

Dennis P. Jamouneau Assistant General Counsel EP1132 701 Ninth Street, NW Suite 1100, 10th Floor Washington, DC 20068

202 872-3034 202 331-6767 Fax djamouneau@pepcoholdings.com

February 23, 2015

Ms. Brinda Westbrook-Sedgwick Commission Secretary Public Service Commission of the District of Columbia 1333 H Street, N.W. 2nd Floor, West Tower Washington, DC 20005

Re: PSCMIR-2015

Dear Ms. Westbrook-Sedgwick:

Enclosed please find Potomac Electric Power Company's Response to the Public Service Commission of the District of Columbia's Order No. 17711, dated November 24, 2014 in the referenced proceeding.

Please feel free to contact me if you have any questions regarding this matter.

Sincerely,

Dennis P. Jamouneau

DPJ/mda

Enclosures

cc: All Parties of Record

On November 24, 2014, in Order No. 17711,¹ the Public Service Commission of the District of Columbia ("Commission") directed Potomac Electric Power Company ("Pepco") to provide additional detail regarding Pepco's Corrosion Abatement Program, which Pepco implemented in June 2013. The following report describes the program, per the directives in paragraph 13 of Order No. 17711, including: (1) the types of corrosion it addresses; (2) the methods of corrosion abatement deployed; (3) the metallurgy and construction of Pepco's transformer cases; (4) Pepco's compliance with applicable IEEE standards with respect to underground transformers; (5) the adaptability of IEEE Standard 57.12.29 for enhanced corrosion resistance on underground equipment, including the potential benefits and costs likely to occur with implementation of this standard; (6) the test locations and frequency of inspections; and, (7) the corrosion control training and qualifications of Pepco personnel and contractors.

Pepco's Update Regarding its Corrosion Abatement Program

Pepco's Corrosion Abatement Program uses various approaches to protect underground transformers and network protectors from harsh environments. Pepco employs the following preventive measures:

1. Pepco's Corrosion Abatement Program addresses the following types of corrosion:

Pepco typically experiences localized corrosion from metal oxidation. The corrosion takes place externally on the surfaces of equipment. The corrosion is not evenly distributed across the transformer and protector, and typically is localized to an area of the equipment. In most instances, the portion of equipment submerged under water or where the water level reaches the equipment is where corrosion typically occurs. Corrosion also occurs on equipment in manholes with no standing water, resulting from various factors, such as debris that can get into manholes (*e.g.*, wet leaves, salt used to melt snow, or the use of a water hose to wash the sidewalk). As this wet debris collects on the equipment, it causes corrosion from metal oxidation. These two types of causes contribute most to the corrosion of the equipment.

2. Pepco's Corrosion Abatement Program uses the following methods to mitigate corrosion:

Pepco, as part of its Corrosion Abatement Program, installs magnesium anodes on equipment in wet transformer vaults or vaults susceptible to debris as part of its cathodic protection program and uses the concept of galvanic corrosion to protect the equipment. Once corrosion is identified, Pepco installs the cathodic protection by placing four (4) 32 lb. magnesium anodes underneath the transformer and three (3) 3 lb. anodes at the throat of protector, and at the top of protector, as well as on top of termination cabinet. See Figures 1-3 for details.

3. Pepco's transformers have the following metallurgy and construction:

• The network protector is a heavy duty structure designed specifically for the underground utility environment. The design of the network protector housing has

¹ In the Matter of the Independent Contractor's 2014 Annual Report Reviewing Pepco's Programs Related to Manhole Inspection, Maintenance and Training, Formal Case No. PSCMIR-2014, Order No. 17711 ("Order No. 17711") at P 13 (Nov. 24, 2014).

been improved by adding stainless steel panels in areas prone to corrosion (door retainer, back and top of the protector).

- The manufacturer is required to test protective coating on all exterior surfaces of the transformers and conform them to IEEE C57.12.32 Submersible Equipment – Enclosure Integrity, latest revision.
- The protective coating consists of the tank being shot blasted, sprayed with a dry film of zinc rich epoxy primer, allowed to air dry for 16 hours, and then treated with a black epoxy topcoat.
- Pepco requires all the horizontal surfaces (including the top of the high voltage terminal chamber, the top of low voltage throat, areas of the main tank, terminal chamber, and bottom of the tank including the sub-base) to have an extra protective coating on top of the finish coat.
- The tank is fabricated from the highest quality copper bearing steel and follows the most current IEEE Standards C57.12.40.
- Transformers have I-beam or sub-base rail used for a transformer stand that are a minimum of 4" high to keep standing water away from the tank. It is not uncommon to see 6" or 8" sub-bases on smaller transformers.
- PEPCO raises the bottom of transformer radiators at least 12" above the floor to help mitigate against rust forming at the bottom tip of the radiators.
- 4. <u>Pepco complies with IEEE Standards C57.12.32 for Submersible Equipment Enclosure</u> Integrity.

