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January 31, 2005

COPY

James McNulty, Secretary
Pa. Public Utility Commission
P.O. Box 3265
Harrisburg PA 17105-3265

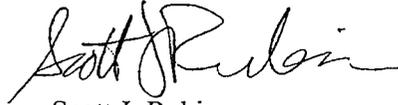
Re: Advance Notice of Proposed Rulemaking
Regarding Small Generation Interconnection
Standards and Procedures
Docket No. L-00040168

Dear Secretary McNulty:

Enclosed for filing please find the original and fifteen (15) copies of the Comments of Pennsylvania AFL-CIO Utility Caucus in the above-referenced proceeding.

If you have any questions or require additional information, please do not hesitate to contact me.

Sincerely,



Scott J. Rubin

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BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Advance Notice of Proposed :
Rulemaking Regarding Small : Docket No. L-00040168
Generation Interconnection :
Standards and Procedures :

COMMENTS OF
PENNSYLVANIA AFL-CIO UTILITY CAUCUS

On December 4, 2004, the Pennsylvania Public Utility Commission ("Commission") published an Advance Notice of Proposed Rulemaking Regarding Small Generation Interconnection Standards and Procedures. 34 Pa. B. 6426 (Dec. 4, 2004). The Pennsylvania AFL-CIO Utility Caucus ("AFL-CIO") files these Comments in response to that notice.

AFL-CIO's Comments are limited to concerns of worker and public safety associated with the installation of small generation installations. Based on experience in other jurisdictions, AFL-CIO recommends that the Commission specifically include a requirement that all installations of small, distributed generation must include facilities that make it possible to:

1. intentionally disconnect the two circuits
2. provide a visible opening whenever possible
3. allow the line worker (or person in charge at the work site) sole control of the disconnecting device, and
4. allow the line worker (or person in charge at the work site) the ability to tag and/or lockout, or otherwise render the disconnecting device inoperable, if the device is accessible to persons outside the utility's control.

AFL-CIO is concerned that if these requirements are not specifically included, the safety of utility workers and the public could be compromised.

Attached to these Comments as Attachment A is a position paper prepared by the International Brotherhood of Electrical Workers concerning Interconnection of Customer-Owned Generation to the Electric Supply Grid. That paper provides a detailed discussion of the need for the requirements set forth above, including a discussion of relevant regulations of the Occupational Safety and Health Administration and relevant provisions of the National Electrical Safety Code ("NESC"). AFL-CIO would further note that the Commission's regulations require electric utilities in Pennsylvania to comply with the NESC for transmission and distribution system installations and operations (52 Pa. Code § 57.193(a) (transmission) and 52 Pa. Code § 57.194(b) (distribution)), but there is nothing currently in the regulations that requires utility customers, or non-utility owners of distributed generation, to comply with the NESC's requirements.

WHEREFORE, AFL-CIO respectfully requests the Commission to include in any regulations the specific requirements set forth above, to help ensure the safety of utility workers and the public.

Respectfully submitted,



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Dated: January 31, 2005

The International Brotherhood of Electrical Workers

INTERCONNECTION OF CUSTOMER-OWNED GENERATION TO THE ELECTRIC SUPPLY GRID

WORKER SAFETY AND PUBLIC SAFETY ISSUES

Protection from Backfeed during Electrical Outages and Maintenance

The interconnection of the electric utility system with non-utility, customer-owned, generation sources (net-metering applications) introduces worker safety and public safety issues not unique to this application. Electric utility line-worker exposure to sources of electrical potential, ranging from 0 – 750,000 V, depending on the source, is a common everyday working situation. Line workers are protected from these sources of hazardous differences in electrical potential by one of the following means:

1) *ENERGIZED WORK*

Insulation of the worker from any known source of electrical potential by the use of rubber protective equipment, rubber-insulating gloves, insulated live-line tools (hotsticks), isolation of the worker from any grounded source (a work practice utilized in the bare-hand live-line method), or

2) *DE-ENERGIZED AND GROUNDED WORK*

The electrical circuit is tagged (or locked), tested for the presence of electrical potential, and personal protective grounds installed to protect the worker from exposure to any hazardous difference in electrical potential.

