Attachment 4

NATIONAL GRID[1]
Third Party Pole Loading Analysis Criteria for Certain Transmission Poles

Analysis of National Grid Transmission (69 kV and below) structures for the addition of new communication cables shall be done using a finite element computer program. The program will be capable of performing analysis on both guyed and unguyed wood pole structures. National Grid recommends the use of two software programs:

Ocalc	Osmose Utilities Services, Inc. 980 Ellicott Street Buffalo, New York 14209 Ph: (800) 877-POLE Fax: (716) 882-5139
Pls-Pole	Power Line Systems, Inc. 918 University Bay Drive Madison, WI 53705, U.S.A. Phone: (608) 238-2171 Fax: (608) 238-9241

Criteria

The analysis shall be done using the following codes and standards:

National Electrical Safety Code 2007 (or Latest Edition)
ANSI O5.1 - 2002 Specifications and Dimensions for Wood Poles (or Latest Edition)
National Grid Overhead Electric Transmission Standards

The loading criteria shall be as follows:

- NESC 250B - Heavy
- NESC 250C – Extreme Wind
- NESC 250D – Extreme Ice (1" for NY)

Grade B Construction shall be used for all poles, even poles below 60'.

[1] Niagara Mohawk Power Corporation, d.b.a. National Grid.

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Pole strength reductions shall be applied as follows:

5 – 12 years:	0 - 0.5%	
13 – 30 years:	0.5% - 2.0%	Note: Interpolation is allowed.
31 – 80 years:	2.0% - 6.0%	

Additionally, pole defects, if found during the structural inspection of the pole, shall be evaluated and an appropriate additional reduction in moment capacity shall be applied. Pole defects can be, but not limited to, woodpecker holes, shell rot, insect damage, excessive checking, external pockets or split pole top.

Conductor/cable diameter and weights should be provided by the appropriate utility. If unavailable then manufacturer's data should be used.

Conductor/cable tension should be provided by the appropriate utility. If unavailable then maximum tension under heavy loading is not to exceed 60% RBS of conductor or messenger, whichever is appropriate.

Procedure

All pole loading analysis calculations and reporting shall be performed under the direction of a professional engineer, licensed by the state where such facility is located, all of which shall be subject to review and acceptance by NGRID Transmission Design NY. The analysis shall be stamped by an engineer licensed in the appropriate state.

Three runs will be made for each structure. The first will analyze the existing structure with the existing loads to determine the capacity of the structure to accept additional loads. A second run will be made to show the existing structure with the new communication loads on it. The third run will analyze the final structure with the appropriate fix. Similar structure configurations may be modeled and analyzed using allowable span runs. The following are the scenarios that can happen:

Existing run passes (stress < 100%)	New passes (stress < 100%) **OK**
Existing run passes (stress < 100%)	New fails (stress > 100%) **Need fix**
Existing run fails (stress > 100%) **Need fix**	

When a fix is required this can be in the form of a new pole, rehabilitated pole or new guy(s), whichever is appropriate. The stress level required for a fix 85% or less.

Reports

All analyses files and the field survey reports, shall be sent to National Grid for review. In addition a final report shall summarize the findings. This report will be modeled after the attached example (Exhibit 1). The files and reports shall be sent electronically or by CD to: nmnytele@us.ngrid.com

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Hardcopies shall be sent via mail, only if requested, to:

Kevin Drzewiecki
National Grid USA
Building F-1
Sub-Transmission Design NY
300 Erie Boulevard West
Syracuse, NY 13202

A copy of the transmittal letter is to be sent to:

National Grid USA
Telecommunications Attachments
636 Quaker Road
Queensbury, NY 12804

Payment for National Grid Review

The entity performing the pole loading analysis on behalf of itself or the Third Party pole attachment Applicant shall include with its "Reports" submittal to National Grid prepayment[2] for National Grid's cost to review such reports.

[2] Payment for this work is due to National Grid in advance of National Grid performing such work. National Grid will provide a proposal for these services in accordance with its current rates.

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Exhibit 1 – Sample Report

Ellicott Road Sub-Transmission Pole Loading Analysis

Structures 270 ½, 271, 272, 273, 274-281
On Sub-Transmission Line: Attica – N. Leroy #208

Communication Company: Company name
Attn: Contact Name

Analysis by: Consultant Company
Attn: Name

Address

and

Engineer Name

Address

Project Number – 159111
Date: September 2, 2008

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Information:

Time Warner has requested to attach a CATV cable to sub-transmission poles 270.5-281 near and on Ellicott Road in the town of Pavilion, New York. These poles are on a 34.5kV line called Attica – North Leroy #208. Poles 270.5 & 273-281 already are under-built with three phase distribution (on cross-arm construction), telephone, and 1/0 secondary. The distribution conductor on all sub-t poles, where it is attached, is 336.4 BACSR, while the sub-transmission is 2/0 BSCU on structures 270.5-273 and 336.4 18/1 ACSR from 273-281. Analysis for structure 274 was also assumed the same for structures 275-281 due to the same pole height, class, attachments, and similar front and back span lengths.

Time Warner Fiber Data: Conductor Diameter: .625"
Conductor/Cable Weight: .163 lbs/ft.
Suspension Strand Diameter: .25"
Suspension Strand Weight: .128 lbs/ft.
Conductor/Cable Design stringing tension: 3500 lbs

Also add information on any other attachments.

Loading Criteria:

- NESC Heavy – Rule 250B per NESC Code – latest edition
- Extreme Wind – Rule 250C per NESC Code – latest edition
- Extreme Ice – Rule 250D per NESC Code – latest edition

Analysis:

- Appendix A – Shows structure 270.5 as it exists in the field. It is a 50' cl-3, D-1211A with distribution primary and secondary underbuild, as well as telephone. There is no line angle on the sub-t, but the line angle for everything else is 90 degrees. The distribution primary and secondary are in-line with the sub-t back span, but change direction on pole 270.5. There are 2 existing guys for distribution primary and secondary, all are oriented against the long span. Structure fails at 345.3%
- Appendix B – Shows structure 270.5 as it would exist in the field with the new CATV in same direction as the sub-t circuit. Structure fails at 344.63%.

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- Appendix C – Shows structure 270.5 as a 50’ cl-1 with 4 additional guys added. Structure passes at 55.13%
- Appendix D – Shows structure 271 as it exists in the field. It is a 45’ cl-3, D-1220A and there are no other attachments. Structure 271 sub-t has an 8°30’ line angle. Structure passes at 83%.
- Appendix E – Shows structure 271 as it would exist in the field with the new CATV and a new guy of 20 feet. Structure passes at 83 %.

Summary:

Structure Number	Original Existing	Existing In Field w/ CATV	Correction
270.5	345.3% Pole fails	344.63% Pole fails	Remove 50’ Cl-3; Install 50’ Cl-1, Add 5 new guys and reattach span guy. Passes at 55.13%.
271	83% Pole passes	83% Pole passes; Install new 20’L side guy.	Install new CATV 20’L side guy.
272	54.6% Pole passes	61.4% Pole passes	N/A
273	208.34% Pole fails	214.16% Pole fails	Remove 55’ Cl-3; Install 60’ Cl-1, Add 5 new guys. Passes at 83.2%
274-281	186.6% Pole fails	197.1% Pole fails	Add 2 side guys. Passes at 74.9%

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New Staking Diagrams: