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May 31, 2017

Via Electronic Filing

Rosemary Chiavetta, Secretary
Pennsylvania Public Utility Commission
P.O. Box 3265
Harrisburg, PA 17105-3265

Re: Alderwoods PA, Incorporated t/a Burton L. Hirsch Funeral Home v.
Duquesne Light Company
Docket No.: C-2016-2522634

Dear Secretary Chiavetta:

Enclosed please find Respondent Duquesne Light Company's expert report for filing in the above matter. Thank you for your kind attention to this matter.

Sincerely,

Jeremy V. Farrell
Attorney for Duquesne Light Company

Enclosure

cc: ALJ Conrad Johnson (with enclosure - via fax)
Alan J. Charkey, Esq. (with enclosure - via email)
Krysia M. Kubiak, Esq.(with enclosure - via email)
Bradley S. Tupi, Esq. (with enclosure - via email)
Anthony Kanagy, Esq. (with enclosure - via email)

LIT:623949-1 014657-139188

John L. Shaner

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May 31, 2017

Bradley S. Tupi, Esq.
Erin Beckner Conlin, Esq.
Jeremy V. Farrell, Esq.

Tucker Arensberg, P.C.
1500 One PPG Place
Pittsburgh, Pa. 15222

Re: Hirsch Funeral Home

Dear Counsel:

On January 19, 2016, Mr. Tupi contacted me via e-mail and asked me to discuss a pending case involving Duquesne Light Company. We then had a telephone discussion and an in-person meeting to discuss the Alderwoods v. Duquesne Light Company case. I agreed to serve as a subject matter expert on behalf of Duquesne Light Company.

My assignment was to review the information pertaining to this case (reports, depositions, recordings, photos, etc.), conduct any additional research and determine, in my opinion, if Duquesne Light Company employees knew or should have known that there was likely to be damage to the Funeral Home's interior electrical equipment prior to restoration of power on January 10, 2009, and whether the relevant actions of Duquesne Light employees were reasonable and followed industry accepted practices.

Sincerely,

John L. Shaner

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Report Contents

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I. Facts Summary

A. Incident Description

On January 9, 2009, at approximately 10:15 pm at 5600 Forward Avenue, Pittsburgh, Pennsylvania, police responded to a utility pole damaged by a motor vehicle collision.[1] The pole was broken and leaning towards Forward Avenue.

The broken pole carried three phase 4kV (4160v phase to phase) primary conductors on the cross arm, three wire secondary 120/240v conductors that dead-ended on the pole, and a 120/208v power bank with three wire service for Hirsch Funeral Home. The single phase service for Hirsch Funeral Home came from an aerial secondary service tap, mid-span, not far from this pole.

The damage to the pole caused the 4kV breaker on Circuit 4329, out of Forward Avenue Substation, to trip and reclose three times automatically (instantaneous, 15, and 75 seconds) and then to lockout. This resulted in an outage to a total of 758 customer accounts.

B. Assessing Damage and Isolating Incident

The following is a brief description of the actions taken by Duquesne Light to repair the broken pole and restore power to its customers. Additional information is provided in Section IV.

On January 9, 2009, at 9:12 pm, the 4kV breaker on Circuit 4329 locked out at Forward Avenue Substation. Duquesne Light's troubleshooter was dispatched to assess the incident. The troubleshooter reported the damage back to Duquesne Light Operations Center and prepared to isolate the area where the facilities were damaged to make the scene safe.

To restore power to some of the affected customers, Duquesne Light lifted the primary jumpers at Pole No. 4902 and then closed a tie switch at Pole No. 151172, which restored power to the majority of the 758 customer accounts affected by the breaker lockout. Duquesne Light then opened the switch at Pole No. 51674 and closed the circuit breaker on Circuit 4329, which prepared the distribution system, when repairs were completed, to reenergize the remaining customers who were still out of power.

At 5:24 am on January 10, 2009, once the repairs were completed, Duquesne Light closed the switch at Pole No. 51674, which energized the primary while service work to the Funeral Home proceeded. This restored power to all customers except the Funeral Home. Power was restored to all these customers without incident.

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[1] The light pole is Duquesne Light Pole No. 51673.

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For Duquesne Light to restore service to the Funeral Home, Pole No. 51673 had to be replaced. This included the power bank and some of the pole hardware. The primary wires were removed from the broken pole and reattached to the new pole. The transformers on Pole No. 51673 were replaced since there were signs of oil leaking. The secondary wires between the poles that fed the single phase service to the Funeral Home were reused, but the single phase service to the Funeral Home was converted from a three wire service to a new triplex service. Duquesne Light then re-energized the single phase service.

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II. Listing of Material Reviewed

In developing my opinions, I reviewed the following materials:

1. PUC Complaint
2. EFI Global Engineer's Report
3. Duquesne Light Answer to PUC Complaint
4. Depositions
    a. Timothy Shields
    b. James Runatz
    c. Joseph Frankhauser
    d. Brandon Boehm
    e. Dave James
    f. Robert Pierce
    g. Donald Lewis
    h. Rick Sipe
    i. Brian Novak
5. Pictures
    a. James Warren photos
    b. EFI photos
    c. Pete Johnson photos
    d. Mark White photos
    e. HIR photos
    f. Detective John Gilkey/Investigator James Bayster photos
6. Fire and Police Reports
7. Media Articles
8. Schematics and prints
    a. Circuit Print (4329)
    b. Three Phase Transformer Installation (D200)
9. Voice Recordings
    a. Call from DLC to Hirsch answering service
    b. Calls between Control Room and Field personnel
    c. Allegheny County 911 and Fire dispatch recordings
10. Forms/Logs/Reports
    a. Duquesne Light Company Report of Accidents and Unusual Occurrences (G23-2712)
    b. Duquesne Light Company Report of Property Damage to DLC Facilities (D17-6012)
    c. Duquesne Light Company Supervisors Log
    d. Duquesne Light Company Trouble Ticket
    e. Duquesne Light Company Work Management Timecard
    f. Duquesne Light Company Circuit Outage Report
    g. Duquesne Light Company Summary of Control Room Events Incident 40015
    h. City of Pittsburgh Bureau of Police Offense/Incident Report
    i. City of Pittsburgh Bureau of Police Investigative Report
    j. City of Pittsburgh Bureau of Police Supplemental Report
    k. City of Pittsburgh Fire Investigation Unit Preliminary Fire Investigation Report

l. Department of Public Safety Fire/Arson Investigations
m. Fire Incident History Detail

