.

RUS will be making available for download a spreadsheet to assist the borrowers with power quality calculations. A downloadable spreadsheet to assist borrowers with power quality calculation will allow easy entering of outage data and will compute SAIDI and the Major Event Day threshold. This spreadsheet will be placed on the RUS web page when Bulletin 1730A-119 is issued.

This fall, ESD will start revising Bulletin 1724D-113, formerly Bulletin 169-4, "Voltage Levels on Rural Distribution Systems."

If you have any questions or concerns regarding power quality, please contact Timothy Roscoe, Distribution Branch at (202) 720-1792 or at Timothy.Roscoe@wdc.usda.gov.

U-1 Specification Revision

RUS is in the process of revising RUS Bulletin 50-70 (U-1), "RUS Specification for 15 kV and 25 kV Primary Underground Power Cable." The revised bulletin will be renumbered RUS Bulletin 1728F-U-1 and be renamed, "RUS Specifications for 15 kV, 25 kV, and 35 kV Primary Underground Power Cable." The bulletin is being revised to keep abreast of current primary insulated cable technology. The U-1 Bulletin will provide RUS specifications on 15 kV, 25kV and 35 kV primary underground cables.

Highlights of the changes that will be proposed include:

- A water blocking sealant would be required in all stranded conductor cables.
- Plain cross-linked polyethylene (XLP) would be removed and be replaced by cross-linked polyethylene with tree-retardant (XLP-TR) as an acceptable insulation material.
- Nominal insulation thickness on 25 kV cable would be reduced from 345 mils to 260 mils.
- A 35 kV rated cable would be included as an RUS acceptable operating voltage for underground residential distribution cable and the specifications for this voltage rating would be included in the revised bulletin.
- A semi conducting jacket will be specified in the proposed bulletin and it is intended to be used on cables to be installed in areas with soil resistivities greater than 2500 ohm-centimeters in lieu of insulating jacket.

If you would like more information or have any questions, please contact Trung Hiu at (202) 720-1877 or at Trung.Hiu@wdc.usda.gov.

EXHIBIT 1

NESC© 2007 Edition Revision Process

Scorecard of Comments Received for SC5

Change Proposal Number	No of Comments
CP2766/NESC SC5 Task Force 5.1.2	79
CP2737/NESC SC5 Working Group 5.2	77
CP2673	67
CP2798/NEXC SC5 Task Force 5.1.2	57
CP2780	36
CP2781	36
CP2658/NESC SC5 Task Force 5.1.1	35
CP2717/NESC SC5 Task Force 5.1.4	32
CP2739/NESC SC5 Task Force 5.1.2	31
CP2553	23
CP2567	18
CP2802/NESC SC5 Task Force 5.1.6	18
CP2709	17
CP2509	15
CP2510	14
CP2644	11
CP2569/NESC SC5 Task Force 5.1.7	5
CP2707	4
CP2829	4
CP2834	4
CP2617	3
CP2768/NESC SC5 Task Force 5.1.9	3
CP2830	3
CP2555	2
CP2568	2
CP2615	2
CP2616	2
CP2718	2
CP2728	2
CP2738	2
CP2729	2
CP2733	2
CP2734	2
CP2736	2
CP2784/NESC SC5 Task Force 5.1.5	2
CP2787/NESC SC5 Task Force 5.1.5	2
CP2821	2
CP2824	2
CP2826	2
CP2506	1
CP2552	1
CP2565	1
CP2566	1
CP2614	1
CP2618	1
CP2720	1
CP2792	1
CP2807/NESC SC5 Task Force 5.1.3	1
CP2810	1
CP2823	1
CP2828	1
	634

EXHIBIT 1(CONT.)

Summary of Some of the Change Proposals submitted to Subcommittee 5

CP NO.	Pg	BRIEF DESCRIPTION	ACTION BY SC5 in Oct, 2003
2553	534	**Delete Rule 261A2e, average strength of three wood poles:** Since the strength of wood poles is highly variable (typical coefficient of variation of strength distribution of wood poles is approximately 20 percent.), wood poles are more dependent on the average strength of their adjacent poles that other types of structures. Therefore, this rule should not be applied to new construction where a pole of adequate strength could reasonably and should be installed. If an existing pole is known to be weak, that pole should be "spliced or reinforced" per Rule 261A2d or "replaced or rehabilitated" to meet the requirements of Table 253-2 footnote 3 or Table 261-1A.	Accept
2658	413	**The following three-part proposed revisions and additions are made to appropriately consider worker and maintenance loads on structures.** Revise existing Rule 250A2 • Change the Vertical Overload Factor for Grade C in Table 253-1 from 1.90 to 1.35. Remove Footnote 6 from the table. • Revise Rules 263A and 263C to require the consideration of worker loads in Rule 250A2. For purposes of this determination, two load cases shall be considered: (a) workers on the structure repairing or installing new facilities and (b) lockup of a stringing block during installation of a wire or conductor. This CP is very detailed.	Accept as modified
2673	359	**Revise Rule 250C to eliminate the 60-ft exemption for application of extreme winds.**	Accept in principle, see CP 2766 on p.390
2717	473	**Delete Alternate method for wood poles in Rules 253 and 261.** Tables 253-2 and 261-1B are deleted.	Accept
2737	322	**Complete Revision of Sections 25, 26 and 27.** • It is the intention of NESC Subcommittee 5 that the strength and loading requirements for	Accept