Work procedures are published in **OSHA 29 CFR 1910.269 *Electric Power Generation, Transmission, and Distribution (1994)***, and **the *National Electric Safety Code (NESC) (2002)***. A brief discussion of these two documents and the pertinent sections are included in this paper to give the reader a clear understanding of the minimum levels of protection that an employer must provide when a worker could be exposed to any hazardous difference in electrical potential.

29 CFR 1910.269 *ELECTRIC POWER GENERATION, TRANSMISSION, AND DISTRIBUTION*

OSHA issued this standard in 1994, addressing work practices to be used during the operation and maintenance of electric power generation, transmission and distribution facilities. The standard includes requirements relating to all issues with these types of working conditions, including hazardous energy control, working near energized parts, grounding for worker protection and work on underground and overhead installations.

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Compliance with the requirements in the standard is designed to prevent injuries to workers when performing work on electric power systems.

Paragraph (l) Working on or near exposed energized parts

This paragraph provides the rules that apply to work on exposed live parts, or near enough to them, to expose the worker to any hazard the live parts may present. These rules include:

- 1) Number of workers necessary to perform certain tasks
- 2) Minimum approach distances – the distance a worker must maintain from exposed live parts to protect from electrocution unless the worker is insulated from the energized part, or the energized part is insulated from the worker
- 3) Types of insulation necessary to protect the worker – rubber-insulating gloves, and in certain conditions, rubber-insulating sleeves
- 4) The position of the worker at the work-site to protect the worker from accidental contact with energized parts (or in the case of live-line bare-handing work, protect from the accidental contact with a grounded object)
- 5) Connecting de-energized and energized parts
- 6) Clothing worn by workers
- 7) Installing and removing fuses under energized conditions
- 8) Working on or near covered (uninsulated) conductors
- 9) Working around non-current carrying metal parts of equipment
- 10) The requirements of devices to open circuits under load

For the purposes of this document, the important paragraphs are numbers (1)(2) and (1)(3). Simply put, any time a worker could encroach on the minimum approach distance to an energized part as provided (1)(2), the worker must be insulated from the energized part as provided in (1)(2)(i), or the energized part must be insulate from the worker as provided in (1)(2)(ii). Paragraph (1)(2)(3) describes when rubber-insulating sleeves are required in addition to the wearing of rubber-insulating gloves.

Paragraph (m) De-energizing lines and equipment for employee protection

This paragraph applies to the de-energizing of transmission and distribution lines and equipment for the purpose of protecting workers. These rules include:

- 1) Clarification regarding generation of electric energy
- 2) Person in charge of the work and maintaining control of “means of disconnection” from energized sources
- 3) Steps to be taken to de-energize a particular line or piece of equipment, obtaining clearance to the line or equipment, the placing of protective tags on the disconnecting devices, the testing of the line or equipment to ensure

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the absence of electrical potential, the application of personal protective grounds to the line or equipment, the removal of grounds and tags at the completion of work, the release of the clearance and the re-energizing of the line or equipment.

For the purposes of this document, the important paragraphs are numbers (m)(2) and (m)(3). The following is taken directly from the standard:

(m)(2)

General

(m)(2)(i)

If a system operator is in charge of the lines or equipment and their means of disconnection, all of the requirements of paragraph (m)(3) of this section shall be observed, in the order given.

(m)(2)(ii)

If no system operator is in charge of the lines or equipment and their means of disconnection, one employee in the crew shall be designated as being in charge of the clearance. All of the requirements of paragraph (m)(3) of this section apply, in the order given, except as provided in paragraph (m)(2)(iii) of this section. The employee in charge of the clearance shall take the place of the system operator, as necessary.

(m)(2)(iii)

If only one crew will be working on the lines or equipment, and if the means of disconnection is accessible and visible to and under the sole control of the employee in charge of the clearance, paragraphs (m)(3)(i), (m)(3)(iii), (m)(3)(iv), (m)(3)(viii) and (m)(3)(xii) of this section do not apply. Additionally, tags required by the remaining provisions of paragraph (m)(3) of this section need not be used.