11. Weather Information (hourly) for January 10, 2009

There were also calls and meetings with Duquesne Light employees to gather information about Duquesne Light's infrastructure, line personnel training, training transcripts, and 4kV Circuit 4329.

My additional research included Google Maps Incident Location Views (2008 and 2015), site visit, IEEE NESC (National Electric Code) C2-2012, Duquesne Light Company Electrical Installation Guidelines, Edison Electric Institute (EEI) Mutual Assistance process, numerous utilities' websites regarding the restoration process (Duquesne Light, First Energy, PPL, Duke Energy, EEI, etc.), Pennsylvania Utility Commission Proposed Rulemaking Docket No. L-2015-2500632, and Pennsylvania Utility Commission Electric Reliability Standards.

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III. Statement of Opinions

Based on my review of the case materials and my research as described in the preceding section, it is my opinion to a reasonable degree of certainty that the facts presented on the night of the incident did not provide Duquesne Light Company with either knowledge or reason to believe that there was likely to be damage to the Funeral Home's internal electrical equipment before restoring power on January 10, 2009. Therefore the Duquesne Light personnel had no reason to warn or inspect the Funeral Home before restoring power.

Furthermore, it is my opinion to a reasonable degree of certainty that Duquesne Light's response to the broken pole outside the Funeral Home and the associated power outage was reasonable, responsible, and in accordance with industry-accepted best practices.

IV. Discussion

A. Duquesne Light did not know and had no reason to believe that there was likely to be damage to the Funeral Home's electrical equipment before restoring power.

On January 9, 2009, a motor vehicle collided with Pole No. 51673 at 5600 Forward Avenue, Pittsburgh, Pennsylvania, which caused damage to Duquesne Light facilities. The deposition testimony of Duquesne Light crew members was consistent that the pole did not fall completely to the ground, but was held up by the wires connected to it.[2] Based on my training and experience, the condition of the broken pole when Duquesne Light arrived at the scene would not have suggested that there was likely to be damage to customer equipment.[3] In fact, in my 20 years as a Lineperson and Transmission and Distribution Supervisor/Shift Supervisor dispatching personnel on trouble calls and taking customers calls, I have never experienced a situation where customer equipment has been damaged by a broken pole. In other words, the fact that Pole No. 51673 was broken and out of position would not generate any safety concerns pertaining to the Funeral Home's internal equipment.

The motor vehicle collision caused Circuit 4329 to lockout at Duquesne Light Forward Avenue Substation and caused 758 customer accounts to lose power. The number of customers out of power would not have suggested to Duquesne Light that there was likely to be damage to customer equipment (including the Funeral Home). In my experience, electric utilities routinely experience outages affecting hundreds or thousands of customer accounts without any damage to customer equipment. Furthermore, before the Funeral Home's single phase service was energized, Duquesne Light restored power to 757 customer accounts on Circuit 4329 without incident (and without warning). There is no record that any of the customers affiliated with those 757 customer accounts reported any power surge or property damage as a result of this power outage. The fact that power was restored to all of these customers without any problems or damage to customer equipment before the Funeral Home was restored would reasonably reinforce the mindset of Duquesne Light's personnel that restoring service to the Funeral Home posed no danger.

Furthermore, the fact that Circuit 4329 locked out would not suggest to Duquesne Light line personnel that there would likely be damage to customer equipment, particularly where the customers that were restored prior to the Funeral Home did not experience any equipment damage. A circuit lockout does not imply any customer safety concerns since the circuit is designed to trip due to a fault on the primary electric facilities. In other words, a lockout only indicates a fault on the *utility's* equipment and not on the *customer's* equipment.[4] In fact, it is so commonly accepted within the electric utility industry that a circuit trip does not threaten customer equipment that Duquesne Light, like many other electric utilities, uses an

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[2] Poles are often broken by motor vehicles and many times the result is that the top of the pole is suspended by the wires that are connected to it.

[3] It is important to differentiate between customer equipment and customer appliances. Customer equipment distributes the electric power throughout their facility after the point of demarcation, whereas customer appliances are the items that consume electricity (*i.e.* furnace, refrigerator, computers, etc.).

[4] Customer equipment is supposed to be protected by customer owned breakers, fuses and surge protectors, etc.

automatic reclosing scheme that is designed[5] to restore power automatically shortly after an interruption. In my experience, the majority of circuit operations are restored through automatic reclosing (which is obviously done without warning to the customer). The industry-accepted practice of utilizing automatic reclosing demonstrates that the design of these distribution circuits presumes that power can be restored safely after circuit trips without notifying customers.[6] During my years in the electric utility sector, I have experienced many thousands of circuit trips and/or lockouts that were restored successfully through a variety of means, such as automatic reclosing, manual restoration from a remote location, and manual restoration after repairs and sectionalizing. None of these occurrences resulted in customer equipment damage or required notification to customers prior to service restoration. So, the fact that Circuit 4329 locked out would not have indicated to Duquesne Light personnel that there was likely to be damage to the Funeral Home's equipment.

