

ROOSEVELT COUNTY ELECTRIC COOPERATIVE, INC.
Administrative Policy No. 15

SUBJECT: Harmonic Control & Limitations

I. OBJECTIVES:

- A. To state the policy of the cooperative with regard to non-linear loads connected to the electric power system.
- B. To establish clearly defined harmonic disturbances and their affect on cooperative members.
- C. Enforcing IEEE 519-2014 limitations on harmonic production.

II. CONTENT:

- A. Definition and examples of a non-linear load as applied to the cooperative's electric power system.
 - 1. Power electronic equipment is called non-linear because it draws non-sinusoidal current. A non-linear load has a discontinuous current relationship that does not correspond to the applied voltage waveform. Examples of non-linear loads that are commonly connected to the cooperative's system include but are not limited to uninterruptible power supplies, electronically operated devices with switched mode power supplies, electronic ballasts for lighting systems, variable frequency drives (both AC and DC) and adjustable speed drives.
- B. Harmonic generation and the limitations imposed by the cooperative.
 - 1. Harmonics
 - a. Harmonics are generated due to non-linear loads. They are created when non-linear loads draw current in abrupt short pulses rather than in a smooth sinusoidal manner. The cooperative supplies electricity to various harmonic-generating loads. These harmonics, when not controlled, can impose problems to other members of the cooperative. Power quality is one of the main focuses of the cooperative but it is greatly reduced when harmonics are not limited and controlled.
 - b. The limitations as described by IEEE 519-2014 are considered suitable and enforceable by the cooperative.

C. Enforcing IEEE 519-2014

1. All non-linear loads as described above are required to limit the harmonics generated as recommended by IEEE 519-2014.
2. The cooperative discourages the use of 6 and 12 pulse drives, however, should ANY electronic equipment/non-linear load on the customer side of the meter be found to be causing disturbances outside the guidelines of IEEE 519-2014, the equipment must either be upgraded or appropriate line reactors, chokes or filters (harmonic mitigating devices) must be installed to remove the problematic harmonic frequencies before they are injected back into the cooperative's system. The harmonic measurement will be made at the point of common coupling between the member and the cooperative.
3. Members of the cooperative that own harmonic generating loads that are not in compliance with IEEE 519-2014 will be removed from service until the appropriate harmonic mitigating device(s) are installed.

D. Variable Frequency Drive Requirements

1. Requirements for new variable frequency drives connected to the cooperative are as follows:

HP	½ - 14	15-49	50 and larger
Minimum # pulses	6	12	18

An option with regard to the 18 pulse drive would be to utilize a 12 pulse drive with filters designed to remove the 11th and 13th order harmonics.

2. Existing 6 pulse drives that are already in place on the cooperative's system will be required to comply with the guidelines set forth by IEEE 519-2014 with regard to the harmonics generated. If the drive is removed from service and replaced because it is damaged or no longer usable, it must be replaced with a drive as specified in the table above. There will be no exceptions.

III. RESPONSIBILITY:

Implementation of this policy is the responsibility of the General Manager.

Date Adopted: 05/27/08

Date Revised: 06/21/11, 11/22/16

Attested: 
Secretary