PUBLIC VERSION

BEFORE THE

PUBLIC SERVICE COMMISSION OF MARYLAND

	*	
IN THE MATTER OF THE APPLICATION OF BALTIMORE GAS AND ELECTRIC COMPANY FOR ADJUSTMENTS TO ITS ELECTRIC BASE RATES	*	CASE NO. 9888
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DIRECT TESTIMONY

OF

DENNIS STEPHENS OF THE WIRED GROUP

ON BEHALF OF THE MARYLAND OFFICE OF PEOPLE'S COUNSEL

September 22, 2026

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DIRECT TESTIMONY OF DENNIS STEPHENS

I. INTRODUCTIONS, PURPOSE, AND PREVIEW

Q. Please state your name and business address.

A. My name is Dennis Stephens, and my business address is 1153 Bergen Parkway, Suite 130, Evergreen, CO 80439.

Q. Please state your occupation.

A. I am an independent distribution utility business advisor, and I often serve as the Wired Group's Senior Technical Consultant.

Q. On whose behalf are you testifying?

A. I am testifying on behalf of the Maryland Office of People's Counsel.

Q. What is the purpose of this testimony?

A. This testimony presents the results of my examination of the prudence of capital projects Baltimore Gas and Electric Company ("BGE" or "Company") placed into service since the final reconciliation of BGE's first MRP in Case No. 9645, conducted in 2024. It is intended to complement the Direct Testimony of OPC Witness Paul J. Alvarez, my Wired Group colleague, who provides background and perspective on BGE's instant Application, and additional information on BGE's City conduit rebuild program. Mr. Alvarez and I worked together to

develop both sets of testimony, and our respective testimonies are thus best considered together.

Q. Please provide an overview of your professional background and education.

A. After an honorable discharge from the US Air Force, and after graduating from the University of Missouri with a bachelor's degree in electrical engineering, I began work for Xcel Energy (then Public Service Company of Colorado) as an electrical engineer in distribution operations. In a series of electrical engineering and management roles of increasing responsibility, I gained experience in distribution planning, operations, asset management, and the use of innovative information and operational technologies to assist with these functions. Positions I held with Xcel Energy included Director, Electric and Gas Operations for the City and County of Denver Colorado; Director, Asset Strategy; and Director, Innovation and Smart Grid Investments for all of Xcel Energy.

In 2007, I was asked to lead parts of Xcel Energy's SmartGridCity™ demonstration project in Boulder, Colorado, the first of its kind at the time, covering 46,000 customers. I developed the technical foundations for the project, including the development of all concepts presented to the Xcel Energy Executive Committee for project approval, and including the negotiations with technology vendors on their contributions to the project. As Director of Utility Innovations for Xcel Energy, I also worked with many software providers, including ABB, IBM,

and Siemens, helping them develop their distribution automation ideas into practical software applications of value to grid owner/operators. I retired from Xcel Energy in 2011, and now work as a consultant for the Wired Group on a part-time basis.

I was directly responsible for distribution grid reliability in several of these roles, and indirectly responsible for grid reliability in all other roles. This is highly relevant in proceedings, such as this one, in which a utility claims reliability as justification for large grid investments. For a good portion of my career at Public Service Company of Colorado, capital spending was constrained. My experience maintaining strong distribution grid reliability in the face of growing distributed energy resources and strict capital constraints is highly relevant to this testimony.

Q. Have you testified before the Maryland Commission previously?

A. Yes. I have testified with my Wired Group colleague Mr. Alvarez on behalf of the Office of People's Counsel ("OPC") in multiple proceedings concerning Baltimore Gas and Electric Company's ("BGE") and Pepco's first and second multi-year rate plans (Case Nos. 9645 and 9692 for BGE and 9655 and 9702 for Pepco). I also testified with Mr. Alvarez in the year three annual reconciliation of Pepco's first multi-year rate plan (Case Nos. 9655 and 9702). Further, Mr. Alvarez and I helped develop comments on OPC's behalf in other proceedings,

including one concerning distribution planning,[1] and one concerning COMAR regulation updates.[2]

In addition, I have testified before eleven other state utility regulatory commissions (California, Georgia, Illinois, Indiana, Massachusetts, Michigan, North Carolina, Oklahoma, Washington, Utah, and Virginia) on distribution grid planning, investment, asset management, and performance measurement issues. I have also served as a technical consultant to parties providing commentary in many other state utility regulatory proceedings. My Curriculum Vitae, attached as Appendix A to this testimony, includes all appearances in the last ten years, with jurisdictions, proceeding numbers, and dates.

Q. Please provide a preview of your testimony.

A. This testimony provides support for my recommendations that the Commission disallow recovery of the cost of eight projects and programs BGE has placed into service since the Company's last annual spending reconciliation. I understand the Commission last reviewed the prudence of BGE plant additions through December 31, 2023 in the Company's last annual spending reconciliation (year three of the Company's first multi-year rate plan, or "MRP"). Upon my review of the capital equipment placed into service since December 31, 2023, I recommend the

[1] OPC, *Comments Regarding the NARUC-NASEAO Task Force's Recommended Distribution Planning* Process, ML# 234139, (PC 44, Mar. 11, 2021).
[2] OPC, *Comments on Staff's Recommended Modifications to COMAR 20.50 and 20.85*, ML# 300882, (RM 79, Jan. 13, 2023).

Commission disallow recovery on $60.2 million in capital costs, as summarized in Table 1 below. BGE has not met its burden of proving the prudence of the project and program plant additions listed.

Program/Projects	Project Identifier	Recommended Disallowance ($ in Millions)
Oil-filled Circuit Breaker Replacement Program	67883	$9.6
4kV Circuit Conversion Program		
Monument Street	55782	$5.9
West Hamilton	54928	$5.8
Calverton Road	65143	$3.4
Clifton Park 4824	65211	$5.9
Clifton Park 4826 & 4828	65213	$5.2
Substation Transformer Oil Containment Pit Upgrades	61349	$8.9
Planned Primary Cable Replacement Program	61132	$15.5
TOTAL		$60.2

In addition, this testimony addresses the benefit-cost analysis ("BCA") BGE completed on its program to rebuild conduit owned by the City of Baltimore ("City"). I challenge the notion that rebuilding conduit is a cost-effective way to improve service reliability for BGE customers in the City, find faults with BCA assumptions, and conclude that the Commission should not rely on BGE's conduit rebuild BCA. OPC Witness Alvarez addresses the prudence of BGE's decision to rebuild conduit the Company does not own more fully in his direct testimony.

II. OIL-FILLED CIRCUIT BREAKER REPLACEMENT PROGRAM

Q. Please preview this section of testimony.

A. BGE maintains a program to prospectively replace all the oil-filled circuit breakers ("OCB") in its substations over time. This section of testimony will summarize the program, BGE's justifications, and spending. I will challenge BGE's justifications for the program and describe a risk-informed benefit cost analysis I completed which indicates that replacing OCBs does not deliver reliability benefits of sufficient value to exceed costs. I will conclude by recommending the Commission disallow the full $9.6 million in costs for this program.

Q. Please summarize BGE's OCB replacement program.

A. BGE maintains an ongoing program to prospectively replace all OCBs in its substations over time. BGE states it is replacing OCBs because they "are costly to maintain, could cause oil leaks and damage to the environment, or fail due to age, which could impact safety or reliability. Parts for these aging oil circuit breakers are also becoming obsolete and harder to acquire."[3] BGE has spent $9.557 million replacing OCBs since the Commission last reviewed the Company's spending for prudence.

[3] BGE, *Direct Testimony of John C. Frain*, ML# 331766 (Case No. 9888, July 2, 2026), JCF-7 Electric Distribution Plant Additions, Cell F96 ("Frain Direct").

Q. Are OCBs costly to maintain?

A. BGE reports that the average annual cost to maintain a vacuum circuit breaker is $322.00, while the average annual cost to maintain an oil-filled circuit breaker is $889.00. This annual savings differential is clearly inadequate justification for a program that replaces OCBs at an average cost of $233,000 each.[4]

Q. Can OCBs leak oil and damage the environment?

A. Yes, they can, but in my experience oil leaks of a significant size are extremely rare. I know of just a single BGE OCB that has leaked a reportable amount of oil since 2018, and it was only 60 gallons.[5] Given that BGE operates 502 OCBs, the risk that any one of them would experience a reportable oil spill is just 2.5 in 10,000 annually.[6] Such a small risk is not worth replacing OCBs.

Q. Can OCBs fail due to age?

A. Strictly speaking, age does not cause circuit breakers to fail. Individual OCB components may fail for a variety of reasons, and these failures increase with age, but in my experience, the annual likelihood that an OCB will fail is very low. In the last ten years, BGE reports that 58 OCBs have failed in service (though only

[4] Exhibit DS-1 (BGE Response to OPC DR 4-27, Attachment 2, Column G).
[5] Exhibit DS-3 (BGE Response to OPC DR 12-30(a)).
[6] Eight operating years x 502 OCBs = 4,016 years; 1 leak event divided by 4,016 years is 0.000249.

42 of these resulted in a service interruption for customers).[7] Given the 502 OCBs in operation, this works out to an annual likelihood of failure of just 1.15%.[8]

Q. Are parts for aging OCBs becoming harder to acquire?

A. Yes, in my experience it is harder to acquire parts for older equipment generally. But I do not equate increasing difficulty with impossibility. In my experience, utilities are very good at sourcing parts, including for older equipment. I am unable to recall any instances in my career in which a utility was unable to secure a part for an OCB of any age.

Q. Can you please explain how you completed a risk-informed benefit cost analysis for circuit breaker replacements that provided these results?