While the motor vehicle collision knocked Duquesne Light lines out of their normal position that does not mean that the wires were broken, on the ground, or in contact with one another. The Duquesne Light line personnel who actually made the repairs to the pole and other Duquesne Light facilities on the day of the fire uniformly stated that the primary lines were neither broken nor intermixed, but were instead intact and holding up the pole.[7] Even if the wires were low or down, that would not be an indicator to Duquesne Light personnel that there is likely to be damage to the customer equipment.[8] From my experience on job sites, dispatching personnel to incidents, and training electric utility emergency responders, I have never encountered a situation where wires being low, down on the ground, or broken indicated customer equipment damage.

When assessing Pole No. 51673, there was no indication to the Duquesne Light crew that the Funeral Home's equipment was damaged. Duquesne Light crews noted no visual damage to the weatherhead or to the Funeral Home's external equipment that suggested that the Funeral Home's internal equipment was damaged.[9] There was no indication of damage to the customer's entrance cable/conduit and it was not pulled away from the building. There was no burning odor/smell coming from customer's weatherhead or external equipment. Similarly, there was no visible

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5 Duquesne Light, as do all electric utilities, uses the industry accepted IEEE Standard C37.104 in designing distribution reclosing as guidance. IEEE Standard C37.104 documents standard practices regarding the application of automatic reclosing control to transmission and distribution line circuit breakers.

6 This reduces the impact of the incident to the customer, which is important because electricity is considered a critical service.

7 Don Lewis stated in his deposition that wires were broken and required splicing but, as explained more fully below, while Mr. Wunderley relies on Don Lewis's testimony in his report as support for his position that wires were down and intermixed, it is important that Mr. Lewis was not on the scene all night and not directly involved with the repairs. Reference Mr. Lewis Deposition page 35, lines 22 to 25 and page 36, lines 4 to 8. Therefore, Mr. Lewis's testimony on these matters is not as reliable as that of the crew members who actually performed the repairs. Moreover, the splice that Mr. Wunderley referenced in his report was not located at the broken pole and was a full span away. Plus, the crew leader, Tim Shields, who would have been responsible for supervising and/or ordering the splicing to be completed, testified that no broken primary wires required splicing. Reference Tim Shields deposition page 13, lines 1 to 5 and page 14, lines 2 to 19.

8 When a three phase primary pole is damaged by a motor vehicle, there is a high probability that the primary wires would not break but instead support the pole and be lower to the ground than usual. This is what occurred on the night of the motor vehicle accident involved in this case. The primary wire size on Pole No. 51673 was 336 Aluminum, which is certainly strong enough to hold the pole. Other facilities connected to the pole that contributed to holding the pole off the ground were telephone and cable wires.

9 One of the three house knobs was pulled out of the Funeral Home, but, based on my experience, this common situation is not an indication of customer equipment damage.

evidence of damage to Duquesne Light facilities that would indicate that there would likely be damage to the Funeral Home's equipment. For example, there was no burning wire odor/smell on Duquesne Light distribution facilities, including primary wires, secondary wires, and service drops. In light of all of these factors, the crew's assessment did not indicate a need to inspect any further than the external facilities at or around the Funeral Home. From my experience, as discussed in section IV(c), the actions taken by the Duquesne Light personnel that assessed the motor vehicle collision damage were and continue to be an industry accepted practice. In summary, the Duquesne Light personnel did not see anything during the assessment and repair process that indicated that there was damage to the customer's equipment, justified an inspection into additional equipment, or suggested any need to contact the customer.

There is also no evidence that the primary wires and secondary wires made contact with one another while they were energized. There was no testimony or report from Duquesne Light's crew, first responders, or witnesses indicating that they saw the primary phase wire(s) contact or become intermixed with the secondary wire(s) while energized on the night in question.[10] There was no evidence of burn marks on the wires, no wires welded together, no burns to the service wire insulation, and no odors of burned wire at the site. Duquesne Light crew members who actually performed the repairs testified that the primary and secondary wires were not intermixed when they arrived at the scene. More importantly, even assuming that primary and secondary wires had made contact with one another, this would not suggest to a reasonable crew member that there was likely to be damage to the customers' internal equipment. Primary and secondary wires contacting each other is a common occurrence in electric utility business.[11] In my 35-plus years working in the electric utility industry, which includes making repairs and dispatching thousands of trouble calls, I have never encountered a situation where primary-to-secondary contact damaged customer equipment.

Furthermore, Duquesne Light personnel had no reason to inspect the Company's meter (which was located inside the Funeral Home's locked basement) before restoring power. In my experience, the industry-accepted response when multiple customers are affected by a trouble incident (like a pole being broken by a motor vehicle collision) does not include inspecting each customer's meter because meters are not impacted by these types of events. (Meter inspections are usually reserved for customer complaints involving high bills, meter noise, and dim lights.) There was nothing on the night of the fire that required Duquesne Light to deviate from the standard response. In fact, there is no evidence that the meter had anything to do with the fire or that there was a problem with the meters at the Funeral Home. Mr. Wunderley did not tie the meters to the fire or explain why he believed that Duquesne Light needed to inspect the meters in the first place. Even if Duquesne Light personnel inspected the meters, this would not have revealed any customer equipment damage in the Funeral Home panel boxes (which, according to Mr. Wunderley's photos, were closed at the time). In summary, there was no need,

[10] There is no practical difference between wires making contact or becoming intermixed, so those terms are used interchangeably throughout this report.

[11] Some examples of causes of primary and secondary wire contact are trees shorting out lines, trees falling into lines, motor vehicle accidents, ice storms, wet snow, and high winds.

based on the facts known to Duquesne Light personnel, to inspect the meters prior to restoring power to the Funeral Home and, even if the meters were inspected, this would not have revealed any damage on the inside of the customer's panel box.

