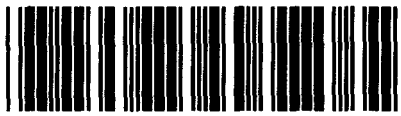
Control Number: 32182



Item Number: 73

Addendum StartPage: 0

PUC PROJECT NO. 32182

INVESTIGATION OF METHODS TO IMPROVE ELECTRIC AND TELECOM INFRASTRUCTURE THAT WILL MINIMIZE LONG TERM OUTAGES AND RESTORATION COSTS ASSOCIATED WITH GULF COAST HURRICANES	§ § § § § §	**BEFORE THE PUBLIC UTILITY COMMISSION OF TEXAS**

LCRA TRANSMISSION SERVICES CORPORATION'S SUPPLEMENTAL COMMENTS

The LCRA Transmission Services Corporation (LCRA TSC) offers the following supplemental comments in Project No. 32182. LCRA TSC also reserves the right to respond to comments provided by others as appropriate and necessary to provide the PUC with relevant information.

Recommendation #3

Require each electric utility to trim or remove (during the normal vegetation management cycle) all trees that are located within right of way (ROW) controlled by the utility and that compromise NESC clearance limits.

Response:

LCRA TSC is supportive of any commission rules or guidelines that can 1) more effectively instruct utilities and 2) help utilities provide more consistent and realistic expectations to land owners regarding necessary vegetation management activities. This includes being supportive of commission rules or guidelines that provide further guidance on the minimum required clearances, and the 1) removal and 2) trimming of vegetation that impact such clearances or impede access to such facilities for maintenance and emergency restoration efforts.

It is LCRA TSC's experience that it is most often prudent, for example, to remove trees from ROWs when they cannot be sufficiently trimmed (due to growth characteristics of certain tree species and other vegetation/site characteristics) to avoid compromising the minimum required clearances caused by further vegetation growth between maintenance intervals. However, it is important that any rules also recognize the need for flexibility; our experience has shown that it is sometimes necessary to address uncommon or unusual circumstances where alternative solutions are required to mitigate certain environmental issues, encroachments, or other unique site characteristics.

Recommendation #5

Each electric utility should provide the Commission by August 1, 2007 with a report identifying all of the utility's transmission lines that were built to pre-1977 NESC wind loading standards. For each identified line, the report should provide the number of miles of ROW, a description of the types of structures used in the line, and an estimated cost and reasonable time required to upgrade the line to the NESC standards in effect at the time the upgrade starts. For each identified line within 10 miles of the Texas coastline, the report should include an estimated cost and reasonable time required to upgrade the line to the NESC standards in effect at the time of the upgrading assuming 140 mile-per-hour wind speed.

Response:

LCRA TSC agrees that hardening the transmission system in the State of Texas to improve reliability and reduce restoration time in the event of a major hurricane should be studied. However, LCRA TSC disagrees with limiting the report to transmission line built to pre-1977 NESC wind loading standards and including all such facilities within all regions of the State of Texas.

LCRA TSC advocates requiring utilities to report transmission lines that fall into two categories. The first category should include lines built to pre-2002 NESC wind loading standards, but only where the 2002 NESC wind loading standard exceeds 90 mph. The second category includes all lines built to pre-2002 NESC medium loading standards. LCRA TSC believes limiting the study to these areas provides the utilities within the State of Texas with the best opportunity to focus their efforts on infrastructure with the highest exposure to extreme wind loads in excess of its inherent strength.

These two categories represent regions where the largest discrepancy exists between pre-2002 and the 2002 NESC wind loading standards. The region where the 2002 NESC wind loading standard exceeds 90 mph includes South Texas, the Rio Grande Valley, Southeast Texas, the Gulf Coast, a portion of Central Texas and a very small portion of East Texas. The second region, wherein lines were built to pre-2002 medium loading district standards, adds additional portions of Central Texas and East Texas and adds a small portion of West Texas.

Outside these regions, in the pre-2002 NESC light loading district, the combined wind and ice loads (in this case, 9 psf and no ice), result in loads exceeding the 2002 NESC wind loading standard (90 mph in this particular area).

Outside these regions, in the pre-2002 NESC heavy loading district, the combined wind and ice loads (in this case, 4 psf and 0.5 inch radial ice), result in loads exceeding, equaling, or only marginally falling short of the 2002 NESC wind loading standard (90 mph).

While we recognize that the 2007 NESC combined wind and ice loads may or may not exceed those specified in the pre-2002 and 2002 NESC loading districts, we do agree that this study is and should be focused on hurricanes and extreme winds.

The following table examines pre-2002 and 2002 wind loading standards for lines located within the three NESC loading districts (heavy, medium, light).

NESC Loading District	Pre-2002 NESC Wind Loading Standards (mph)	2002 NESC Wind Loading Standards (mph)
Heavy	70, 80	90
Medium	70, 80	90, 100
Light	70, 80, 90	90, 100, 110, 120, 130, 140

Converting those wind speeds into pressures (0.00256 x square of the velocity), results in the following table.

NESC Loading District	Pre-2002 NESC Wind Loading Standards (psf)	2002 NESC Wind Loading Standards (psf)
Heavy	13, 16	21
Medium	13, 16	21, 26
Light	13, 16, 21	21, 26, 31, 37, 43, 50

However, in many cases, prior to 2002, the NESC district loads controlled the design over and above any specified extreme wind loading. In these cases, using the NESC district loads could have resulted in wire loads equal to or exceeding pre-2002 and even the 2002 NESC wind loading standards.