A. The equation below describes how to calculate the benefit of a risk reduction (in this case, the reduction in risk that a circuit breaker will fail) in dollars:[9]

Annual Value of Risk Reduction (in $)	=	Annual Adverse Event probability %	✖	Reduction in probability % as a result of investment	✖	Consequence of the Adverse Event (in $)

As mentioned above, BGE's observed annual in-service failure rate for OCBs is just 1.15%. I conservatively assumed that replacing OCBs with new

[7] Exhibit DS-1 (BGE Response to OPC DR 4-27, Attachment 1, tab "Failure data").
[8] Ten operating years x 502 OCBs = 5,020 operating years; 58 failures divided by 5,020 years is 0.01155.
[9] Ca. Pub. Util. Comm'n, Decision 22-12-027 (Rulemaking R.20-07-013, Dec. 15, 2022), Appendix A, page A-13, item 13.

vacuum circuit breakers completely (100%) eliminates the risk of failure for a full 30-years. As to consequences, I employed data on service interruption cost per customer, by customer type, employed by the U.S. Department of Energy's Interruption Cost Estimator tool,[10] multiplied by the average customers interrupted (1,622) and average customer minutes of interruption (67) BGE reported for OCB failures over the last 10 years.[11] Assuming BGE's customer mix (90% residential and 10% non-residential), this gave me an average consequence cost per OCB failure of $556,894. The annual value of replacing OCBs with new vacuum circuit breakers is therefore just $6,434 (1.15% failure risk x 100% risk reduction x $556,894 consequence cost).

I then converted this annual benefit value into present benefit value over 30 years, inflating benefits 2.5% per year and using BGE's weighted average cost of capital (6.3%) as a discount rate. The present value of $6,434 in annual risk reduction value over 30 years under these assumptions is $112,507. As the average cost to replace an OCB is $233,000, the benefit-to-cost ratio of OCB replacement is negative, at just $0.48 per $1.00 in spending.

[10] Larsen, PH et al., *ICE Calculator 2 – Final Report for Phase 1 and 2 of the National Initiative to Update the Interruption Cost Estimate (ICE Calculator)*, Lawrence Berkeley National Laboratory and Resource Innovations, Inc. (Feb. 2026). ES Table 3, page xiv.
[11] Exhibit DS-1 (BGE Response to OPC DR 4-27, Attachment 1, tab "Failure Data").

Q. Is this the right approach to calculate the risk-informed benefits and costs of any substation equipment replacement program?

A. Yes, and furthermore, it is the right approach to calculating the benefits from any project or program a utility claims will improve reliability. Properly completed, risk-informed benefit cost analyses are completely data-driven, and represent the most objective foundation for decision-making available.

Q. Why do you characterize OCB replacements as prospective?

A. In my experience, all utilities of which I am aware periodically test critical substation equipment, including power transformers, switches, circuit breakers, relays, and others. These tests are highly reliable at identifying approaching equipment failure in advance, based on decades of industry use. For instance, oil-filled equipment such as OCBs are subjected to a combination of diagnostic and functional tests, including oil quality/dielectric testing, contact resistance, timing/travel testing, insulation testing, mechanical inspection, and examination of the interrupting contacts. By monitoring these changes over time, approaching failure can be identified. If the device fails to respond as designed within manufacturer specifications, the device is scheduled for prompt repair or replacement. In summary, if a piece of substation equipment passes its diagnostic and/or functional tests, it is operating safely and reliably and should remain in service. Replacing substation equipment that passes its diagnostic and functional

test thus constitutes prospective replacement. BGE does not cite failure to pass diagnostic or functional tests as justification for any OCB replacement projects.

Q. What are your recommendations regarding BGE's OCB program?

A. Given BGE's unquantified and speculative justifications for the program, and given the data driven, risk-informed benefit cost analysis I completed showing the program's benefit-cost ratio to be negative, I recommend the Commission disallow the entire $9.6 million cost of this program from customer recovery.

III. 4.8kV CIRCUIT CONVERSION PROGRAM

Q. Please preview this section of testimony.

A. BGE maintains a program to prospectively convert 4kV circuits to 13kV circuits over time, using reliability improvement as justification. This section of testimony will summarize the program, BGE justifications, and spending. I will challenge BGE's justifications for the program, and present data indicating that 4kV circuit reliability is better than 13kV circuit reliability, not worse. I will conclude by recommending the Commission disallow the full $26.2 million cost of five circuit conversion projects BGE placed into service since the Commission last examined the prudence of BGE spending.

Q. Please summarize BGE's 4kV circuit conversion program.

A. BGE operates distribution circuits at two voltages, 4kV and 13kV. Since 13kV circuits offer roughly three times the capacity of 4kV circuits, when 4kV circuits near capacity, one of the most effective ways to increase their capacity is to

convert them to 13kV circuits. In this manner, as 4kV circuits have been converted to 13kV circuits to accommodate load growth over time, 4kV circuits have comprised a smaller and smaller proportion of utilities' total circuits over time. Here, BGE did not use load growth or equipment capacity limitations as justification for any of its 4kV conversion projects.

BGE's 4kV circuit conversion program seeks to accelerate conversions faster than growing loads (and associated needs to increase 4kV circuit capacity) would indicate. BGE justifies this program through improved reliability, stating that circuit conversion addresses aging equipment issues, increases grid configuration options, and takes advantage of the automated grid configuration capabilities available on BGE's 13kV circuits.[12] Since the Commission last reviewed the prudence of BGE spending, five circuit conversion projects were placed into service at a capital cost of $26.2 million.[13]

Q. Are the reliability of BGE's 4kV circuits inferior to that of 13kVcircuits?

A. No. In fact, from 2018 to 2025, the reliability of BGE's 4kV circuits was significantly better than BGEs 13kV circuits, whether excluding or including major event days, as indicated in Tables 2 and 3 below.[14] This casts significant

[12] Frain Direct, JCF-7 Electric Distribution Plant Additions, cells F69 to F71 and F81 to F83.
[13] *Id.* at Cells D69 to D71 and D81 to D83.
[14] Exhibit DS-2 (BGE Response to OPC DR 13-36, CONFIDENTIAL CEII Attachment 1, tab "Data Sheet").

doubt on BGE's assertion that converting circuits from 4kV to 13kV is likely to improve reliability.

Table 1: Historical 4kV and 13kV circuit reliability performance excluding major event days

	System Avg. Interruption Duration Index	System Avg. Interruption Frequency Index	Customer Avg. Interruption Duration Index
4kV circuits	229.7 minutes	1.09 interruptions	210.7 minutes
13kV circuits	299.8 minutes	1.06 interruptions	282.8 minutes

Table 2: Historical 4kV and 13kV circuit reliability performance including major event days

	System Avg. Interruption Duration Index	System Avg. Interruption Frequency Index	Customer Avg. Interruption Duration Index
4kV circuits	349.5 minutes	1.28 interruptions	273.0 minutes
13kV circuits	405.4 minutes	1.26 interruptions	321.7 minutes

Q. Given these observations, what are your conclusions and recommendations?

A. Given that BGE's own data indicates 4kV reliability has historically been better than 13kV reliability, I conclude that converting circuits from 4kV to 13kV is not a cost-effective means to improve reliability. I recommend the Commission instruct BGE that anything other than bona fide load growth forecasts indicating near-term 4kV equipment overloads is not an acceptable justification for 4kV circuit (or substation) conversions to 13kV. Further, as BGE has not demonstrated that its 4kV conversions are likely to deliver benefits in excess of costs, I

recommend the Commission disallow recovery of $26.2 million in capital spending for all five conversion projects placed into service since the Commission last reviewed BGE spending for prudence.

IV. SUBSTATION TRANSFORMER OIL CONTAINMENT PIT UPGRADES

Q. Please preview this section of testimony.

A. BGE is requesting recovery of $8.9 million in costs to upgrade transformer oil containment pits in seven substations. I will describe this program, challenge the support BGE provides for it, and recommend the Commission disallow cost recovery in full.

Q. What is a transformer oil containment pit?

A. Transformers are filled with oil to provide electrical insulation and cooling. A smaller substation transformer can contain a few thousand gallons of oil, while larger substation transformers can contain ten times that much. As with the oil-filled circuit breakers described earlier, transformer failures where all the oil drains out of them are exceedingly rare. However unlikely, containment pits are designed into substations to prevent the oil from leaking into the environment in the event of that type of transformer failure.

Q. What justification does BGE provide for the seven oil containment pit upgrade projects?

A. For all seven projects, BGE cites compliance with EPA regulation 40 C.F.R. § 112.7(c).

Q. Does EPA regulation 40 C.F.R. § 112.7(c) require BGE to upgrade these seven pits?

A. No. This EPA regulation only requires that containment pits be designed to hold oil in place until any spill can be appropriately cleaned up. It does not require BGE to upgrade these seven pits. BGE appears to have chosen to upgrade these seven pits voluntarily.

Q. Why did BGE spend $8.9 million upgrading these seven pits voluntarily?

A. I do not know. In discovery, I asked BGE to provide the analyses it completed to demonstrate that the pit upgrade projects it completed were the least-cost alternative to ensure the pits would satisfy EPA regulation 40 C.F.R. § 112.7(c). BGE failed to provide any such analysis of alternatives to the completed projects.[15]

Q. Is it prudent to proceed with costly capital projects without examining alternatives?

A. No. As BGE provided no documentation that it evaluated alternatives to costly transformer oil containment pit upgrade projects the Company appears to have completed voluntarily, I recommend the Commission disallow the entire $8.9 million cost of these projects.

[15] Exhibit DS-1 (BGE Responses to OPC DR 4-28(b) and OPC DR 13-26).

V. PROSPECTIVE CABLE REPLACEMENT

Q. Please preview this section of testimony.

A. This section of testimony examines the prudence of BGE's Planned Cable Replacement program. I will summarize the program, its spending, and BGE's justification for it; challenge those justifications; and conclude with my recommended disallowances. I recommend a $15.2 million disallowance for this program.