Requiring the crew to inspect or warn about customer equipment (*i.e.* panel boxes and internal wiring) does not conform with their job training. Duquesne Light crews are not qualified to inspect internal electrical wiring or circuitry because they are not NEC certified electricians. When discussing equipment used to distribute and use electricity it is important to understand who is responsible for what and what codes apply to what facilities. Duquesne Light's distribution facilities, up to the line of demarcation, fall under the National Electric Safety Code (NESC) and Duquesne Light personnel are trained in the NESC.[12] On the other hand, customer facilities, which include everything from the demarcation point into their facility including the meter base, must comply with a different code -- the National Electric Code (NEC). Customer equipment is inspected by a certified electrician, typically when a new building is constructed, service is changed/upgraded, and/or upon customer request. Duquesne Light personnel are not trained in the NEC or certified to inspect customer equipment; therefore, it is unreasonable to require or expect electric utility crews to inspect or warn about customer's equipment prior to energizing after an outage. That equipment belongs to the customer (not Duquesne Light) and Duquesne Light personnel are not qualified to inspect it. Requiring these crew members to be responsible for inspecting and verifying (or warning about) customer equipment would be an enormous change in their job responsibilities. Furthermore, requiring inspection and verification of customer equipment prior to restoration would significantly hinder the utility's ability to restore power in a reasonable amount of time and would also negatively impact customer expectations, priority customers, and life support customers.

There was also no indication at the time Duquesne Light connected the single phase[13] service drop to the Funeral Home that there was any damage to customer equipment. If there in fact was a fault in the customer equipment caused by Duquesne Light primary and secondary wires making contact, then the crews would have seen a large flash and/or heard a loud pop when they connected the service drop. Such a flash or pop would have been unmistakable to the crew. There is no evidence that either occurred.[14] It is also undisputed that Duquesne Light connected the service drop correctly. Once the connections were completed at the weatherhead, then Duquesne Light personnel connected the service drop to the secondary wires in accordance with industry practice. In summary, the Duquesne Light line personnel followed the correct procedure when connecting the service drop at the customer's weatherhead and to Duquesne Light's secondary wires. By all accounts this was a typical job and did not give Duquesne Light crews any indication that the customer had damaged equipment.

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[12] For more information about the line of demarcation, reference Duquesne Light's Tariff, Electrical Installation Guidelines, and website - https://www.duquesnelight.com/additional-services/facility-management/customer-responsibilities

[13] There were two services to the Funeral Home, a three phase and single phase. The three phase service was never re-energized after the motor vehicle accident.

[14] There is a difference between the large flash described above and sparking/spitting at load pick-up, which Brian Novak witnessed on the morning in question. The latter is common and expected in these types of jobs and not at all an indication of customer equipment damage. Reference Novak deposition on page 70, lines 14 to 24 and page 71, lines 6 and 12.

Finally, imposing a duty on the electric utility companies to warn customers prior to restoring power under the circumstances of this case would be unreasonable. Broken poles, like the one involved on the night in question, are common occurrences. There is no known correlation in the industry between incidents that damage utility equipment (such as weather, lightning, wind, snow/ice, accidents, animals, trees, etc.) and customer equipment damage. There are times when customer equipment has been impacted, for example by flooding, fire, major structural damage, and/or damage to the customer's external facilities, where the electric utility personnel will warn the customer to have their equipment repaired and/or inspected by a certified electrician/inspector because there is an obvious risk to customer equipment in those cases. Broken poles pose no such risk. Nothing Duquesne Light crews knew or should have known pertaining to the broken pole on the night in question indicated there was likely to be customer equipment damage.

Additionally, requiring Duquesne Light Company and other utilities to warn their customers before restoring power under the common circumstances presented in this case raises a host of practical problems that would negatively impact the critical service that electric utilities provide to their customers. Perhaps the biggest problem associated with warning customers is the delay in restoring power. This delay would cause loss of customer property and potential health risks. Such delay would also result in many customers being deprived of service under circumstances where it is not necessary. The broken pole incident that affected the Funeral Home on January 9, 2009, impacted a total of 758 customer accounts. Power was restored to 757 customer accounts without warning the customers prior to restoring service. All of those customers were restored without incident. Warning customers prior to energizing would obviously delay the restoration, which is contrary to the Pennsylvania Utility Public Commission mandate to restore power to the customers as safely and quickly as possible.

Imposing a duty on electric utilities to warn customers before restoring power would raise a host of questions, such as: Should utilities treat all outage incidents related to broken poles as a potential risk to customer equipment? If the practice was to warn customers prior to re-energizing, what would happen if the customer is not home? What if the customer wants their equipment to be inspected, does the power stay off until it is inspected? Who conducts the inspection? Who pays for the inspection? If the customer insists that service be re-energized without inspection, would there need to be a waiver signed to protect the electric company? Imposing a duty to warn would also affect the use of the automatic reclosing scheme that accounts for 30 percent[15] of equipment operations being restored without any in-person response by Duquesne Light. Must these automatic reclosing devices be removed? Should line patrols be required prior to customer power being restored?[16] All of these would negatively impact customer expectations, and the impact would be most harshly felt by priority customers (*i.e.* hospitals, fire, police, water, etc.).

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[15] The 30 percent statistic comes from Duquesne Light's website. https://www.duquesnelight.com/outages/restoring-power/causes-of-power-outages

[16] Duquesne Light averages more than 900 poles damaged by motor vehicle accidents a year. In 2009, the number of outage incidents associated with damage poles was 165. The total number of incidents for Duquesne light, including broken poles, in 2009 were 2,373.

B. Duquesne Light's response to the outage and broken pole was reasonable, safe, and in compliance with industry standards.