For example, the NESC heavy loading district (NESC heavy) specifies 0.5 inch radial ice combined with a four (4) pound per square foot (psf) wind and an Overload Capacity Factor (OCF) of 2.5. In the case of a 0.93-inch diameter conductor, NESC heavy results in a wire load of 1.61 pounds per lineal foot (plf)—being the result of the following computation:

Heavy wire load = 2.5 OCF x 4 psf x (0.93 inch diameter + 2 x 0.5 inch radial ice) / 12 in/ft = 1.61 pounds per lineal foot (plf).

In most of the State of Texas that lies within the NESC heavy district, pre-2002 NESC versions would have specified an extreme wind of 13 psf (70 mph). Since the OCF for extreme wind is 1.0, the resulting extreme wind load on the wire would have been 1.01 plf—being the result of the following computation:

Extreme wire load = 1.0 OCR x 13 psf x 0.93 inch diameter / 12 in/ft = 1.01 plf

Since the heavy wire load is larger than the extreme wire load, an equivalent extreme wind load can be calculated by converting the heavy wire load into an equivalent wind pressure on a bare wire and then translating that result into a wind speed. In this example, the heavy wire load of 1.61 plf is equivalent to a 20.77 psf (90 mph) extreme wind load on a bare wire—being the result of the following computations:

Equivalent wind pressure = 1.61 plf / (0.93 in diameter/12 in/ft) = 20.77 psf
Equivalent wind speed = square root (20.77 psf / 0.00256) = 90 mph

Thus, NESC heavy loads on wires with diameters not exceeding 0.93 inches result in wire loads equal to or exceeding a 90 mph extreme wind, which is the 2002 NESC wind loading standard within the NESC heavy district. NESC heavy loads on wires with diameters not exceeding 1.59 inches result in wire loads equal to or greater than an 80 mph extreme wind. Larger conductors (greater than 1.59 inches) would result in loads equivalent to a lower wind speed, typically 70 mph.

Within the NESC medium district in the State of Texas, pre-2002 NESC versions would have specified an extreme wind of 70 to 80 mph and the 2002 NESC wind load varies from 90 to 100 mph. The NESC medium load consists of 0.25 inch radial ice combined with a four (4) pound per square foot (psf) wind using an Overload Capacity Factor (OCF) of 2.5. Similar calculations to those performed above result in maximum diameters of 2.10, 0.80, 0.46 and 0.32 inches for wind speeds of 70 mph, 80 mph, 90 mph and 100 mph, respectively. Thus, only the smallest of wires result in wire loads equal to or exceeding the 2002 NESC wind loading standard.

Within the NESC light district, pre-2002 NESC versions would have specified an extreme wind from 70 to 90 mph and the 2002 NESC wind loading standard varies from 90 to 140 miles per hour. The NESC light load consists of no ice combined with a nine (9) pound per square foot (psf) wind using an Overload Capacity Factor (OCF) of 2.5. Since the NESC light district loads include no ice, the diameter of wire makes no difference to the calculations. The NESC light district loads result in an equivalent extreme wind of 94 mph.

The results of these calculations are summarized below and demonstrate that the largest discrepancies between pre-2002 and 2002 NESC loads exist within certain regions of Texas within the NESC medium and light loading districts. LCRA TSC recommends that the study be concentrated in those regions specifically.

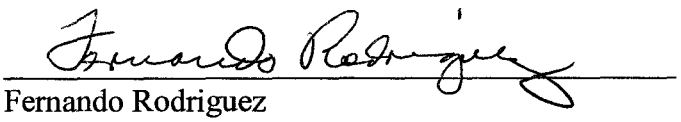
NESC Loading District	Maximum Wire Diameter (in)	Pre-2002 NESC Equivalent Loading Standards (mph)	2002 NESC Wind Loading Standards (mph)
Heavy	2.10	70	90
Heavy	1.59	80	90
Heavy	0.93	90	90
Medium	2.10	70	90, 100
Medium	0.80	80	90, 100
Medium	0.46	90	90, 100
Medium	0.32	100	90, 100
Light	No limit	94	90, 100, 110, 120, 130, 140

The preceding analyses have been simplified by not considering the effects of the 2002 NESC velocity pressure coefficients and gust response factors. However, the combined effect of these factors generally serves to reduce the overall 2002 extreme wind loading, which would add further support to excluding from this study, lines located within and built to the NESC heavy loading standard.

LCRA TSC asserts that hardening electric transmission lines within the State of Texas should be accomplished by targeting facilities built to pre-2002 NESC standards and located where the 2002 NESC wind loading standard exceeds 90 mph and by targeting facilities built to pre-2002 NESC medium load standards.

Respectfully submitted,

Fernando Rodriguez
Associate General Counsel
Lower Colorado River Authority
P. O. Box 220
Austin, Texas 78767-0220
Telephone: (512) 473-3354
Facsimile: (512) 473-4010
Email: ferdie.rodriguez@lcra.org



Fernando Rodriguez
Texas State Bar No. 17145300

ATTORNEY FOR LCRA TRANSMISSION
SERVICES CORPORATION