Q. Please describe the Planned Primary Cable Replacement Program.

A. Primary cable is a main distribution line (like a 'backbone') installed underground that provides service to many customers. "Secondary" cable is smaller, taps into primary cable, and is also installed underground, but serves fewer customers. It appears some secondary cable is also often replaced as part of this program. (Note that generally, "cable" refers to underground lines and "conductor" refers to overhead lines.) BGE provides one of two justifications for almost all cable replacement projects placed into service: (1) because a section of cable has experienced two faults within 24 months ('reactive' replacement); or (2) because the Feeder Main cable is of a type that has experienced more than 30 or 40 faults per 100 miles (primary or secondary, respectively) on average elsewhere on BGE's distribution system (prospective replacement).[16]

[16] Exhibit DS-1 (BGE Response to OPC DR 4-15).

It is prospective cable replacement that concerns me. This is because a specific type of cable's overall failure rate does not mean that those failures are consistent across the entire population of cable. BGE admits that the useful life of cable depends on factors such as cable composition and installation conditions.[17] In my experience, installation conditions include soil types, moisture levels, rocky conditions, installation methods, and other factors that vary by location. Cable should only be replaced in those sections where higher levels of failure justify the replacement. Blanket replacement programs that intend to replace all of a certain type of cable regardless of location or conditions, are not appropriate.

Q. Why does prospective cable replacement concern you?

A. First, I note BGE spends as much capital prospectively replacing cable as it does reactively replacing cable.[18] Spending capital on prospective cable replacement projects appears to delay reactive cable replacement projects that BGE should be giving a higher priority.[19] Second, while BGE claims to prioritize prospective replacement projects based on cable type, failure counts, customer counts, critical customer counts, and costs, the Company provided no data on these prioritization factors for completed projects when requested in discovery.[20] As a result, I am unable to confirm that the prospective cable replacement projects completed

[17] Exhibit DS-1 (BGE Response to OPC DR 13-10(f)).
[18] Exhibit DS-1 (OPC DR 4-15, Attachment 1, tab "OPCDR04-15 B").
[19] Exhibit DS-1 (OPC DR 4-15, Attachment 1, tab "OPCDR04-15 C").
[20] Exhibit DS-1 (BGE Response to OPC DR 4-15 (b)).

constituted those of highest priority of all potential prospective replacement projects BGE could have completed.

Further, BGE admits it does not consider cable injection technology (also known as cable rejuvenation) as a life-extension alternative to cable replacement. Rejuvenation can be completed for about one-half the cost of replacement, reportedly adds decades to cable life, and can be completed with dramatically less disruption to neighborhood traffic and customer premises.[21] Failure to consider reasonable alternatives to prospective cable replacement projects is not prudent.

Q. Why does BGE not consider rejuvenation as an alternative to replacement?

A. BGE reports it has previously evaluated the technology but deemed it ineffective because "the injection fluid cannot pass through hand-wrapped splices that are used on many BGE cables."[22] While I agree, I note that "many BGE cables" is fewer than 'most BGE cables.' The inability to rejuvenate some underground sections should not disqualify the consideration of rejuvenation for all other underground cable sections.

Q. What are your conclusions and recommendations regarding BGE's Planned Cable Replacement program?

A. I conclude BGE has not demonstrated the prudence of prospective cable replacement projects. From work order detail provided in discovery, I calculate

[21] Exhibit DS-4 (Penelec Press Release), available at https://www.firstenergycorp.com/newsroom/.
[22] Exhibit DS-1 (BGE Response to OPC DR 4-15(d)).

that work orders for prospective replacement comprised 52.7% of the capital cost of all Planned Cable Replacement work orders.[23] Applied to total placements into service of $29.4 million,[24] this amounts to $15.5 million, and I recommend the Commission disallow $15.5 million in estimated prospective cable replacement capital from recovery from customers.

VI. CITY CONDUIT REBUILD BENEFIT-COST ANALYSIS ("BCA")

Q. Please preview this section of testimony.

A. This section of testimony examines the BCA a BGE consultant developed after the Company agreed to invest at least $120 million[25] rebuilding parts of the City-owned underground conduit in which BGE electric cables and equipment are located. I will challenge the notion that rebuilding conduit is a cost-effective way to improve service reliability for BGE customers in the City, find faults with critical assumptions employed in the BCA, and conclude that the Commission should not rely on BGE's conduit rebuild BCA.

Q. Why do you believe that rebuilding parts of the City-owned conduit is not a cost-effective way to improve service reliability for BGE customers in the City?

A. For two reasons, one related to cost recovery and one related to infrastructure design. First, regarding cost recovery, customers pay more for capital spending

[23] Exhibit DS-1 (OPC DR 4-15, Attachment 1, tab "OPCDR04-15 B).
[24] Frain Direct, JCF-7 Electric Distribution Plant Additions, line 74.
[25] BGE, *Direct Testimony of David M. Vahos*, ML# 301409 (Case No. 9692, Feb. 17, 2023) at 52:12.

than they do for lease payments. This is because customers pay BGE interest expense, profits, and income taxes on top of BGE capital spending. These costs are not added on top of BGE O&M spending, and City conduit lease payments are classified as O&M spending. In addition, the City was (and is) in the process of rebuilding its conduit. The conduit is getting rebuilt one way or another, but if BGE rebuilds the conduit, BGE selects the locations, timing, and extent of rebuild projects. While I can perceive some value in that, the salient question is whether customers are likely to get enough dollar value (in terms of improved reliability) from BGE's conduit rebuild spending to exceed the cost premium associated with BGE capital spending.

Q. How does this impact the cost-effectiveness of conduit rebuilds to improve the reliability of BGE customers in the City?

A. Not all the dollars customers pay to BGE to rebuild City conduit goes to rebuilding conduit. Some of the conduit rebuild capital spending customers cover in rates goes to BGE shareholders, and debt holders, and to pay BGE income taxes. Thus, for every dollar in rate increase BGE charges to customers for City conduit rebuilds, less than a dollar is spent rebuilding conduit.

Q. This is an argument BGE makes against paying City lease payments, is it not?

A. Yes, it is. BGE complains that funds the City receives from the Company lease payments are not spent solely on conduit maintenance and improvement.[26] While this may be true, at least lease payments the City does not spend on conduit remain in the City, and help to pay for City overhead expenses and other City services. A significant portion of BGE conduit rebuild capital that BGE customers cover in rates does not stay in the City; it goes instead to BGE shareholders, bondholders, and the US Internal Revenue Service. BGE's argument against making City lease payments—that the City does not spend all BGE lease payments on conduit rebuilds—is also true for BGE, as BGE does not spend all customer receipts on conduit rebuilds either.

Q. How significant is the portion BGE customers pay that does not go to conduit rebuilds?

A. In its conduit rebuild BCA, BGE assumes that over the potential seven-year term of the 2023 conduit rebuild agreement eventually reached with the City, the revenue requirements covered by customers would be the same in either the conduit rebuilding or lease payment scenario, at $274 million.[27] BGE's BCA also indicates that to keep its conduit rebuild program revenue requirement in line with $274 million in potential lease payments to the City, it must keep conduit spending to just

[26] Frain Direct at 54:23 to 55:4.
[27] Frain Direct, BGE Conduit BCA Business Case_ Explanatory Model-FINAL, tab "Overall Results," Cells C14, C27.

$198 million.[28] Thus, the size of the "cut" to shareholders, bondholders, and the US Internal Revenue Service is $76 million, or about 28%.

Q. Please describe the infrastructure BGE uses to distribute electricity in the City.

A. Like most electric utilities, BGE uses two types of circuits to serve major metropolitan areas like Baltimore. Some circuits, from beginning (the source of electric supply) to end, are installed entirely underground, within conduit. Other circuits start out as overhead circuits, and only enter underground conduit at some point along their length. The difference is important, as overhead portions and underground portions in conduit are characterized by different fault/service interruption frequency. Underground cable in conduit is protected from the most common causes of service interruptions on overhead sections, including falling trees/limbs, other vegetation contact, animal contact, ice, wind, vehicle accidents, and the like. Thus, overhead sections of circuit, and any underground sections that use those overhead sections as sources of supply (meaning underground sections that are 'downstream' of the overhead sections), are generally less reliable than the circuits installed entirely underground.

[28] *Id.* at Cell C5.

Q. Of the BGE customers in the City, what proportion are served by circuits that are entirely underground in conduit, and what proportion are served by circuits that consist of both overhead and underground in conduit sections?

A. Only 20% BGE customers in the City are served by circuits that are exclusively underground. The other 80% of BGE customers in Baltimore are served by circuits that start out as overhead lines and enter the underground conduit at some point along their length.[29] As described earlier, underground cable using overhead lines as sources of supply subjects customers served by that cable (meaning, 'downstream') to all the same common causes of service interruptions as customers served exclusively by overhead lines for the overhead portions of that circuit.

Q. How significant is the exposure of cables in underground conduit to overhead service interruptions?

A. On average, 65 percent of the length of the circuits that serve BGE customers in the City is overhead before those circuits enter underground conduit.[30] Thus, the exposure of underground cable in conduit to interruptions in overhead supply can be significant. Of the relatively smaller proportion of these circuits installed in underground conduit, BGE conduit rebuilds only address an even smaller proportion. Rebuilding conduit is extremely costly, at as much as $2 million per

[29] Exhibit DS-1 (BGE Response to OPC DR 4-3, Attachment 3 and OPC DR 4-4) [65,652 divided by (65,652+256,591)].
[30] Exhibit DS-1 (BGE Response to OPC DR 14-1, Attachment 1).

mile.[31] Thus, the $120 million BGE committed to spend rebuilding City conduit will rebuild 60 miles of conduit at most. (Some of the spending goes to rebuilding manholes.) While that may seem like a lot, the City claims it owns and operates 700 miles of conduit.[32]

Q. How does the allegedly poor condition of City conduit impact the service reliability of BGE customers in the City?

A. In two ways. It appears to me that the most significant problem is what BGE calls obstruction, which means the cable becomes difficult to remove. There are a variety of reasons that cable can be difficult to remove, such as hardened mud and even in some cases collapsed conduit. When a fault occurs, if the faulted section cannot be removed from the conduit for repair or replacement (from manholes located at either end), the section must be excavated. Excavation lengthens the duration of any associated service interruption.