The actions that Duquesne Light Company took to respond to the power outage affecting the Funeral Home were at all times reasonable and in accordance with industry standards and best practices.[17]

On the night of January 9, 2009, Duquesne Light Company responded to an outage incident that affected the Funeral Home and many other customers. The cause of the incident would later be confirmed to be a motor vehicle collision. When the initial fault occurred, the breaker operated via automatic reclosing and then locked out (stayed open), which resulted in an interruption to 758 customer accounts.

For Duquesne Light, as many other utilities, there are two ways the Company is alerted of customer interruptions. The first is Duquesne Light Company Distribution Operation SCADA (Supervisory Control and Data Acquisition), which would indicate an abnormal status from Forward Avenue Substation. The second is customer calls. Through these two sources of information, Duquesne Light Operations Center dispatcher was able to recognize that 4 kV breaker on Circuit 4329 was open and 758 customer accounts were interrupted.

The Duquesne Light Operations Center dispatcher, following normal response process, dispatched Joseph Frankhauser Senior Operator (troubleshooter) to the scene to do an initial assessment. Since the 4kV breaker was open, Mr. Frankhauser went to Forward Avenue Substation where the breaker was located. This was the standard response since the breaker lockout indicated that the trouble was somewhere between the substation and the first line interrupting device (*i.e.* line fuse, line recloser, etc.).

While Mr. Frankhauser was en route to the substation, additional information was received from police that there was a broken pole at 5600 Forward Avenue, Pittsburgh, Pennsylvania. After receiving this information, the Duquesne Light Operations Center Dispatcher contacted Mr. Frankhauser to notify him of the broken pole. The location of the broken pole was within eye sight of Forward Avenue Substation. In addition, the Duquesne Light Operations Center dispatcher notified the backshift line personnel Crew Leader Timothy Shields at Penn Hills Service Center to stand by (total of six additional line personnel) and prepare to respond to the broken pole. The dispatcher also notified Don Lewis, Line Construction Supervisor.

Mr. Frankhauser was the first Duquesne Light person to arrive at the broken pole and confirmed the status of the pole with the Duquesne Light Operations Center dispatcher. At this point, Mr. Frankhauser and the Duquesne Light Operations

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[17] Duquesne Light has participated in working with Pennsylvania utilities, Regional Mutual Assistance Groups, and Edison Electric Institute in developing and sharing best practices.

Center dispatcher worked to determine the best locations on Circuit 4329 to isolate the broken pole (so that the power could be restored to as many customers as possible on the circuit) and make the incident location safe. While this was underway, Mr. Lewis, Timothy Shields, and his crew partner Brian Novak arrived in individual vehicles. Mr. Shields and Mr. Novak assessed the incident and then called the remaining personnel at Penn Hills Service Center to start loading material that they needed to fix the broken pole (*i.e.* pole, transformers, etc.). Then they assisted in opening equipment on Circuit 4329 to isolate the broken pole and make the incident location safe. The top priority of restoration for an electric utility when an outage occurs is the safety of the public as well as those who will be working on the lines.

Once the broken pole was isolated, Circuit 4329 was restored to all customer accounts except three buildings, which included the Funeral Home. The remaining Duquesne Light crew brought the necessary materials and assisted in the repairs.

The crews on site started the repairs with a job safety briefing to make sure everyone understood the clearances, work zone, steps of the repairs to be made, and assignments. While there were multiple activities occurring at the same time, the order of restoration was first to complete the damage assessment, remove the damaged facilities, clean up any spills, replace the pole, reinstall the primary wires and neutral, secondary, three phase power bank, reattach repair or upgrade services, reenergize primary, reenergize secondary, and then make service connections. Once the secondary conductors were put back on the pole, they were reenergized from the single phase transformer two spans away so that the other two buildings would be restored before the Funeral Home connections were completed. As discussed in the preceding section, at no point during assessment or the repairs was there any indication that there was likely to be damage to the customer equipment inside the Funeral Home.

Once the service triplex was connected at the Funeral Home weatherhead, the single phase service was connected in the mid span of the secondary (which had already been energized). The service was connected following normal practice of the neutral first and then the single phase 120 volt phase wires. When connecting the first of the two 120 volt service wires, there was some spitting, which is normally expected since the customer's appliances inside would start up, such as the furnace, lighting, hot water tank, etc.

During the repairs the three single wires for the single phase service were replaced with a new triplex service (which is a neutral with the two phase wires wrapped around it). This is a common practice for utilities that serves several purposes -- it removes old wire that has a bigger footprint or exposure than the triplex, reduces the number of house knobs on the customer building, and has a cleaner visual appearance.

Once the fire occurred at the Funeral Home the Duquesne Light personnel took quick decisive actions to disconnect the single phase service 120 volt phase wires and call 911.

In summary, the steps taken by Duquesne Light Company personnel, from the initial outage calls, SCADA indications, dispatching, initial troubleshooter response, assessing, isolating the damaged pole, restoring customers, making repairs, reenergizing, and even disconnecting the single phase service -- are practices that electric utility personnel typically follow. As previously stated, the actions that Duquesne Light Company took to respond to the power outage affecting the Funeral Home were at all times reasonable and in accordance with industry standards and best practices.[18]

C. Response to EFI Global Engineer's Report.

This section responds to, and outlines the deficiencies in, the report prepared by Richard Wunderley of EFI Global Engineering. Mr. Wunderley's first error in this case was his argument that Duquesne Light made the wrong connections on the single phase service to the Funeral Home, which he later had to admit was wrong. What is most noticeable about this error was it came *after* a site inspection, which would have revealed visual proof that the connections were made correctly.[19]

Mr. Wunderley's current hypothesis is that the primary wire contacted the three wire single phase service to the Funeral Home and sent a surge into the Funeral Home's electrical equipment. Importantly, there was no proof presented in Mr. Wunderley's report, the depositions, or police/fire investigation reports that the primary actually contacted the Funeral Home service or any other wire.