Pepco follows the stringent requirements IEEE Standards C57.12.32 for Submersible Equipment – Enclosure Integrity. As the title of the standard implies, the equipment is typically located outdoors, below grade level, and is designed to withstand harsh environments such as being submerged under water.

5. <u>Pepco assessment of adaptability of IEEE Standard C57.12.29, including potential benefits</u> and costs likely to occur with implementation.

The IEEE Standard C57.12.29 recommended for adaptation in the audit report is for Padmounted Equipment – Enclosure Integrity for Coastal Environment. This standard is designed for outdoor transformers above ground level, such as pad-mounted transformers or switchgear. It typically applies to transformers such as the ubiquitous green box seen in residential or commercial areas. The environment experienced in the District of Columbia, including significant equipment exposure to runoff from the street, is better suited to the more stringent standards defined in IEEE Standard C57.12.32 for Submersible Equipment – Enclosure Integrity. Pepco does not believe that adapting the less rigorous IEEE Standard C57.12.29 -designed for above ground equipment -- for use on underground equipment would be more conducive to preventing corrosion than the already-employed IEEE Standard C57.12.32 for submersible equipment. As Pepco has identified no potential benefits from adapting IEEE Standard C57.12.29, it has not estimated the costs.

6. Test Locations and Frequency of Inspection.

Pepco established the efficacy of the Corrosion Abatement Program through a ten year pilot program. Pepco inspects the magnesium anodes during both short inspections (in which corrosion on equipment and anodes is identified for remediation) and long cycle inspections (in which equipment is de-energized for inspection and anodes can be installed on the spot). The long and short inspection routines are staggered over five years; thus, Pepco inspects each location approximately every 2.5 years to assess corrosion, as well as other conditions. Pepco also convenes quarterly meetings to discuss these issues as part of the Equipment Condition Assessment ("ECA") program. Inspection results and the condition of network equipment are addressed during ECA meetings, and action plans are developed and prioritized to address equipment that needs attention, whether from corrosion or other issues associated with underground network equipment. Additionally, on average, 40 to 45 network transformer/protector assemblies are replaced annually due to excessive corrosion and other deteriorating factors observed as part of the routine inspection programs described above.

7. Corrosion control training and qualifications of Pepco personnel and contractors.

The training and qualifications of the Pepco personnel and any contractors associated with the Corrosion Abatement program at Pepco are controlled and performed by the personnel in Pepco's transformer shop. There are approved inspection checklists used during the inspections mentioned above that quantify corrosion and the results are reviewed by the ECA to address any potential issues with the applicable equipment. As no special qualifications are required, installation training is provided on the job.

The following figures reflect the simple installation required to install the "sacrificial" magnesium anodes which provide protection from corrosion:



Figure 1: 4-32 lb. Magnesium Anodes Are Placed Under the Transformer.

Figure 2: 3 lb. Magnesium Anodes Are Placed on the Protector's Throat, Protector, and Termination Chamber.



Figure 3: Leads Are Connected to the Neutral Plate of the Transformer, Including all Four Anode Locations.



Certificate of Service

I hereby certify that a copy of Potomac Electric Power Company's Response to the Public Service Commission of the District of Columbia's Order No. 17711was served this 23rd day of February 2015, on all parties in Docket PSCMIR by electronic mail.

Ms. Brinda Westbrook-Sedgwick Commission Secretary Public Service Commission of the District of Columbia 1333 H Street, NW, 2nd Floor Washington, DC 20005 bwestbrook@psc.dc.gov

Sandra Mattavous-Frye, Esq. People's Counsel Office of the People's Counsel 1133 15th Street, NW Washington, DC 20005 smfrye@opc-dc.gov

Daniel Durbak Siemens Power Transmission & Distribution, Inc. 400 State Street PO Box 1058 Schenectady, NY 12301 daniel.durbak@siemens.com

Herbert Harris, Chairman DC Consumer Utility Board 1133 15th Street NW, Suite 500 Washington, DC 20005 dccub@msn.com Brian J. H. Lederer, Esq. International Brotherhood of Electric Workers (IBEW) Local 1900 3003 Van Ness Street, NW Suite W228 Washington, DC 20008 brian.lederer@att.net

Bernice K. McIntyre, Esq. Washington Gas Light Company 101 Constitution Avenue, NW Washington, DC 20080 bmcintyre@washgas.com

Brian Caldwell, Esq.
Office of the Attorney General for the District of Columbia
441 4th Street, NW
Suite 450 North
Washington, DC 20001
brian.caldwell@dc.gov

Richard Beverly, Esq. General Counsel Public Service Commission of the District of Columbia 1333 H Street, NW, 2nd Floor Washington, DC 20005 rbeverly@psc.dc.gov

Dennis P. Jamouneau