BGE also claims that collapsing conduit can itself cause service interruptions, though I believe this to be relatively rare. BGE provides no data which shows how often, if at all, collapsed conduit causes cable failures and service interruptions.

[31] Frain Direct, BGE Conduit BCA Business Case_ Explanatory Model-FINAL, tab "Input Mapping," Cell K10. ($121,196 average work order) divided by cell P10 (323 feet average repair) x 5,280 feet in a mile.
[32] Exhibit DS-4 (City of Baltimore Press Release), available at https://www.baltimorecity.gov/mayor/news-media/press-releases/2023-02-07-city-baltimore-reaches-conduit-agreement-baltimore-gas-electric.

Q. How often does collapsing City conduit cause faults/service interruptions, or extend the duration of repairs/service interruptions?

A. BGE reports that it does not know.[33]

Q. BGE negotiated an agreement to spend at least $120 million rebuilding conduit it did not own without knowing the frequency with which the City conduit causes faults or extends the duration of repairs/service interruptions?

A. Yes, that appears to be the case.

Q. Do you have concerns specific to the BCA BGE offers in defense of its decision to rebuild conduit it does not own?

A. Yes. One concern is that the BCA was not completed in advance of the decision to spend the capital. It appears to me that BGE simply assumed, without completing any analysis, that its customers would be better off if BGE spent at least $120 million rebuilding City conduit. Additionally, I am concerned that the reliability improvement benefit assumptions are not based on historical reliability data, leading to overstated reliability improvement value. I am also concerned that the benefit-cost ratio, at just $1.15 to $1.00, is small, and thus likely to be overwhelmed by either benefit overstatements or cost understatements.

Q. Please discuss your concern that the BCA overstates the reliability improvement value of conduit rebuilding.

A. I am concerned that BGE could not state the frequency of service interruptions caused by or extended by City conduit condition. BGE admits it "does not track actual realized reliability benefits" on the conduit rebuild projects it has

[33] Exhibit DS-1 (BGE Response to OPC DR 4-1).

completed.[34] Without baseline data, BGE cannot accurately estimate the reliability improvement value of conduit rebuilding.

Q. How does BGE's BCA estimate reliability improvements?

A. Rather than using historical data on service interruptions caused or extended by conduit condition, BGE's BCA projects underground failure event frequency, and then assumes that 47 percent of these are caused by conduit failures.[35] Both failure event frequency and the percentage of events caused by conduit failure are extremely critical BCA assumptions, yet neither is informed by historical data. Instead, these assumptions are informed by subject matter experts' opinions, not historical data, and therefore cannot be relied upon to accurately estimate reliability improvement value.

Q. Do you believe these assumptions exaggerate the reliability improvements BGE's BCA calculates?

A. Yes, I do. Again, BGE provides no historical data on service interruptions caused by, or extended by, collapsed conduit. Rather than work to collect this data, which might not provide the BCA results BGE prefers, BGE chose to use employee estimates for two critical BCA inputs. For these reasons, I do not find the reliability improvement projections in BGE's BCA credible, and I don't think the Commission should either.

[34] Exhibit DS-1 (BGE Response to OPC DR 13-01(a)).
[35] Frain Direct, BGE Conduit BCA Business Case_ Explanatory Model-FINAL, Cell E23.

Q. Please discuss your concern that the BCA's benefit-cost ratio is small.

A. Mr. Frain characterizes the benefits of the conduit rebuild program as "overwhelming."[36] I would certainly not use that word to characterize a benefit-cost ratio that is as narrowly favorable as BGE's BCA estimates, at just $1.15 to $1.00. With such a narrowly favorable benefit-cost ratio, just a small variance in actual benefits from projected benefits, or in actual costs from projected costs, can result in a negative benefit-cost ratio for customers from conduit rebuild spending.

Q. You have discussed how the BGE BCA might overstate reliability benefits; might the BCA understate costs as well?

A. Yes, of course it can. In my experience, the costs of all projects involving excavation are notoriously variable. It can be difficult to determine what facilities or obstructions might be present underground, and every project is somewhat different. This is why, for high level estimates, the Association for the Advancement of Cost Engineering assumes that actual project costs will be as much as 30 percent below to 50 percent above such estimates.[37] At a benefit-cost ratio of just $1.15 in benefits to every $1.00 in costs, a project that is 20 percent more expensive than expected delivers a negative benefit-cost ratio, and that assumes the benefit projections are not overstated. To summarize, BGE's BCA

[36] Frain Direct at 48:15.

[37] The witness assumes that a cost estimate is 'high level' when 1% to 15% of the project is defined. According to AACE International Recommended Practice No. 18R-97, "Cost Estimate Classification System – As Applied in Engineering, Procurement, and Construction for the Process Industries," the expected cost accuracy range for projects that are 1% to 15% defined will typically vary from -30% below estimates to +50% above estimates. *See* Exhibit DS-4 (AACE Int'l Recommended Practice No. 18R-97).

does not convince me that the conduit rebuild program delivers benefits in excess of costs for customers, and I recommend the Commission not rely on BGE's BCA when considering the prudence of BGE's decision to replace City lease payments with conduit rebuild capital spending.

Q. What are your conclusions regarding the BGE BCA that indicates conduit rebuilding is a cost-effective way to improve reliability?

A. In addition to my critiques of the BCA itself, several observations lead me to conclude that rebuilding City conduit is not a cost-effective way to improve reliability. These include:

- Underground cable in conduit is generally highly reliable, meaning that the opportunity to reduce the frequency of service interruptions is not large to begin with;
- Collapsing conduit is not likely a frequent cause of faults/service interruptions, and BGE does not track the frequency with which conduit condition causes or extends service interruptions;
- An underground cable in conduit is only as reliable as the overhead line that might serve as its upstream source of supply, and with 80 percent of Baltimore City customers served by these 'combination' lines that are overhead for 65 percent of their length on average, these customers will still be exposed to the most frequent causes of service interruptions on overhead lines irrespective of conduit rebuilds; and
- Rebuilding conduit is extremely costly, at as much as $2 million per mile.

Q. On this basis, do you recommend the Commission reject BGE's request to recover $80.5 million in conduit rebuild cost recovery?

A. The prudence of BGE's decision to spend capital to rebuild conduit the Company does not own, and associated disallowances, are addressed in OPC Witness Alvarez's direct testimony. Using my findings and his own, Mr. Alvarez recommends the Commission disallow the $80.5 million cost of conduit rebuilds based on imprudent BGE decision-making.

VII. REVIEW AND CONCLUSION

Q. Please provide a review of this testimony.

A. Following the introduction, Section II addressed the prudence of BGE projects to replace oil-filled circuit breakers, or OCBs. I found BGE's justifications for the program, from safety and environmental risk reduction to spare part procurement and maintenance cost savings, to be speculative and unquantified. Most significantly, I found reliability improvements cost ineffective, given an annual OCB failure rate of just 1.15% annually. A risk-informed benefit-cost analysis I completed using BGE's own historical failure rate and service interruption data quantified a benefit-cost ratio of just $0.48 per $1.00 in spending. As a result of these observations, I recommend the Commission disallow the entire $9.6 million cost of these projects.

Section III addressed the prudence of BGE's 4kV circuit conversion projects. In my experience, 4kV circuits should only be converted to 13kV when

bona fide load forecasts indicate the 4kV equipment will be loaded beyond capacity ratings. Instead, BGE cites reliability improvements as justification for these projects. Unfortunately, I observed that BGE's own reliability performance data indicates that BGE's 4kV circuits are significantly more reliable than 13kV circuits, irrespective of whether major event days (storm-related interruptions) are included or excluded. As a result, I recommended the Commission disallow $26.2 million in circuit conversion project costs.

Section IV addressed the prudence of BGE projects to upgrade substation transformer oil containment pits. As BGE provided no documentation the Company evaluated alternatives to costly transformer pit upgrade projects, I recommended the Commission disallow the entire $8.9 million cost of these projects.

Section V addressed the prudence of BGE's Planned Cable Replacement program. While I found reactive cable replacement projects to be reasonable, I found that prospective cable replacement projects were insufficiently supported. I could not verify that prospective cable replacement projects were of greater priority than reactive replacement projects, and I found that BGE failed to consider cable rejuvenation as a lower-cost alternative (about half as much) to prospective cable replacement. Because of inadequate support and a lack of alternative analysis, I found the prospective cable replacement portion of BGE's

Planned Cable Replacement program to be imprudent, and recommended the Commission disallow the $15.5 million cost I estimated for that portion.

Section VI addressed the Benefit-Cost Analysis BGE provided in support of its decision to spend capital rebuilding portions of the City's conduit. While BGE describes the benefits to customers as overwhelming, I indicated that the meager $1.15 to $1.00 benefit-cost ratio BGE calculated is unlikely to be realized, owing to overstated reliability improvements and potentially understated cost estimates. I provided several reasons why conduit rebuilding was unlikely to deliver the reliability improvements projected by BGE in its benefit-cost analysis, including the fact that circuits serving 80% of the Company's customers in the City start out overhead, with 65% of their lengths overhead on average, exposing these customers to all the same causes of service interruptions that any other customers served by overhead lines are exposed to. I also observed that BGE could not identify the frequency of service interruptions caused by or extended by the condition of City conduit, and fault BGE for failing to complete a benefit-cost analysis in advance of its decision to replace lease payments with capital spending. (Using my findings and his own, OPC Witness Alvarez recommends the Commission disallow the $80.5 million cost of conduit rebuilds based on imprudent BGE decision-making.)

