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Via electronic mail and via Federal Express

April 8, 2011

Re: Pepco's Response to District of Columbia Department of the Environment  
Compliance Directive of March 31, 2011, Item 1

Dear Mr. Burrell:

This letter responds to Item 1 of the Department's Compliance Directive dated March 31, 2011, requesting that Pepco submit an incident report regarding the January 23, 2011, mineral oil spill at Pepco's Potomac River Substation located at 1300K North Royal Street, Alexandria, Virginia. This report is submitted pursuant to Section 8-103.08(a) of the District of Columbia Code.

#### **DESCRIPTION OF RELEASE AND SUMMARY OF RESPONSE ACTIONS**

Shortly after midnight on Sunday, January 23, 2011, a coupling that connects a circulating pump to the exterior cooling mechanism for an electric transformer (No. 9 Transformer) failed, causing mineral oil to leak from the transformer's main oil tank. Under normal operation, mineral oil is circulated in a loop from the transformer past a series of external cooling fans and back to the transformer to help maintain proper temperature. The mineral oil used in the cooling system is not toxic, and, as explained below, does not contain PCBs. The leak triggered a low oil alarm at Pepco's Control Center in Rockville, Maryland, at 12:46 am. Pepco technicians were dispatched to the site in response to the alarm, and the first responders arrived within 10 minutes of the alarm. After determining that a coupling failure had caused the oil to leak from the transformer's main oil tank, the response crew de-energized the transformer and manually closed the cut-off valve to stop the flow of oil from the transformer.

The mineral oil that leaked from the No. 9 Transformer flowed first into the retention dike surrounding the transformer building, and then into an underground emergency containment reservoir via an underground pipe. In addition, a small amount of mineral oil flowed over the retention dike and onto the gravel lot adjacent to the transformer building. Pepco engineers understood that the capacity of the containment reservoir was sufficient to hold a complete loss of mineral oil from the transformer, and therefore did not initially anticipate a release of oil from the containment facilities. Pepco called in

a contractor -- Triumvirate -- to pump out the containment reservoir, and focused its efforts on cleaning up the mineral oil that had overflowed the transformer building retention dike. Triumvirate arrived on the site at about 10:30 am on January 23 and commenced removal of the oil from the reservoir.

At approximately 10:00 am on January 23, before Triumvirate arrived, onsite Pepco employees were advised by GenOn that there was an oil sheen on the Potomac River. This observation indicated that oil may have overflowed from the containment reservoir into a concrete storm water trench, and eventually to the Potomac River via a storm water discharge pipe.<sup>1</sup> Pepco confirmed the presence of oil in the river, reported the discharge to the various federal and state regulatory agencies, and immediately deployed booms on the river to contain and absorb the oil. Over the ensuing 24 hours, Pepco called in additional contractors to assist in oil recovery and cleanup efforts. Pepco calculates that approximately 4500 gallons of mineral oil reached the river. To date, Pepco has recovered approximately 500 gallons of oil from the river, and an additional 60,000 pounds of mineral oil absorbed materials and debris.

Pepco also engaged a contractor -- Tri-State Bird Research and Rescue -- to assess possible impacts to wildlife. Tri-State conducted wildlife surveys in the river over several days. Of the more than 1000 bird observations by Tri-State, only two birds had visible signs of oiling or exhibited oiled bird behavior. (A report from Tri-State is attached to the incident report submitted by Pepco to the Coast Guard, a copy which is enclosed with this letter.)

A detailed timeline of the response actions is set out in the table enclosed with this letter.

### **FINDINGS REGARDING CAUSE OF RELEASE**

As noted above, the mineral oil leak from the transformer was caused by a failure of a coupling that connects the circulating pump to the exterior cooling mechanism for the No. 9 Transformer. This is the first time that this coupling (or any similar couplings associated with transformers at the site) has failed in thirty years of operation. Pepco's initial analysis indicates that the coupling failure was the result of long term mechanical stress.