CP NO.	Pg	BRIEF DESCRIPTION	ACTION BY SC5 in Oct, 2003
		overhead lines be revised to be consistent with the latest trends in ANSI recognized standards, including the American Society of Civil Engineers, ANSI/ASCE 7 and other related documents. These changes include new combined ice and wind loading maps and associated requirements, and recognition of loadings that may not have been previously explicitly accounted for in the NESC. This new method will impact the structures, conductors and insulators, as would be specified in revised Sections 25, 26 and 27, and may also impact the sags and clearances of Section 23. In order to allow the industry a reasonable transition period (5 years) to adjust to and the new procedures and modify their internal procedures and standards, etc., the proposed "new" method would be included in the 2007 NESC with an "N" prefixed to all of the rules, section and table numbers. The present "old" or previous method would remain in the 2007 NESC with a "P" prefixed to all of the rules, section and table numbers. Users of the 2007 NESC may use either the New "N" rules or Previous "P" rules and methods for the design of new facilities. Except as may be related to conductor sag and clearance issues, under no circumstances may the two methods be combined or intermingled in the design of a structure.	
2739	507	**Remove the 60-foot exclusion (for high winds) from Grade B and Grade C construction. Change load factor for Grade C**. For Rule 250C Loads, show overload factors of 1.00 for Grade B construction and .87 for Grade C construction in Table 253-1. For Rules 250C Loads, show overload factors of 1.00 for Grade C new construction and .87 for Grade C 'at replacement' value in Table 253-2. This change proposal provides appropriate load factors for Grade B and Grade C construction for the extreme wind loads, Rule 250C.	Accept in principle, see CP 2766 on p.390
2766	390	**Remove the 60-foot exclusion (for high winds) from Grade B and Grade C construction. Change load factor for Grade C and set maximum limits for high winds for structures under 60 feet.**	Accept as modified, (modified max wind

CP NO.	Pg	BRIEF DESCRIPTION	ACTION BY SC5 in Oct, 2003
		For Rule 250C Loads, show overload factors of 1.00 for Grade B construction and .87 for Grade C construction in Table 253-1. For Rules 250C Loads, show overload factors of 1.00 for Grade C new construction and .87 for Grade C 'at replacement' value in Table 253-2. This change proposal provides appropriate load factors for Grade B and Grade C construction for the extreme wind loads, Rule 250C and show a maximum wind load for Grade B (modified to 22.5 psf) and Grade C (modified to 15 psf) construction under 60 feet for Tables 253-1 and Tables 253-2.	load as 22.5 and 15 psf)
2780	525	**Add reference to the 2002 edition of ANSI O5.1, 2002 to Rule: 261A2b(1).** For taller single pole applications, the point of maximum bending stress may occur at a location above the groundline due to the pole taper and other effects. When this occurs, guidelines are provided to account for reduced fiber stress values in the pole at heights above the groundline, assuming linear taper based on the minimum circumferences. In addition, when the theoretical point of maximum stress is projected to occur above groundline, the ultimate bending capacity of a pole changes as the height of the applied horizontal load changes.	Accept as modified (added fiber stress height effect shall be considered.)
2781	523	**Delete Exception 1 in Rule 261A2a.** This exception deals with calculating moments at the groundline for single poles and unbrace H-frames.	Accept as modified, see page 524
2798	402	**Remove the 60 foot exclusion from Grade B and Grade C construction and show a maximum wind load for Grade B (30 psf) and C (15 psf for wind speeds greater than 90 and 10 psf for wind speeds less than 90) construction under 60 feet for Tables 253-1 and Tables 253-2.**	Accept in principle, see CP 2766 page 390

APPENDIX A

SELECTED METRIC CONVERSION FACTORS

TO CONVERT FROM:	TO:	MULTIPLY BY:
Inch (in)	Centimeter (cm)	2.54
Foot (ft)	Meter (m)	0.3048
Mile (mi)	Kilometer (km)	1.609
Pound (lb)	Newton (N)	4.448
Gallon (gal)	Liter (L)	3.785