Q. Does this conclude your testimony?

A. Yes, it does.

Curriculum Vitae – Dennis Stephens

DS Consulting, 1153 Bergen Pkwy, Evergreen CO 80439 dstephens@wiredgroup.net 303.434.0957

Profile

Mr. Stephens has over 40 years' experience in electric and gas distribution grid planning, design, operations management, and asset management, and the innovative use of technology to assist with these functions. He spent his entire career at Xcel Energy and its subsidiary Public Service Company of Colorado, a distribution utility serving 1.5 million electric customers and 1.4 million gas customers. After a series of electrical and gas engineering and management roles of increasing responsibility, Mr. Stephens retired as the Director of Innovation and Smart Grid Investments for all of Xcel Energy's electric and gas distribution businesses in 2011. He now works for the Wired Group and its clients on a part-time basis.

Career History (all positions with Public Service Company of Colorado or its parent, Xcel Energy)

1976 -- Planning Engineer. Performed electric distribution system planning for Southeast Denver, Boulder, Front Range and Cheyenne divisions, including system protection, voltage support and distribution system design.

1983 – Senior Engineer, Electric Distribution Planning. Provided direction and guidance for junior engineers. Led special projects relating to electric distribution system reliability and design. Promoted to Supervisor of Electric Distribution Planning with a staff of 12 electrical engineers with responsibility for capacity and reliability planning.

1988 -- Manager of Operations, Colorado Front Range Division. Responsible for all electric and gas distribution operations, including a high-pressure gas system (engineering, operations, and construction).

1994 -- Manager of Operations & Maintenance Engineering, Southeast Denver. Managed the design of gas and electric distribution system replacements.

1997 -- Manager, Distribution Reliability Assessment, Xcel Energy South (CO, WY, TX, OK). Led an engineering team focused on electric distribution grid reliability and capacity.

1998 -- Director of Electric and Gas Operations, Southwest Denver Division. Responsible for all aspects of electric and gas engineering, operations, and construction in the Southwest Denver Division.

1999 -- Director of Operations, City and County of Denver Division. Responsible for all aspects of electric and gas engineering, operations, and construction for Division, including downtown Denver. Promoted to Director, New Construction of electric and gas systems for the entire metro area.

2001 -- Director Electric Distribution Asset Strategy, Xcel Energy. Developed and implemented asset management strategies for all electric distribution assets in Xcel Energy's 8-state service area.

2005 -- Director of Utility Innovations and Smart Grid Investments. Led Xcel Energy's Utility Innovations department, developing and implementing new technologies and business processes in multiple electric and gas distribution functional areas. Advanced the concept of an Intelligent Network at Xcel Energy, and led several aspects of the SmartGridCity® demonstration project in Boulder, Colorado. Department secured a national Edison Award for Innovation in 2006. Retired in 2011.

2016 – Senior Technical Consultant, Wired Group.

Noteworthy Projects

Smart Grid Solutions Development, 2010. Worked with several large solution providers to develop and implement technical distribution grid solutions and innovations, including IBM, ABB, and Siemens**.**

DER Integration Strategy and Roadmap Development, 2009. Established DER integration strategy and road-maps for Xcel Energy, including technology and capability roadmap for high DER penetration geographies in Boulder, Colorado.

SmartGridCity™ Project Development, 2008. Developed the technical foundations for the SmartGridCity project in Boulder, Colorado (46,000 customers).

Distribution Automation Design, 2007. Worked with ABB Corporation to design software to identify and locate failures in underground cable. The ABB Smart Analyzer™ was programmed with three traps to capture detailed information using Oscillography/Digital Fault Records (O/DFR).

Utility Innovations Program Development, 2006. Led the development of Xcel Energy's Utility Innovations program, for which Mr. Stephens' team receive a national Edison Award.

Distribution Asset Optimization Process, 2005. Taking advantage of SPL's Centricity Outage Management Program and Itron's Real Time Performance Management system (RTPM), developed a Distribution Asset Optimization process by mining AMI meter data and asset utilization information in the development of an enhanced asset loading forecasting process. The process took advantage of the systems' abilities to forecast sudden changes in usage patterns to take proactive mediation of equipment overloading.

Distribution Asset Optimization Software Development, 2004. Worked with Itron on the development of a Distribution Asset Optimization software program.

Fixed AMI Communications Network Development, 2003. Worked with Itron to pilot one of the first applications of a fixed wireless radio network to collect data from customer meters.

Electric Asset Management Strategy Development, 2002. Developed Xcel Energy's Electric Distribution Asset Management Strategy

Automated Switching System Deployment, 2001. Worked with S&C Electric Corporation to deploy its Intelliteam™ devices on Xcel Energy's distribution grid to reduce the number of customers impacted by an outage by isolate faults through automated switching routines.

High Pressure Gas Pipe Replacement Program, 1988. Initiated and managed the renewal and replacement of 26 miles of high pressure gas pipe, over a 5 year period, reducing the likelihood of seam failures as outlined in an "Alert Notice" issued by the Department of Transportation's Office of Pipeline

Safety. Project roles included community engagement, government and regulator relations (PUC, DOT, EPA), and contractor management. Project completed 1 year ahead of schedule and 14% under budget.

Regulatory Appearances

Evaluate DTE's proposed distribution capital projects and programs. Testimony on behalf of a group of environmental and consumer advocates in PSC Case No. U-22046. August 26, 2026.

Examine Commonwealth Edison Company 2028-2031 Grid Plan. Panel testimony with Paul J. Alvarez on behalf of the Illinois Attorney General in ICC Case No. 26-0047. May 14, 2026.

Examine Ameren Illinois Company 2028-2031 Grid Plan. Panel testimony with Paul J. Alvarez on behalf of the Illinois Attorney General in ICC Case No. 26-0051. May 7, 2026.

Evaluate spending under the Infrastructure, Safety, Reliability, and Electrification Mechanism (annual capital tracker reconciliation). Massachusetts Electric and Nantucket Electric Companies (National Grid). Panel testimony with Paul J. Alvarez on behalf of the Massachusetts Attorney General. DPU 25-170. January 30, 2026.

Review prudence of DTE capital costs recovered through the Infrastructure Recovery Mechanism. Testimony on behalf of a group of advocates in Michigan PSC U-21845. September 9, 2025.

Review DTE's proposed distribution capital spending projects and programs. Testimony on behalf of a group of environmental and consumer advocates in Michigan PSC U-21860. August 22, 2025.

Wildfire Risk Evaluation and Mitigation Selection. Testimony on behalf of the Office of Consumer Services in Utah PSC Docket No. 24-035-04. February 14, 2025.

Evaluate Cost Containment, Recovery, and Prudence Review Processes Associated with Utilities' Electric Sector Modernization Plans. Joint Direct Testimony with Paul J. Alvarez on behalf of the Attorney General in Massachusetts DPU Case Nos. 24-10, 24-11, and 24-12. January 30, 2025.

Examine AEP Ohio's $350 million Distribution Automation proposal. Testimony on behalf of the Ohio Office of Consumers' Counsel in Ohio PUC Case No. 24-0787-EL-RDR. December 13, 2024.

Evaluate the Prudence of Pepco MRP 1 Year 3 Spending. Panel Testimony with Paul J. Alvarez on behalf of the Office of People's Counsel in Maryland PSC Case No. 9655. November 15, 2024.

Examine Duke Energy's Request to Continue, Expand, or Initiate Various Riders in its Electric Security Plan. Testimony on behalf of the Office of Consumer Counsel in PUCO Case No. 24-278-EL-SSO. October 23, 2024.

Evaluate the Application of Public Service of Oklahoma for a Rate Increase and Changes in Cost Recovery Practices for Some Expenses. Testimony on behalf of Commission Staff in PUD 2023-000086. July 29, 2024.

Evaluate DTE Energy's Request for Rate Increase, and to Extend and Expand Rider IRM. Testimony on behalf of a group of environmental and consumer advocates in Michigan PSC U-21534. July 26, 2024.

Evaluate Commonwealth Edison Company's Refiled Grid Plan. Panel Testimony with Paul J. Alvarez on behalf of the Attorney General in Illinois Commerce Commission Case No. 22-0486. May 23, 2024.

Evaluate Ameren Illinois Company's Refiled Grid Plan. Panel Testimony with Paul J. Alvarez on behalf of the Attorney General in Illinois Commerce Commission Case No. 22-0487. May 13, 2024.

Evaluate Oklahoma Gas & Electric Company's historical spending. Testimony on behalf of the Oklahoma Corporation Commission Staff in PUD 2023-000087. April 26, 2024.

Evaluate National Grid's historical spending and multi-year rate plan. Panel testimony with Paul J. Alvarez on behalf of the Attorney General in Massachusetts DPU Case 23-150. March 29, 2024.

Evaluate Pepco's Second Multi-year Rate Plan. Panel testimony with Paul J. Alvarez on behalf of the Office of People's Counsel in Maryland PSC Case No. 9702. December 15, 2023.

Evaluate BGE's Second Multi-Year Rate Plan (Electric Distribution Components 2024-2027) and Electric Distribution Spending 2021-2022. Panel testimony with Paul J. Alvarez on behalf of the Office of People's Counsel in Maryland PSC Case No. 9692. June 20, 2023.

Evaluate DTE Energy's Request for Strategic Capital Plan Cost Recovery and Infrastructure Recovery Mechanism Rider on behalf of the Attorney General and a group of environmental and consumer advocates in Michigan PSC U-21297. June 13, 2023.

Evaluate Commonwealth Edison's Multi-year Grid Plan. Panel testimony with Paul Alvarez on behalf of the Attorney General in Illinois Commerce Commission 22-0486. May 22, 2023.

Evaluate Ameren Illinois Corporation's Multi-year Grid Plan. Panel testimony with Paul Alvarez on behalf of the Attorney General in Illinois Commerce Commission 22-0487. May 11, 2023.

Evaluate the Technical Justifications for Public Service Oklahoma's $450 million Grid Enhancement and Resilience Plan. Testimony on behalf of the Attorney General in PUD-2022-000093. March 7, 2023.