The release of mineral oil from the underground containment reservoir appears to have been the result of reduced capacity due to the presence of rain water in the reservoir. The reservoir measures approximately 10.5 feet by 25 feet by 12.5 feet high, and has a capacity of approximately 23,500 gallons. The rain water that falls within the containment dikes for each of the six transformers at the substation drains to the containment reservoir (in the same manner as any oil released into the containment dikes). There is a sump at one end of the reservoir equipped with a pump that is used to

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<sup>1</sup> This discharge point is Outfall 006 under an NPDES permit issued by the U.S. Environmental Protection Agency. The permit was issued to Pepco in May of 2000 and subsequently transferred to the new owner of the Potomac River generating station when Pepco sold that facility in December of 2000. Pepco remains authorized to discharge storm water through Outfall 006 pursuant to a contractual arrangement with the current owner of the generating station -- GenOn. A copy of the permit is enclosed with this letter. The permit was scheduled to expire in 2005. According to GenOn, a timely application for renewal of the permit was filed but a new permit has not yet been issued. The May 2000 permit therefore remains in effect.

remove accumulated rain water. The pump discharges through the overflow pipe to the concrete storm water trench and then to Outfall 006. The pump is manually activated so that the effluent can be observed to ensure that water pumped from the reservoir does not contain oil. The reservoir also is equipped with a high water alarm triggered by a float mechanism. The alarm registers both at a control room at the substation, and at Pepco's Control Center (which is staffed on a 24-hour basis). At the time of the leak, the float was set to trigger the high water alarm when the level in the reservoir reached approximately six feet from the bottom of the reservoir.

The main oil tank for the No. 9 Transformer holds 21,500 gallons of mineral oil. Pepco recovered 4500 gallons of mineral oil from the transformer, indicating that a total of approximately 17,000 gallons leaked from the transformer. Pepco recovered 12,500 gallons of mineral oil from the underground reservoir, indicating that approximately 4500 gallons of mineral oil passed through the reservoir's overflow pipe to the storm water trench and eventually to the river. Based on the reservoir's 23,500 gallon capacity and the recovery of 12,500 gallons of mineral oil from the reservoir, Pepco calculates that there was approximately 11,000 gallons of water in the reservoir at the time of the spill.

Prior to the date of the spill, Pepco's maintenance procedures called for the substation to be inspected on a weekly basis. During each inspection, Pepco maintenance personnel would remove the manhole cover for the underground reservoir and visually check the water level. If the water level was observed to be high (generally, within approximately one to two feet of the float for the high water alarm), the sump pump would be operated manually to lower the water level. A certain amount of water must be left in the reservoir to ensure that there is a buffer between the pump and any mineral oil that may collect in the reservoir (e.g., mineral oil that may spill onto the ground and reached the reservoir). Under these procedures, the maintenance personnel used their judgment to determine how much to lower the water level. In addition to the weekly inspections, maintenance personnel would be dispatched to pump down the water level whenever the high water alarm was triggered.

Prior to the spill, the maintenance personnel did not make a written record to document when they pumped water from the reservoir.<sup>2</sup> However, based on interviews with maintenance personnel, Pepco has confirmed that the last inspection prior to the spill was performed on Sunday, January 16, 2011, at which time the water level was pumped down according to normal procedure.

According to precipitation records for Reagan National Airport, there was just under 0.5 inches of rain between the January 16 maintenance event and the spill on January 23. It appears that through the combination of water remaining in the reservoir upon completion of the maintenance and the intervening rainfall, there were approximately 11,000 gallons of water in the reservoir at the time of the spill. Notably, this is just below the level at which the high water alarm would have been triggered. As a result, the reservoir's effective capacity at the time of the spill was only 12,500 gallons. The release of 17,000 gallons from the transformer therefore resulted in the overflow from

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<sup>2</sup> As a result, there are no historical "pumping records" to provide as requested in the Compliance Directive. However, as described below, Pepco has since established a log at the Potomac River substation in which maintenance personnel are now required to record the results of each inspection and pumping event. Copies of the logbook entries to date are enclosed.

the reservoir and eventual discharge to the river of approximately 4500 gallons of mineral oil.

### **ENGINEERING EVALUATIONS OF SECONDARY CONTAINMENT RESERVOIR AND TRANSFORMER COOLER PIPE**

Pepco hired an independent engineering company to perform a structural inspection of the secondary containment reservoir. The scope of the inspection included measuring the dimensions of the reservoir, and mapping cracks, distresses, and other points of possible infiltration or leakage into soil and groundwater. The engineering company's investigation concluded that the structural integrity and permeability of the reservoir was not a contributing factor to the discharge of oil.

Pepco identified the failure of a press fitted flange located between the cooler pump and transformer tank. The flange was replaced and retrofitted. Pepco has identified other transformers at the Potomac River Substation with a similar configuration and retrofits are being scheduled to avoid possible failure similar to that which occurred at No. 9 Transformer.