APPENDIX B

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APPENDIX C

NRECA TRANSMISSION & DISTRIBUTION ENGINEERING COMMITTEE

Member	Organization	Location
Committee Chair		
Max Davis	South Alabama Elec Co-op	Troy, AL
NRECA Staff Coordinators		
Martin Lowery	NRECA	Arlington, VA
Mike Pehosh	NRECA	Arlington, VA
Bob Saint	NRECA	Arlington, VA
Overhead Distribution Lines Subcommittee		
Terry Rosenthal, Chair	Laclede EC	Lebanon, MO
Jim Bohlk	RUS	Washington, DC
James Byrne	Poudre Valley REA	Fort Collins, CO
Titus (Ty) Diamond	Flint Energy	Warner Robbins, GA
Allan Glidewell	Southwest Tennessee EMC	Brownsville, TN
Tom Hoffman	Agralite Electric Co-op	Benson, MN
Greg Linsly	Dixie EMC	Baton Rouge, LA
Shannon Messer	Clark Energy Co-op	Winchester, KY
Brian Nelson	Intercounty ECA	Licking, MO
Ernest Neubauer	Pioneer Electric Co-op	Piqua, OH
Gene Smith	SGS Witter, Inc.	Lubbock, TX
Tom Suggs	Middle Tennessee EMC	Murfreesboro, TN
Substation Subcommittee		
Daniel Geiger, Chair	Heartland Engineering Services	Rockford, MN
Kenny Adams	SGS Writer, Inc.	Albuquerque, NM
Mike Avant	Garkane Energy Co-op	Loa, UT
Thomas Barnette	Berkeley EC	Moncks Corner, SC
Mike Eskandary	RUS	Washington, DC
Bill Kahanek,	Lower Colorado River Auth.	Austin, TX
Ken Malone	Middle Tennessee EMC	Murfreesboro, TN
Mike Pehosh	NRECA	Arlington, VA
Paul Rupard	East Kentucky Power Co-op	Winchester, KY
Kevin White	Northeast Missouri Electric Power	Palmyra, MO
Allen Xi	Burns & McDonnell	Houston, TX

Member	Organization	Location
System Planning Subcommittee		
Robin Blanton, Chair	Piedmont EMC	Hillsborough, NC
Steve Atkinson	Northern Virginia EC	Gainesville, VA
Robert Dew	Power Tech Engineering	Norcross, GA
Joe Dorough	Jackson EMC	Jefferson, GA
Ronnie Frizzell	Arkansas EC Corp.	Little Rock, AR
David Garrison	Allgeier Martin & Associates	Okmulgee, OK
Wayne Henson	East Mississippi EPA	Meridian, MS
Donald Junta	RUS	Washington, DC
Joe Perry	Patterson & Dewar Engr.	Decatur, GA
George Shultz	RUS	Washington, DC
Ryan Smoak	Mc-Call-Thomas Engineering	Orangeburg, SC
Harold Taylor	Georgia Transmission	Tucker, GA
Kenneth Winder	Moon Lake Electric	Roosevelt, UT
Power Quality Subcommittee		
Ed Bevers, Chair	Rural Electric Co-op	Lindsay, OK
Chris Brewer	Blue Grass Energy Co-op	Nicholasville, KY
Robert Casey	Georgia Transmission Corp	Tucker, GA
Peter Daly	Power Systems Engineering	Madison, WI
Bhaji Dhilon	Cobb Energy	Marietta, GA
Herman Dyal	Clay Electric Co-op	Keystone Heights, FL
Doug Joens	Power System Engineering	Madison, WI
Ken Kjar	Cass County Electric Co-op	Kindred, ND
Chris Melhorn	EPRI PEAC Corporation	Knoxville, TN
Dave Mueller	Electrotek Concepts, Inc.	Knoxville, TN
Chris Perry	Nolin EMC	Elizabethtown, KY
Tim Pierce	Great River Concepts	Elk River, MN
Jeff Pogue	Wabash Valley Power Assoc	Indianapolis, IN
Timothy Roscoe	RUS	Washington, DC
Lewis Shaw	Brunswick EMC	Shallotte, NC
Michael Watson	Duck River EMC	Shelbyville, TN
Jim Worley	Eastern Kentucky Power Co-op	Winchester, KY

Member	Organization	Location
Transmission Lines Subcommittee		
John Burch, Chair	Florida Keys EC	Tavernier, FL
Dominic Ballard	East Kentucky Power Co-op	Winchester, KY
Don Heald	RUS	Washington, DC
Chuck Lukkarila	Great River Energy	Elk River, MN
Charles McCall	Georgia Transmission Corp.	Tucker, GA
Stephen Mundorff	Tri-State G&T Association	Denver, CO
Norris Nicholson	RUS	Washington, DC
Bob Oldham	Southern MD EC (Retired)	FL
Art Smith	Burns & McDonnell	Atlanta, GA
David Turner	Lower Colorado River Auth.	Austin, TX
John Twitty	Alabama EC	Andalusia, AL
Underground Distribution Subcommittee		
Ace Necaise, Chair	Singing River EPA	Lucedale, MS
Russ Dantzler	Mid-Carolina EC	Lexington, SC
Berl Davis	Palmetto EC	Hilton Head, SC
William Duke	Allgeier Martin & Associates	Okmulgee, OK
Steven Gwin	Middle Tennessee EMC	Murfreesboro, TN
Vince Heuser	Nolin RECC	Elizabethtown, KY
Trung Hiu	RUS	Washington, DC
Tim Mobley	Berkeley EC	Moncks Corner, SC
John Rodgers	Nodak EC, Inc.	Grand Forks, ND
Les Shankland	Mountain Parks Electric	Granby, CO
Blaine Strampe	Federated REA	Jackson, MN
Edward Thomas	Utility Elec. Consultants	Raleigh, NC
Scott Wehler	Adams Electric Cooperative Corp.	Gettysburg, PA