Evaluate Georgia Power's Transmission and Distribution Spending Proposals. Panel testimony with Paul Alvarez on behalf of Public Interest Advocacy Staff. Georgia PSC 44280. October 20, 2022.

Evaluate Pacific Gas & Electric's 2023-2026 Multi-year Rate Plan. Panel testimony with Paul Alvarez on behalf of AARP. California PUC A.21-06-021. June 10, 2022.

Evaluate the Distribution Business Components of Georgia Power Company's Integrated Resource Plan. Panel testimony with Paul J. Alvarez on behalf of Public Interest Advocacy Staff. Georgia PSC 44160. May 6, 2022.

Evaluate Oklahoma Gas & Electric Company Grid Modernization Spending and Plans. Testimony on behalf of the Office of Attorney General in PUD 202100164. April 27, 2022.

Evaluate Grid Modernization and Advanced Metering Proposals by Massachusetts Utilities. Panel testimonies with Paul J. Alvarez on behalf of the Office of Attorney General in D.P.U. 21-80, 21-81, and 21-82. January 19, 2022.

Dominion Grid Modernization Plan Review. Testimony on behalf of Appalachian Voices/Southern Environmental Law Center. PUR-2021-00127. September 13, 2021.

Avista Utilities' Electric Distribution and Wildfire Spending, Plans, and Processes. Panel testimony with Paul J. Alvarez on behalf of Public Counsel. WUTC 200900, 200901, and 200894. April 29, 2021.

Pepco's 2021-2023 Grid Investment and Plan. Panel testimony with Paul J. Alvarez on behalf of the Maryland Office of People's Counsel. MDPSC 9655. March 3, 2021

Baltimore Gas & Electric Company's 2021-2023 Grid Investment and Operations Plan. Panel testimony with Paul J. Alvarez on behalf of the Maryland Office of People's Counsel. MD PSC 9645. Aug 14, 2020.

Review of Maryland Utilities' 2019 Annual Performance Reports. Comments of the Office of People's Counsel. MD PSC 9353. June 8, 2020

Duke Energy Carolinas/Duke Energy Progress $2.3 billion Grid Improvement Plan. Testimony before the North Carolina Utilities Commission critiquing Duke Energy's Plan on behalf of a group of environmental and consumer advocates. NCUC E-7, Sub 1214 Feb 18, 2020 & E-2, Sub 1219 Mar 25, 2020.

Indianapolis Power and Light's proposed $1.2 billion Grid Improvement Plan. Testimony before the Indiana Utility Regulatory Commission on behalf of the City of Indianapolis critiquing Indianapolis Power and Light's proposed $1.2 billion Grid Improvement Plan. Cause 45264. October 7, 2019.

Investigation into Distribution Planning Processes. Comments to the Michigan Public Service Commission recommending a transparent, stakeholder-engaged distribution planning process. U-20147. September 11, 2019.

New Hampshire Public Utilities Commission Distribution Planning/Grid Modernization Proceeding. Comments in IR 15-296 describing a transparent, stakeholder-engaged distribution planning process.

Pacific Gas and Electric 2019 General Rate Case. Testimony in A.18-12-009 on behalf of TURN related to $270 million in proposed "Integrated Grid Platform" investments.

Southern California Edison 2017 General Rate Case. Testimony in A.16-09-001 on behalf of TURN related to $2.3 billion in proposed grid modernization investments.

Pacific Gas and Electric 2016 General Rate Case. Testimony in A.15-09-001 on behalf of related to $100 million in proposed grid modernization investments.

Notable Publications and Presentations

Alternative Ratemaking in the US: A Prerequisite for Grid Modernization, or an Unwarranted Shift of Risk to Customers? With Paul Alvarez, Kenneth Costello, and Sean Ericson. Electricity Journal. Volume 35 (October 2022).

Utility Regulation Through Legislation: A Cautionary Tale for Legislators, Regulators, Stakeholders, and Utilities. With Paul Alvarez and Sean Ericson. Electricity Journal. Volume 34 (August 2021).

Florida Storm Protection Plans: A Bonanza for Utilities, A Bust for Consumers and the State. Whitepaper co-authored with Paul J. Alvarez for AARP-Florida. October 5, 2020.

Challenging Utility Grid Modernization Proposals. With Sean Ericson and Dennis Stephens. Public Utilities Fortnightly. Part 1, August, 2020, pages 59-62; Part 2 to be published September, 2020.

The Rush to Modernize: An Editorial on Distribution Planning and Performance Measurement. With Paul Alvarez & Sean Ericson. Accepted for publication by Public Utilities Fortnightly. Anticipated publication June, 2019.

Modernizing the Grid in the Public Interest: Getting a Smarter Grid at the Least Cost for South Carolina Customers. Whitepaper co-authored with Paul Alvarez for GridLab. January 31, 2019

Modernizing the Grid in the Public Interest: A Guide for Virginia Stakeholders. Whitepaper co-authored with Paul Alvarez for GridLab. October 5, 2018.

DistribuTECH 2010, Tampa, Florida. "Realizing the Benefits of DER, DG and DR in the Context of Smart Grid"

OSI 2008 User's Conference, Denver, Colorado; DistribuTECH 2007, San Diego, California. "Smart Grid City: A blueprint for a connected, intelligent grid community"

ABB 2007 World Conference, Jacksonville, Florida. "Use of Distribution Automation Systems to identify Underground Cable Failure"

North American T&D Conference 2005, Toronto, Canada; Itron 2005 User Conference, Boca Raton, Florida. "Xcel Energy Utility Innovations and Distribution Asset Optimization"

DistribuTECH 2005, San Diego, California. "How Advanced Metering Technology is Driving Innovation at Xcel Energy"

Education

Bachelor of Science Degree in Electrical Engineering, 1975, University of Missouri at Rolla.

Awards

Led Xcel Energy team that received a National Edison Award for Utility Innovation, 2006.

Baltimore Gas and Electric Company's Application for Adjustments to Its Electric Base Rate

Case No. 9888

Data Responses Cited in the Direct Testimony of Dennis Stephens

BGE Response to OPC Data Request 4-1

BGE Response to OPC Data Request 4-3, including Attachment 3

BGE Response to OPC Data Request 4-4

BGE Response to OPC Data Request 4-15, including Attachment 1

BGE Response to OPC Data Request 4-27, including Attachments 1 and 2

BGE Response to OPC Data Request 4-28

BGE Response to OPC Data Request 13-1

BGE Response to OPC Data Request 13-10

BGE Response to OPC Data Request 13-26

BGE Response to OPC Data Request 13-36, including Attachment 1 - Confidential, omitted from public version

BGE Response to OPC Data Request 14-1, including Attachment 1

Case No. 9888
Baltimore Gas and Electric Co.
Response to OPC Data Request 4
Request Received: August 11, 2026
Response Date: August 25, 2026
Sponsor(s): Laura A. Wright

Item No.: OPCDR04-01

Refer to Mr. Frain's Direct Testimony at 55:1 which states, regarding City expenditures under historical City conduit agreements, "Those expenditures could include salaries, administrative overhead, and generalized municipal conduit activities that were not necessarily targeted to protecting BGE's electric facilities or reducing outage risk for BGE customers." Refer also to 50:5, which states "Beginning around 2016, the City began to proactively replace entire spans of outdated conduit and associated manholes."

a. OPC understands that BGE began making investments in the City's conduit network in 2023. Provide a list of service interruptions from January 1, 2016 through December 31, 2022, caused by outdated City conduit and manholes. For each such service interruption please provide:
   i. The date of the service interruption;
   ii. The recorded primary category of service interruption cause;
   iii. The recorded secondary category of service interruption cause;
   iv. The count of customers interrupted;
   v. The count of customer minutes interrupted; and
   vi. The field notes associated with the service interruption.

b. Provide a list of service interruptions from January 1, 2016 through December 31, 2022, in which the duration of a service interruption was extended due to outdated City conduit and manholes. For each such service interruption please provide:
   i. The date of the service interruption;
   ii. The recorded primary category of service interruption cause;
   iii. The recorded secondary category of service interruption cause;
   iv. The count of customers interrupted;
   v. The total count of customer minutes interrupted;
   vi. The proportion (in percent) of the total count of customer minutes interrupted extended due to outdated City conduit and manholes; and
   vii. The field notes associated with the service interruption.

RESPONSE:

a. BGE does not track the requested information in the manner requested. Accordingly, the requested data is not available in the ordinary course of business and BGE is unable to provide the information as requested.

b. BGE does not track the requested information in the manner requested. Accordingly, the requested data is not available in the ordinary course of business and BGE is unable to provide the information as requested.

Case No. 9888
Baltimore Gas and Electric Co.
Response to OPC Data Request 4
Request Received: August 11, 2026
Response Date: August 25, 2026
Sponsor(s): Laura A. Wright

Item No.: OPCDR04-03

Refer generally to Mr. Frain's City Conduit testimony. OPC wishes to obtain an understanding of the overlaps and dependencies of the City's Conduit network with BGE's downtown networked circuits and BGE's non-network circuits. Please provide a map of the City Conduit network, overlaid with 1) BGE's downtown network circuit map, including sections of the network that extend beyond the City Conduit network; and 2) a map of BGE's non-network circuits that may also use the City Conduit network. Please also provide (or estimate):

a. For BGE's networked circuits using City Conduit,
   i. Circuit identifiers;
   ii. The line miles of underground cable installed in City Conduit, as well as a count of customers served by type (Res, Small Commercial, Large Commercial, and Industrial); and
   iii. The line miles of underground cable not installed in City Conduit, as well as a count of customers served by type.

b. For BGE's non-networked circuits that may use City Conduit,
   i. Circuit identifiers; and
   ii. The line miles of underground cable installed in City Conduit, as well as a count of customers served by type.