Mr. Wunderley's report stated that Duquesne Light personnel were aware of the *potential* for the primary wires to come in contact with the secondary wires due to the extensive damage to the pole. As stated above, there was no evidence that the primary wires and secondary wires actually made contact with one another while they were energized nor did Duquesne Light's crew have any reason to believe that the wires had contacted each other. There was no testimony or reports from Duquesne Light's crew, first responders, or witnesses indicating that they saw the primary phase wire(s) contact or became intermixed with the secondary wire(s) while energized on the night in question. There was no evidence of burn marks on wires, no wires welded together, no burns to the service wire insulation, and no odors of burnt wire at the site. Duquesne Light crew members who performed the repairs testified that the primary and secondary wires were not intermixed when

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[18] Incident response practice is so similar between companies that when utilities assist each other during storms, no special training is needed.

[19] Mr. Wunderley also failed to address and eliminate other potential causes of the fire. For example, the NFPA (National Fire Protection Association) recognizes building electrical distribution (customer internal distribution system) and lighting equipment as leading causes of fires. Source: U.S. Structure Fires in Stores and Other Mercantile Properties, Richard Campbell, NFPA Fire Analysis and Research, Quincy, MA, December 2015, available on line at http://www.nfpa.org/news-and-research/fire-statistics-and-reports/fire-statistics

they arrived at the scene.[20] More importantly, even assuming that primary and secondary wires made contact with one another, this would not suggest to a reasonable crew member that there was damage to the customers' internal equipment. Primary and secondary wire contact is a common occurrence in electric utility business and is not considered to be a danger to customer equipment.[21]

Another flaw in Mr. Wunderley's report is that he relies on an incomplete portrayal of the Duquesne Light employees' depositions. A total of nine Duquesne Light personnel gave depositions. Of the nine, six were at the broken pole location from the start of repairs to when the single phase service to the Funeral Home was energized. Mr. Wunderley referenced statements from only four Duquesne Light personnel depositions, two of whom were not on site for the entirety of the repairs (Donald Lewis and Joseph Frankhauser). Mr. Wunderley did not cite the deposition of the Duquesne Light employee who was in charge of the repairs on the night of the fire, Timothy Shields, Senior Hot Stick Lineman ("Working Foreman").

The first deposition that Mr. Wunderley cited was that of Mr. Frankhauser, who was Duquesne Light's troubleshooter and first to arrive on the scene. Mr. Frankhauser's job was to assess the situation, make the area safe, and determine the resources needed to make repairs. Mr. Wunderley cited Mr. Frankhauser's statement that there were broken wires at the site, but neglected to include Frankhauser's testimony that the broken wires were the service wires that went to a nearby billboard and not those to the Funeral Home.[22] Mr. Frankhauser also stated in his deposition he did not recall seeing any *primary conductors* on the ground or signs of arcing or shorting, which Mr. Wunderley did not reference in his report.[23]

The next deposition that Mr. Wunderley's report referenced was that of Donald Lewis. That night Mr. Lewis was at the job site on and off as other job responsibilities pulled him away.[24] Don Lewis assigned the job to Mr. Shields, who became the person in charge of the repairs. Mr. Wunderley cited Mr. Lewis's deposition where Lewis stated that he believed there was one, or maybe two, phases down at the site.[25] Apparently Mr. Wunderley believes this testimony demonstrates that the wires were intermixed. However, Mr. Wunderley ignores the difference between "down" wires and "broken" wires and also ignores that there were three other depositions from Duquesne Light personnel who were on the scene all night, including the on-site crew leader Mr. Shields, that indicated no primary wire was down.[26] Mr. Wunderley also referenced Mr. Lewis's statement that the primary wire needed to be spliced, but again ignored the testimony of the troubleshooter and the repairmen on site all night who would have actually been the ones who would have spliced the wire. Mr. Shields, the person in charge of the repairs, said no

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[20] Reference Shields deposition page 13, lines 1 to 5, Frankhauser deposition page 15, lines 11 to 23, and Boehm deposition page 14, lines 4 to 19.

[21] Some examples of causes are tree conditions shorting out lines, trees falling into a line, motor vehicle accidents, ice storms, wet snow, and high winds.

[22] Reference Frankhauser deposition page 30, lines 4 to 13. The wires to the billboard can be seen in Wunderley Report picture 30.

[23] Reference Frankhauser deposition page 30, lines 14 to 25 and page 31, line 1.

[24] Reference Lewis deposition page 36, lines 4 and 5.

[25] Reference Lewis deposition page 25, lines 10 and 11.

[26] Reference Frankhauser deposition page 30, lines 4 to 13. The Shields deposition indicated no primary wires severed on page 13, lines 1 to 5 and page 14, lines 2 to 19, and Boehm deposition on page 19, line 8 to 14 did not remember any severed wires or in deposition on page 21, lines 13 to 18 did not see any splices.

primary wires were broken or required splicing in connection with these repairs.[27] Furthermore, the splice pictured in Mr. Wunderley's report, photos No. 31 and 32, that Mr. Wunderley cited to support his position that the wires needed to be spliced, was a *full span away* from the pole in question. Finally, Mr. Wunderley relied heavily on Donald Lewis's hindsight speculation regarding possible causes of the fire, but ignored the lack of evidence supporting that speculation.[28]

The final Duquesne Light deposition referenced in Mr. Wunderley's report was that of Brian Novak, who connected/energized the single phase service to the Funeral Home on the morning of the fire. Mr. Wunderley relied on Mr. Novak's statement that one of the two hot legs sparked when he made the connection.[29] Not only does Wunderley fail to explain why this fact is relevant to his analysis, but he also ignores that Mr. Novak later stated that the spark/spit he described was common when connecting a service.[30]

Another error in Mr. Wunderley's report is his assumption that the hole inside the Funeral Home's panel box would have been obvious if someone from Duquesne Light had inspected the meter. First, as noted above, there was no reason or need for Duquesne Light to inspect the Funeral Home meter (or the meters associated with the 757 other customer accounts affected by the outage). Second, inspecting the meter would not have indicated any damage to the Funeral Home's panel box. As indicated in various photos,[31] the damage to the panel cover would not have been visible with the panel door closed. Even if the Duquesne Light personnel would have inspected the meter, they would not have found anything wrong since the door to panel No.1 was closed. Additionally, there would have been no reason for them to open the panel doors because that equipment belonged to the Funeral Home and Duquesne Light personnel are not qualified or certified to inspect the equipment anyway.