(m)(2)(iv)

Any disconnecting means that are accessible to persons outside the employer's control (for example, the general public) shall be rendered inoperable while they are open for the purpose of protecting employees.

(m)(3)

De-energizing lines and equipment

(m)(3)(i)

A designated employee shall make a request of the system operator to have the particular section of line or equipment de-energized. The

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designated employee becomes the employee in charge (as this term is used in paragraph (m)(3) of this section) and is responsible for the clearance.

(m)(3)(ii)

All switches, disconnectors, jumpers, taps, and other means through which known sources of electric energy may be supplied to the particular lines and equipment to be de-energized, shall be opened. Such means shall be rendered inoperable, unless its design does not so permit, and tagged to indicate that employees are at work.

(m)(3)(iii)

Automatically and remotely-controlled switches, that could cause the opened disconnecting means to close, shall also be tagged at the point of control. The automatic or remote control feature shall be rendered inoperable, unless its design does not so permit.

(m)(3)(iv)

Tags shall prohibit operation of the disconnecting means and shall indicate that employees are at work.

(m)(3)(v)

After the applicable requirements in paragraphs (m)(3)(i) through (m)(3)(iv) of this section have been followed, and the employee in charge of the work has been given a clearance by the system operator, the lines and equipment to be worked shall be tested to ensure that they are de-energized.

(m)(3)(vi)

Protective grounds shall be installed as required by paragraph (n) of this section.

(m)(3)(vii)

After the applicable requirements of paragraphs (m)(3)(i) through (m)(3)(vi) of this section have been followed, the lines and equipment involved may be worked as de-energized.

(m)(3)(viii)

If two or more independent crews will be working on the same lines or equipment, each crew shall independently comply with the requirements in paragraph (m)(3) of this section.

(m)(3)(ix)

To transfer the clearance, the employee in charge (or, if the employee in charge is forced to leave the worksite due to illness or other emergency, the

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employee's supervisor) shall inform the system operator; employees in the crew shall be informed of the transfer; and the new employee in charge shall be responsible for the clearance.

(m)(3)(x)

To release a clearance, the employee in charge shall:

(m)(3)(x)(A)

Notify employees under his or her direction that the clearance is to be released;

(m)(3)(x)(B)

Determine that all employees in the crew are clear of the lines and equipment;

(m)(3)(x)(C)

Determine that all protective grounds installed by the crew have been removed; and

(m)(3)(x)(D)

Report this information to the system operator and release the clearance.

(m)(3)(xi)

The person releasing a clearance shall be the same person that requested the clearance, unless responsibility has been transferred under paragraph (m)(3)(ix) of this section.

(m)(3)(xii)

Tags may not be removed unless the associated clearance has been released under paragraph (m)(3)(x) of this section.

(m)(3)(xiii)

Only after all protective grounds have been removed, after all crews working on the lines or equipment have released their clearances, after all employees are clear of the lines and equipment, and after all protective tags have been removed from a given point of disconnection, may action be initiated to reenergize the lines or equipment at that point of disconnection.

These rules clearly delineate the procedures that the person in charge of the work, at the jobsite, must have sole control of the means of disconnection, and the disconnecting device must be visible to the person in charge, in order for the line or equipment to be considered disconnected from the source of potential. The rules also include provisions that any means of disconnection, including automatically and remotely-controlled

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switches, shall also be tagged and rendered inoperable, which is commonly accomplished by placing the device in the opened position and the operating device locked in that opened position. This must first be accomplished prior to being ready to tag, test and apply personal protective grounds in order to work on and treat the line or equipment as de-energized. Paragraph (n) *Grounding for the protection of employees* contains provisions for the application of personal protective grounds and that the line or equipment must be de-energized under the provisions of paragraph (m) prior to installation.