RESPONSE:

BGE does not maintain a map of Baltimore City's Conduit System or the records to accurately draw one for overlay. Please see *OPCDR04-03 CONFIDENTIAL Attachment 1* for a map of BGE's networked circuits in Baltimore City and *OPCDR04-03 CONFIDENTIAL Attachment* 2 for a map of BGE's non-networked circuits in Baltimore City.

a. i. See *OPCDR04-03 Attachment 3* for circuit identifiers for customers served by a combination of conduit and overhead and *OPCDR04-03 Attachment 4* for circuit identifiers for customers served solely via conduit.

ii.-iii. BGE objects to OPCDR04-03 subparts a.ii and a.iii to the extent the request seeks customer counts and facility information that are not maintained in the ordinary course of business. While BGE maintains information regarding facilities located within the Baltimore City Conduit, BGE does not maintain customer counts segregated by whether customers are served by facilities located in City Conduit or by facilities located outside City Conduit. Nor does BGE maintain records identifying, for network circuits using City Conduit, the line miles of underground cable not installed in City Conduit. Producing such information would require BGE to develop new analyses, assumptions, and estimates that do not exist in its books

and records. Subject to and without waiving these objections, BGE estimates that there is approximately 6,000 miles of underground cable within Baltimore City. BGE's last estimate of the number of line miles of underground cable installed in City Conduit is approximately 2,400 line miles.

Please also see OPCDR04-03 Attachment 3 for customer counts served by a combination of conduit and overhead and OPCDR04-03 Attachment 4 for those customers served solely via conduit.

b. 100% of BGE's networked circuits are located in Baltimore City's conduit system.

CUSTOMERS BY FEEDER AND SEGMENT

Sum of customer counts for each feeder, split by customer segment

Customer Count	CUSTOMER_SEGMENT			
FEEDER	Large Commerical	Residential	Small Commercial	Grand Total
13008	1			1
13244	4		7	11
13246	3		15	18
13257	1			1
13330	1		13	14
13331	1	1	2	4
13602	2	226	2	230
13603	1		1	2
13703			1	1
13757	1		2	3
13758	7		10	17
13820	3		15	18
13821	1			1
13842	3			3
13843	3			3
13888	2	31		33
13889	6	176	11	193
13928	1			1
13930	2			2
13931	2			2
13936	76	28	3	107
13946	2			2
13951	1			1
13961	1			1
13970	10			10
33635	1		30	31
33636	5		14	19
33703		1	1	2
33704			1	1
33711	2		1	3
4020	29	588	80	697
4021	7	4	38	49
4116	17	422	39	478
4118	3	85	9	97
4123	25	159	29	213
4124	9	248	42	299
4421	4	411	8	423
4423	3	603	28	634
4424	6	359	30	395
4425	1	460	28	489
4429	5	427	59	491
4430	1	743	35	779

Feeder Pivot

4431	4	301	47	352
4434	2	153	1	156
4436	4	633	27	664
4574	4	129	14	147
4577	6	462	29	497
4578	5	279	13	297
4581	5	224	30	259
4801	1	106	11	118
4803	4	135	14	153
4804	10	111	14	135
4805	5	163	17	185
4810	9	271	12	292
6040		305	7	312
6041		213	10	223
6042		54	2	56
6043			3	3
7000	4	235	86	325
7001	19	1366	134	1519
7002	29	1813	184	2026
7003	68	2724	332	3124
7004	54	631	102	787
7005	91	2042	486	2619
7006	75	2919	303	3297
7007	35	2386	130	2551
7008	28	2544	297	2869
7009	18	542	103	663
7010	43	1882	190	2115
7011	66	2174	339	2579
7012	22	1510	146	1678
7013	8	490	116	614
7014	22	1561	57	1640
7015	7	4	15	26
7017	30	1196	108	1334
7018	50	1187	237	1474
7019	47	2550	181	2778
7020	37	1617	113	1767
7021	26	1873	147	2046
7022	14	1487	76	1577
7023	54	369	199	622
7024	15	338	43	396
7025	15	140	53	208
7026	14	3030	40	3084
7027	24	2536	109	2669
7028	29	1117	89	1235
7038	25	1750	76	1851
7039	15	2201	51	2267
7040	3	886	1	890

Feeder Pivot

7041	20	2282	73	2375
7042	19	1494	132	1645
7043	2		3	5
7044	24	2445	80	2549
7045	25	1596	77	1698
7046	16	1993	79	2088
7047	29	1748	114	1891
7048	22	765	29	816
7049	13	1778	71	1862
7101		2		2
7103	3	261	17	281
7104	44	1873	100	2017
7106	20	783	87	890
7107	19	617	112	748
7108	3	382	19	404
7109	4	345	8	357
7110		24		24
7111	5	990	40	1035
7182	8	696	39	743
7186	33	1836	93	1962
7190	3	501	41	545
7191	11	613	49	673
7290	3	654	35	692
7380	14	606	42	662
7381	56	364	65	485
7382	33		45	78
7383	17	796	83	896
7384	10	364	50	424
7390	21	27	111	159
7391	19	1031	69	1119
7394	9	640	74	723
7397	12	380	85	477
7398	10	1654	69	1733
7506	17	2124	91	2232
7507	13	227	8	248
7508	9	1478	57	1544
7509	17	1561	123	1701
7511	30	2271	141	2442
7512	19	2229	116	2364
7513	29	1720	85	1834
7514	5	366	12	383
7515	11	1900	58	1969
7516	26	1130	146	1302
7517	14	785	36	835
7518	9	647	26	682
7538		15	1	16
7540	13	107	25	145

7581	2	48	5	55
7582	2	169	9	180
7583	15	1022	61	1098
7584	4	35	25	64
7702	4	534	14	552
7706	18	1096	58	1172
7708	25	1865	83	1973
7709	15	1941	119	2075
7804	22	1500	123	1645
7807	8	529	20	557
7808	15	2421	56	2492
7809	9	752	21	782
7811	30	2981	79	3090
7812		4		4
7817	33	7	44	84
7830	27	360	102	489
7831	35	1928	169	2132
7832	28	1024	91	1143
7833	5	3	13	21
7834	1	431	14	446
7835	12	273	19	304
7837	8	289	22	319
7838	46	1955	164	2165
7839	6	130	13	149
7840	6	267	9	282
7841	10	372	26	408
7844	29	1049	107	1185
7845		31	1	32
7846	4	495	58	557
7847	4	1	3	8
7848	30	1408	192	1630
7849	25	868	111	1004
7850	41	2844	149	3034
7851	33	1224	107	1364
7852	22	747	140	909
7853	15	535	60	610
7854	66	1829	262	2157
7855	41	1347	109	1497
7856	40	1691	102	1833
7857	14	422	63	499
7858	5	297	29	331
7860	28	2306	112	2446
7870	65	2116	141	2322
7871	32	1893	294	2219
7872	43	2581	144	2768
7873	36	147	99	282
7874	29	1402	68	1499

7875	20	1568	121	1709
7876	5	748	28	781
7877	28	2271	123	2422
7878	10	838	64	912
7879	26	1839	108	1973
7880	44	968	86	1098
7881	12	1869	76	1957
7890	31	1839	313	2183
7891	45	834	104	983
7892	30	380	65	475
7893	26	1707	114	1847
7894	21	1076	222	1319
7895	22	368	83	473
7896	30	1501	58	1589
7897	45	1244	147	1436
8000	34	2460	123	2617
8001	29	774	84	887
8002	24	1489	162	1675
8003	42	2502	265	2809
8004	36	2015	134	2185
8005	62	1622	164	1848
8006	46	2376	177	2599
8007	33	282		315
8008	18	1611	58	1687
8009	45	2085	126	2256
8010	23	1366	135	1524
8011	16	1442	76	1534
8018	10	1332	64	1406
8019	30	1556	66	1652
8020	84	1784	123	1991
8021	23	1068	67	1158
8022	30	378	67	475
8023	50	236	120	406
8101	5	233	19	257
8102	9	416	28	453
8104	3	72	2	77
8501	7	237	17	261
8601	12	17	14	43
8602	4	409	20	433
8603	11	300	43	354
8604	16	1473	84	1573
8605	27	1668	49	1744
8606	17	541	17	575
8607	45	450	71	566
8608	1		8	9
8609	5	298	16	319
8610	22	940	268	1230

Feeder Pivot

8611	5	413	13	431
8612	26	165	30	221
8614	11	300	40	351
8615	24	1004	143	1171
8616	23	1445	79	1547
8617	24	963	127	1114
8618	16	52	12	80
8619	19	1678	176	1873
8620	4	5	17	26
8621	37	1405	151	1593
8622	16	611	53	680
8652	11	1	8	20
8653	3		4	7
8776	1	306	12	319
8777	7	552	21	580
8904	56	2010	192	2258
8905	20	58	47	125
8906	29	2480	150	2659
8907	42	2207	200	2449
8951	20	711	100	831
8952	40	782	135	957
8953	5	594	41	640
8954	56	1620	363	2039
8955	42	1835	231	2108
8956	33	1558	235	1826
8957	43	2212	314	2569
8961	18		38	56
8962	16	1336	92	1444
8963	25	714	86	825
8964	32	984	107	1123
8965	10		6	16
8966	10		2	12
8967	2		10	12
8968	2		11	13
NETWORK	150	1764	738	2652
UNKNOWN		6	3	9
Grand Total	**5118**	**231133**	**20340**	**256591**