### **ENGINEERING SOLUTIONS & OPERATIONAL CHANGES**

As part of the company's incident response actions, Pepco has modified its maintenance procedures for the underground reservoir at the Potomac River Substation. As part of each inspection, maintenance personnel are now required to use a dip stick to measure the water level in the reservoir, and if necessary, to pump the water level down to 20 inches above the floor of the reservoir (sufficient to maintain a minimum water level to isolate the pump intake from any oil that may enter the reservoir). In addition, the float for the high water alarm has been lowered to trigger the alarm when the water level exceeds 20 inches. Maintenance personnel are also now required to record each inspection and pumping event in a log book maintained at the control room.

In addition to implementing the foregoing changes to the maintenance procedures, Pepco evaluated the installation of the following four engineering options to prevent the possibility of incident recurrence at the Potomac River Substation:

- *Stancor Oil-Minder Control System (SE50 Pump with Float & Oil-Minder)* – This system is a combination pump and oil sensor which allows water to be automatically pumped from sumps without ejecting oily substances into rivers, waterways, etc.
- *GE Oil Sensor (Leakwise)* – This is an oil sensor with a guard to provide controls to the existing pump. This device is similar to other devices which in Pepco's experience may have led to false alarms and high maintenance costs.
- *Petro-Pipe (Petro)* – Pipe plugs up via a chemical reaction to stop oil flow.
- *Oil Stop Valve (AFL Industries)* – This device produces a chemical reaction to stop oil flow; however, joint is large in size and must be kept wet at all times.

After careful evaluation and consideration of all aforementioned options, Pepco has decided to install a combination of the *Stancor Oil-Minder Control System* and *Petro-Pipe*. Pepco believes that the combination of an automatic sump pump with a built-in oil sensor and the *Petro Pipe* system will provide adequate protection to prevent any future

oil spills from entering the river. In addition, the existing transformer low-oil alarm will remain tied into the control systems to provide further protection against recurrence. The anticipated timeframe for installing these additional engineering controls at the Potomac River Substation is June 2011 with an estimated installation cost of \$50,000.

Pepco also will be conducting a comprehensive review of the Potomac River Substation SPCC plan.

#### **No. 9 TRANSFORMER MAINTENANCE HISTORY**

Pepco has an established maintenance program for No. 9 transformer that meets industry practice. Routinely, the transformer's mechanical and electrical systems are inspected and tested. Mineral oil samples are tested for signs of coking, burning, and sediments, indications of which may expedite the need for a more thorough inspection of the transformer. Enclosed are records that summarize the maintenance history for No. 9 Transformer from 2007 to 2011. Also enclosed is a report of the electric integrity tests (known as Doble tests) for No. 9 Transformer that was conducted on 2/21/2007, as reflected on the maintenance history. Due to a change in equipment maintenance software program, records dating back to 2006 are not readily available. We will provide these records if they are located.

#### **PCB USE HISTORY AT NO. 9 TRANSFORMER**

The substation was constructed in the late 1970s and the electrical equipment, including No. 9 Transformer, was installed in 1979. The manufacturer's nameplate data for No. 9 Transformer indicates that this equipment was filled with mineral oil at the time of manufacture, but does not indicate whether the oil contained PCBs. The production of PCBs was banned in July of 1979, and Pepco believes that the oil-filled electrical equipment at this Potomac River facility, including transformers, oil circuit breakers, and reactors, have always contained non-PCB mineral oil. Pepco is continuing to review its records for information indicating whether or not PCBs may have been used in connection with No. 9 transformer, and we will supplement this response as appropriate.

#### **CERTIFICATION**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

Sincerely,



Shirley H. Harmon  
Manager, Environmental Compliance & Performance Assessment  
Pepco Holdings, Inc.

Attachment 1 Chronology of events  
Attachment 2 NPDES Permit for Potomac River Station  
Attachment 3 No. 9 Transformer Maintenance History Summary and Doble Test Report  
Attachment 4 Pumping log for secondary containment reservoir 2/11/2011 to 4/5/2011  
Attachment 5 PHI letter to USCG CDR Randall Brown (plus enclosures)  
Attachment 6 PHI letter to EPA III Regional Administrator  
Attachment 7 Pepco Potomac River SPCC Plan

cc: Jacob Zangrilli, DDOE Water Quality Division