Mr. Wunderley supported his position that Duquesne Light should have checked its meter by referencing the "Access to Customer Premises" section in Duquesne Light's Service Installation Rules. However, that section only provides Duquesne Light with the right to access its own equipment. It does not grant Duquesne Light the right to roam through nearby customer equipment.

Mr. Wunderley's report also failed to take into account the line of demarcation (service point) that defines customer versus the electric utility responsibility. The service point is the jurisdictional line of demarcation between two nationally recognized codes: The National Electric Safety Code (NESC), which applies to the electric company's equipment, and the National Electrical Code (NEC), which applies

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27 Shields said no primary wires were broken in his deposition page 13, lines 1 to 5.

28 Mr. Wunderley made a similar error with respect to Robert Pierce's deposition. Specifically, Wunderley referenced the following portion of Mr. Pierce's deposition: "I heard that when the pole got hit. That the primary contacted the neutral wire of the funeral home, which may have done damage in the building." Reference Wunderley's Engineer Report page 4. But Mr. Wunderley ignores that Pierce stated his speculation was based on comments from Dave James (who was not at the scene on the night of the fire), who in turn received his information from Don Lewis (which was addressed above). Reference James deposition page 13, line 1 to 10.

29 Reference Novak deposition page 67, lines 14 to 24.

30 Reference Novak deposition page 68, lines 6 to 12.

31 Reference EFI Global Report photos No. 9 10, 12, 14, and 26.

to customer's equipment.[32] Beyond the service point the customer owns and assumes the responsibility for the maintenance and security of the internal wiring and other facilities. Mr. Wunderley incorrectly uses the location of the meter in an attempt to confuse or combine the Funeral Home's and Duquesne Light's responsibilities.

Mr. Wunderley's report is based on the premise that highly trained Duquesne Light line personnel with many years of experience did not do their jobs because Duquesne Light failed to inspect the Funeral Home's electrical system and Duquesne Light's meter.[33] That is absolutely not true. Duquesne Light inspected their facilities external to the Funeral Home and looked for any external damage at customer's weatherhead. No damage or evidence of damage was found during that inspection. There was no need to inspect Duquesne Light's meter.

Electric utilities consider the safety of life and property as the uppermost priority. Duquesne Light, as part of the electric industry, has that same commitment and follows industry recognized practices regarding safety and followed industrial practices on the night of the fire.[34] Contrary to Mr. Wunderley's report, Duquesne Light's actions in repairing the broken pole complied with industry standards and there is simply nothing that they encountered that indicated or should have indicated to them that there was likely to be damage to the Funeral Home's equipment.

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[32] The NEC, which governs electricians and building contractors and not public utilities, provides standards for the safe installation of electrical wiring inside the premises (*i.e.*, the premises wiring system owned by the customer).

[33] Reference EFI Global Report page 8, number 3.

[34] https://www.duquesnelight.com/safety

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V. Conclusion

After reviewing all the facts and case material, it is my opinion to a reasonable degree of certainty that the facts on the night of the incident did not provide Duquesne Light Company personnel with either knowledge or reason to believe that a dangerous condition existed in the customer's electrical equipment before power was restored. Therefore they had no basis to inspect the customer's equipment or issue a warning to the customer before restoring power. Duquesne Light Company personnel responded to the broken pole and outage in a reasonable manner consistent with industry standards and best practices. In summary, I would like to reiterate the following important points.

1. The Duquesne Light Company pole damage was due to a motor vehicle as documented in the police report, and not due to Duquesne Light equipment failure.

2. The associated outage affected 758 customer accounts, including the Funeral Home. All of the customer accounts were restored without incident prior to the Funeral Home.

3. The facts associated with this incident did not give the Duquesne Light personnel any indication that there was likely to be damage to the Funeral Home's internal electrical equipment.

4. Outages occur daily in the electric sector and there is no known correlation between the circumstances surrounding this broken pole and customer equipment damage.

5. There was no reason or need for Duquesne Light to inspect its meter prior to restoring power to the Funeral Home.

6. Duquesne Light had no reason or responsibility to inspect any customer's facilities before restoring power.

7. There was no reason for Duquesne Light to warn the Funeral Home before restoring power.

8. All known facts and documentation indicated that Duquesne Light responded, assessed, repaired, and restored service in a reasonable, safe, and industry standard manner.