NATIONAL ELECTRIC SAFETY CODE (NESC, 2002)

The NESC is a national consensus document, and is used in some fashion in every state in the country. Most states adopt the Code in its entirety by commission rule or statute. All states without direct adoption use the NESC in some fashion when the subjects covered by the Code arise.

The NESC is not a design code. It provides specifications for the construction, operation and maintenance of electric supply and communications facilities. It is a performance code and provides the requirements for building, operating and maintaining a safe system. The NESC is intended to promote the safety and protection of persons engaged in work on or near, or other activities in the vicinity of electric lines or equipment.

The following is taken directly from the NESC, 2002:

010. Purpose

The purpose of these rules is the practical safeguarding of persons during the installation, operation, or maintenance of electric supply and communication lines and associated equipment.

These rules contain the basic provisions that are considered necessary for the safety of employees and the public under the specified conditions. This code is not intended as a design specification or as an instruction manual.

011. Scope

A. These rules cover supply and communication lines, equipment, and associated work practices employed by a public or private electric supply, communications, railway, or similar utility in the exercise of its function as a utility. They cover similar systems under the control of qualified persons, such as those associated with an industrial complex or utility interactive system.

B. The NESC covers utility facilities and functions up to the service point.

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C. NESC rules cover street and area lights (supplied by underground or overhead conductors) under the exclusive control of utilities (including their authorized contractors) or other qualified persons (such as those associated with an industrial complex). *NOTE:* Luminaries not under such exclusive control are governed by the requirements of the NEC.

D. NESC® rules do not cover installations in mines, ships, railway rolling equipment, aircraft, or automotive equipment, or utilization wiring except as covered in Parts 1 and 3.

012. General Rules

- A. All electric supply and communication lines and equipment shall be designed, constructed, operated and maintained to meet the requirements of these rules.
- B. The utilities, authorized contractors, or other entities, as applicable, performing design, construction, operation, or maintenance tasks for electric supply or communication lines or equipment covered by this code shall be responsible for meeting applicable requirements.
- C. For all particulars not specified in these rules, construction and maintenance should be done in accordance with accepted good practice for the given local conditions known at the time by those responsible for the construction or maintenance of the communication or supply lines and equipment.

Part 4 - *Rules for the Operation of Electric Supply and Communications Lines and Equipment*, is the second main document containing work rules specifically applicable to work on electric power lines and equipment. Normally, OSHA adopts the provisions, in part or in its entirety, of the Code to develop similar and applicable industry standards. The majority of Part 4 of the Code was adopted by OSHA in the development of several standards including the aforementioned *29 CFR 1910.269*.

The following is taken directly from the NESC, 2002:

441. Energized Conductors or Parts

Employees shall not approach, or knowingly permit others to approach, any exposed ungrounded part normally energized except as permitted by this rule.

A. Minimum Approach Distance to Live Parts

1. General

Employees shall not approach or take any conductive object within the distances to exposed parts that operate at the voltages listed in Table 441-1 or Table 441-4 unless one of the following is met:

- a. The line or part is de-energized and grounded per Rule 444D.

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- b. The employee is insulated from the energized line or part. Electrical protective equipment insulated for the voltage involved, such as tools, gloves, rubber gloves or rubber gloves with sleeves, shall be considered effective insulation for the employee from the energized part being worked on.
- c. The energized line or part is insulated from the employee and from any other line or part at a different potential.

These provisions are very similar to the requirements in OSHA 1910.269. The worker must be insulated from the energized line or part, or the energized line or part must be insulated from the worker. Other provisions include:

442. Switching Control Procedures

E. Tagging Electric Supply Circuits Associated With Work Activities

- 1. Equipment or circuits that are to be treated as de-energized and grounded per Rule 444D shall have suitable tags attached to all points where such equipment or circuits can be energized.

443. Work on Energized Lines and Equipment

A. General Requirements

- 1. When working on energized lines and equipment, one of the following safeguards shall be applied:
 - a. Insulate employee from energized parts
 - b. Isolate or insulate the employee from ground and grounded structures, and potentials other than the one being worked on.