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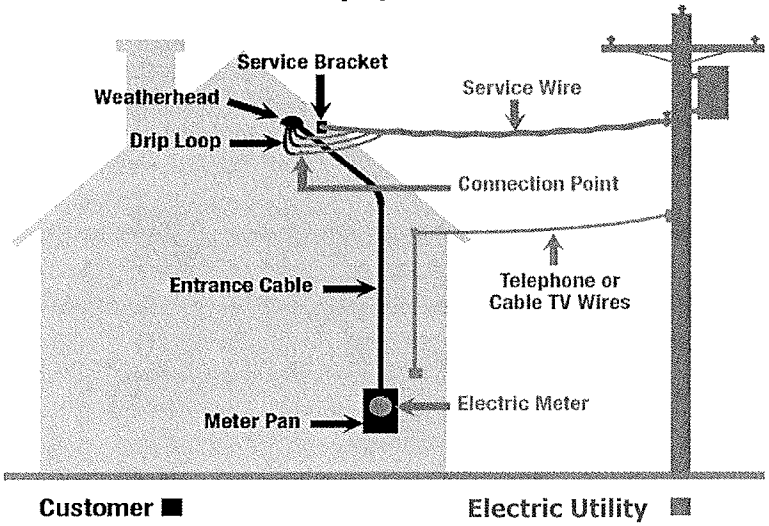
VI. References

a. Line of Demarcation

The line of demarcation between equipment belonging to the utility and customer is clearly defined in the National Electrical Code,[35] National Electric Safety Code,[36] Pennsylvania Code (52 Pa. Code 57.1), Duquesne Light's Electric Service Tariff,[37] and Duquesne Light's Electric Service Installation Rules.

The line of demarcation is depicted in the graphic below.

Customer Equipment and Electric Utility Equipment



35 NAFA NEC 70: National Electrical Code, 2017 Edition. Chapter 1 General, Informational Note: The service point can be described as the point of demarcation between where the serving utility ends and the premises wiring begins. The serving utility generally specifies the location of the service point based on the conditions of service.

36 National Electrical Safety Code (C2-2012), Section 1, 011. Scope.

37 Duquesne Light's Tariff Installation of Service, No. 6. Page 13.

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In the National Electrical Safety Code (C2-2012), Section 1, 011, the following graphic is used to demonstrate the demarcation of the NESC/NEC Codes at the Service Point:

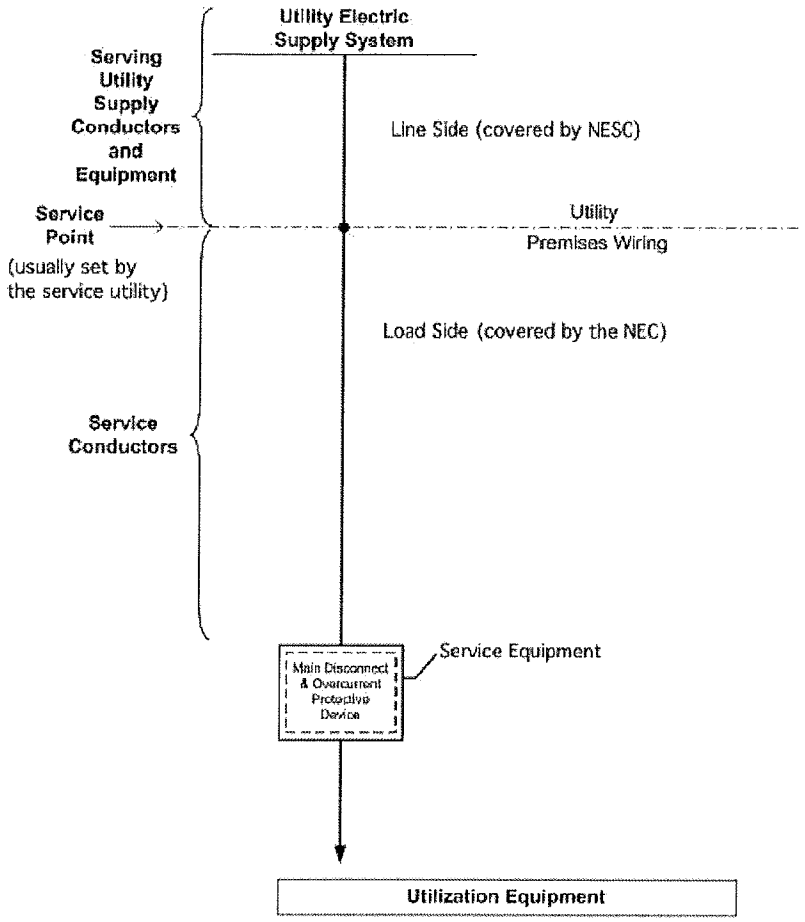

Figure 011-1—Service point—General illustration of what is covered and not covered by the NESC

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b. Line Personnel Qualifications

On the night of January 9, 2009, Duquesne Light's crew consisted of seven experienced line personnel, two of whom were crew leaders. In addition there was a line construction supervisor who visited the job site and two remote support personnel.

Name	Title	Years of Experience
Joseph G. Frankhauser	Senior Operator	12
Timothy K. Shields	Senior Hot Stick Lineman	29
Brian M. Novak	Journey Line Worker	6
Brandon Boehm	Journey Line Worker	6
Dave Wilker	Senior Hot Stick Lineman	20
Robert Pierce	Journey Line Worker	10
Rick Sipe	Journey Line Worker	6
Donald Lewis	Line Construction Supervisor	28
James Runatz	Major Account Manager	4.5
Dave James	Service Center Coordinator	28

c. Pennsylvania Electric Reliability Standards

Reference was made to the Pennsylvania Reliability Standards throughout this report. Those standards are codified at 52 Pa. Code §§ 57.191-57.197. These standards measure the reliable performance of the electric system being delivered to customers. They measure the frequency, duration, and magnitude of adverse effects on the electric supply by considering two basic and functional aspects of the electric system -- adequacy and security. These measurements focus on day to day operations and small storm events and utilize the following indices:

1. *CAIDI—Customer Average Interruption Duration Index:* The average interruption duration of sustained interruptions for those customers who experience interruptions during the analysis period.
2. *MAIFI—Momentary Average Interruption Frequency Index:* The average frequency of momentary interruptions per customer occurring during the analysis period.
3. *SAIDI—System Average Interruption Duration Index:* The average duration of sustained customer interruptions per customer occurring during the analysis period.
4. *SAIFI—System Average Interruption Frequency Index:* The average frequency of sustained interruptions per customer occurring during the analysis period.