444. De-energizing Equipment or Lines to Protect Employees

C. Operating Switches, Disconnectors, and Tagging

The designated person shall direct the operation of all switches and disconnectors through which electric energy may be supplied to the particular section of equipment and lines to be de-energized, and shall direct that such switches and disconnectors be rendered inoperable and tagged. If switches that are controlled automatically or remotely, or both, can be rendered inoperable, they shall be tagged at the switch location. If it is impractical to render such switches and disconnectors inoperable, then these remotely controlled switches shall also be tagged at all points of control. A record shall be made when placing the tag, giving the time of disconnection, the name of the person making the disconnection, the name of the employee who requested the disconnection, and the name or title or both, of the designated person.

D. Employee's Protective Grounds

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When all the switches and disconnectors designated have been operated, rendered inoperable where practical, and tagged in accordance with Rule 444C, and the employee has been given permission to work by the designated person, the employee in charge should immediately proceed to make the employee's own protective grounds or verify that adequate grounds have been applied (see Rule 445) on the disconnected lines or equipment. During the testing for potential and/or application of grounds, distances not less than those shown in Tables 441-1 to 441-3, as applicable, shall be maintained.

Grounds shall be placed at each side of the work location and as close as practical to the work location, or a single point ground shall be placed at the work location. If work is to be performed at more than one location on a line section, the line section shall be grounded and short-circuited at one location in the line section and the conductor to be worked on shall be grounded at each work location.

The distance in Tables 441-1, 441-2, or 441-3, as applicable, shall be maintained from ungrounded conductors at the work location. Where the making of a ground is impractical, or the conditions resulting therefrom are more hazardous than working on the lines or equipment without grounding, the ground may be omitted by special permission of the designated person.

E. Proceeding With Work

1. After the equipment or lines have been de-energized and grounded per Rule 444D, the employee in charge, and those under the direction of the employee in charge, may proceed with work on the de-energized parts.

Equipment may be re-energized for testing purposes only under the supervision of the employee in charge and subject to authorization by the designated person.

2. Each additional employee in charge desiring the same equipment or lines to be de-energized and grounded per Rule 444D for the protection of that person, or the persons under direction, shall follow these procedures to secure similar protection.

The OSHA standard and the NESC clearly demonstrate the detailed requirements for the protection of electric line workers and the public from the hazards associated with electric lines and equipment constructed, operated and maintained by electric utilities.

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While it is true detailed rules for working these lines and equipment under energized conditions exist, the rules listed in this document reflect the detailed requirements for working the lines or equipment under de-energized and grounded conditions.

Work activities on lines or equipment associated with the interconnection of electric supply and customer-owned generation apparatus, such as photovoltaic (PV) systems and customer-owned fuel cells, create a situation where a hazardous difference in electrical potential may exist on lines or equipment. Although the National Electric Code (NEC) contains minimum requirements for the building wiring of these devices, other codes and standards prevail when work by electric line-workers on the supply side is concerned.

It is not feasible or possible, in every situation, to perform work on electric supply equipment interconnected with customer-owned generation equipment under energized conditions. Certain work conditions, if required to work under energized conditions, could in fact prolong outage times related to planned or unplanned situations. Even though the argument will be made that a breaker is open (associated with an inverter or transformer), this does not comply with the requirements that allow work to be performed under de-energized and grounded conditions. These requirements prevail and the utility employer is responsible for providing the level of safety established by these rules.

Following this analysis of codes and standards governing work activities on equipment associated with this subject, and the reality that certain work activities, at any given time, will be required to be performed under de-energized and grounded conditions, one must conclude that it is necessary to install a disconnecting means to:

- 1) **intentionally disconnect the two circuits**
- 2) **provide a visible opening whenever possible**
- 3) **allow the line-worker (or person in charge at the work-site) sole control of the disconnecting device**
- 4) **allow the line worker (or person in charge at the work-site) the ability to tag and or lockout, or otherwise render the disconnecting device inoperable if the device is accessible to persons outside the employer's control**

Failure to follow these conclusions will not provide the work procedures compliant with established and mandatory codes and standards, and will compromise the safety of the utility worker and the public.