Customer Counts

FEEDER	CUSTOMER_SEGMENT	counts
13008	LCS	1
13244	LCS	4
13244	SMB	7
13246	LCS	3
13246	SMB	15
13257	LCS	1
13330	LCS	1
13330	SMB	13
13331	LCS	1
13331	RES	1
13331	SMB	2
13602	LCS	2
13602	RES	226
13602	SMB	2
13603	LCS	1
13603	SMB	1
13703	SMB	1
13757	LCS	1
13757	SMB	2
13758	LCS	7
13758	SMB	10
13820	LCS	3
13820	SMB	15
13821	LCS	1
13842	LCS	3
13843	LCS	3
13888	LCS	2
13888	RES	31
13889	LCS	6
13889	RES	176
13889	SMB	11
13928	LCS	1
13930	LCS	2
13931	LCS	2
13936	LCS	76
13936	RES	28
13936	SMB	3
13946	LCS	2
13951	LCS	1
13961	LCS	1
13970	LCS	10
33635	LCS	1
33635	SMB	30
33636	LCS	5
33636	SMB	14
33703	RES	1

Customer Counts

33703	SMB	1
33704	SMB	1
33711	LCS	2
33711	SMB	1
4020	LCS	29
4020	RES	588
4020	SMB	80
4021	LCS	7
4021	RES	4
4021	SMB	38
4116	LCS	17
4116	RES	422
4116	SMB	39
4118	LCS	3
4118	RES	85
4118	SMB	9
4123	LCS	25
4123	RES	159
4123	SMB	29
4124	LCS	9
4124	RES	248
4124	SMB	42
4421	LCS	4
4421	RES	411
4421	SMB	8
4423	LCS	3
4423	RES	603
4423	SMB	28
4424	LCS	6
4424	RES	359
4424	SMB	30
4425	LCS	1
4425	RES	460
4425	SMB	28
4429	LCS	5
4429	RES	427
4429	SMB	59
4430	LCS	1
4430	RES	743
4430	SMB	35
4431	LCS	4
4431	RES	301
4431	SMB	47
4434	LCS	2
4434	RES	153
4434	SMB	1
4436	LCS	4

Customer Counts

4436	RES	633
4436	SMB	27
4574	LCS	4
4574	RES	129
4574	SMB	14
4577	LCS	6
4577	RES	462
4577	SMB	29
4578	LCS	5
4578	RES	279
4578	SMB	13
4581	LCS	5
4581	RES	224
4581	SMB	30
4801	LCS	1
4801	RES	106
4801	SMB	11
4803	LCS	4
4803	RES	135
4803	SMB	14
4804	LCS	10
4804	RES	111
4804	SMB	14
4805	LCS	5
4805	RES	163
4805	SMB	17
4810	LCS	9
4810	RES	271
4810	SMB	12
6040	RES	305
6040	SMB	7
6041	RES	213
6041	SMB	10
6042	RES	54
6042	SMB	2
6043	SMB	3
7000	LCS	4
7000	RES	235
7000	SMB	86
7001	LCS	19
7001	RES	1366
7001	SMB	134
7002	LCS	29
7002	RES	1813
7002	SMB	184
7003	LCS	68
7003	RES	2724

Customer Counts

7003	SMB	332
7004	LCS	54
7004	RES	631
7004	SMB	102
7005	LCS	91
7005	RES	2042
7005	SMB	486
7006	LCS	75
7006	RES	2919
7006	SMB	303
7007	LCS	35
7007	RES	2386
7007	SMB	130
7008	LCS	28
7008	RES	2544
7008	SMB	297
7009	LCS	18
7009	RES	542
7009	SMB	103
7010	LCS	43
7010	RES	1882
7010	SMB	190
7011	LCS	66
7011	RES	2174
7011	SMB	339
7012	LCS	22
7012	RES	1510
7012	SMB	146
7013	LCS	8
7013	RES	490
7013	SMB	116
7014	LCS	22
7014	RES	1561
7014	SMB	57
7015	LCS	7
7015	RES	4
7015	SMB	15
7017	LCS	30
7017	RES	1196
7017	SMB	108
7018	LCS	50
7018	RES	1187
7018	SMB	237
7019	LCS	47
7019	RES	2550
7019	SMB	181
7020	LCS	37

Customer Counts

7020	RES	1617
7020	SMB	113
7021	LCS	26
7021	RES	1873
7021	SMB	147
7022	LCS	14
7022	RES	1487
7022	SMB	76
7023	LCS	54
7023	RES	369
7023	SMB	199
7024	LCS	15
7024	RES	338
7024	SMB	43
7025	LCS	15
7025	RES	140
7025	SMB	53
7026	LCS	14
7026	RES	3030
7026	SMB	40
7027	LCS	24
7027	RES	2536
7027	SMB	109
7028	LCS	29
7028	RES	1117
7028	SMB	89
7038	LCS	25
7038	RES	1750
7038	SMB	76
7039	LCS	15
7039	RES	2201
7039	SMB	51
7040	LCS	3
7040	RES	886
7040	SMB	1
7041	LCS	20
7041	RES	2282
7041	SMB	73
7042	LCS	19
7042	RES	1494
7042	SMB	132
7043	LCS	2
7043	SMB	3
7044	LCS	24
7044	RES	2445
7044	SMB	80
7045	LCS	25

Customer Counts

7045	RES	1596
7045	SMB	77
7046	LCS	16
7046	RES	1993
7046	SMB	79
7047	LCS	29
7047	RES	1748
7047	SMB	114
7048	LCS	22
7048	RES	765
7048	SMB	29
7049	LCS	13
7049	RES	1778
7049	SMB	71
7101	RES	2
7103	LCS	3
7103	RES	261
7103	SMB	17
7104	LCS	44
7104	RES	1873
7104	SMB	100
7106	LCS	20
7106	RES	783
7106	SMB	87
7107	LCS	19
7107	RES	617
7107	SMB	112
7108	LCS	3
7108	RES	382
7108	SMB	19
7109	LCS	4
7109	RES	345
7109	SMB	8
7110	RES	24
7111	LCS	5
7111	RES	990
7111	SMB	40
7182	LCS	8
7182	RES	696
7182	SMB	39
7186	LCS	33
7186	RES	1836
7186	SMB	93
7190	LCS	3
7190	RES	501
7190	SMB	41
7191	LCS	11

Customer Counts

7191	RES	613
7191	SMB	49
7290	LCS	3
7290	RES	654
7290	SMB	35
7380	LCS	14
7380	RES	606
7380	SMB	42
7381	LCS	56
7381	RES	364
7381	SMB	65
7382	LCS	33
7382	SMB	45
7383	LCS	17
7383	RES	796
7383	SMB	83
7384	LCS	10
7384	RES	364
7384	SMB	50
7390	LCS	21
7390	RES	27
7390	SMB	111
7391	LCS	19
7391	RES	1031
7391	SMB	69
7394	LCS	9
7394	RES	640
7394	SMB	74
7397	LCS	12
7397	RES	380
7397	SMB	85
7398	LCS	10
7398	RES	1654
7398	SMB	69
7506	LCS	17
7506	RES	2124
7506	SMB	91
7507	LCS	13
7507	RES	227
7507	SMB	8
7508	LCS	9
7508	RES	1478
7508	SMB	57
7509	LCS	17
7509	RES	1561
7509	SMB	123
7511	LCS	30

Customer Counts

7511	RES	2271
7511	SMB	141
7512	LCS	19
7512	RES	2229
7512	SMB	116
7513	LCS	29
7513	RES	1720
7513	SMB	85
7514	LCS	5
7514	RES	366
7514	SMB	12
7515	LCS	11
7515	RES	1900
7515	SMB	58
7516	LCS	26
7516	RES	1130
7516	SMB	146
7517	LCS	14
7517	RES	785
7517	SMB	36
7518	LCS	9
7518	RES	647
7518	SMB	26
7538	RES	15
7538	SMB	1
7540	LCS	13
7540	RES	107
7540	SMB	25
7581	LCS	2
7581	RES	48
7581	SMB	5
7582	LCS	2
7582	RES	169
7582	SMB	9
7583	LCS	15
7583	RES	1022
7583	SMB	61
7584	LCS	4
7584	RES	35
7584	SMB	25
7702	LCS	4
7702	RES	534
7702	SMB	14
7706	LCS	18
7706	RES	1096
7706	SMB	58
7708	LCS	25

Customer Counts

7708	RES	1865
7708	SMB	83
7709	LCS	15
7709	RES	1941
7709	SMB	119
7804	LCS	22
7804	RES	1500
7804	SMB	123
7807	LCS	8
7807	RES	529
7807	SMB	20
7808	LCS	15
7808	RES	2421
7808	SMB	56
7809	LCS	9
7809	RES	752
7809	SMB	21
7811	LCS	30
7811	RES	2981
7811	SMB	79
7812	RES	4
7817	LCS	33
7817	RES	7
7817	SMB	44
7830	LCS	27
7830	RES	360
7830	SMB	102
7831	LCS	35
7831	RES	1928
7831	SMB	169
7832	LCS	28
7832	RES	1024
7832	SMB	91
7833	LCS	5
7833	RES	3
7833	SMB	13
7834	LCS	1
7834	RES	431
7834	SMB	14
7835	LCS	12
7835	RES	273
7835	SMB	19
7837	LCS	8
7837	RES	289
7837	SMB	22
7838	LCS	46
7838	RES	1955

Customer Counts

7838	SMB	164
7839	LCS	6
7839	RES	130
7839	SMB	13
7840	LCS	6
7840	RES	267
7840	SMB	9
7841	LCS	10
7841	RES	372
7841	SMB	26
7844	LCS	29
7844	RES	1049
7844	SMB	107
7845	RES	31
7845	SMB	1
7846	LCS	4
7846	RES	495
7846	SMB	58
7847	LCS	4
7847	RES	1
7847	SMB	3
7848	LCS	30
7848	RES	1408
7848	SMB	192
7849	LCS	25
7849	RES	868
7849	SMB	111
7850	LCS	41
7850	RES	2844
7850	SMB	149
7851	LCS	33
7851	RES	1224
7851	SMB	107
7852	LCS	22
7852	RES	747
7852	SMB	140
7853	LCS	15
7853	RES	535
7853	SMB	60
7854	LCS	66
7854	RES	1829
7854	SMB	262
7855	LCS	41
7855	RES	1347
7855	SMB	109
7856	LCS	40
7856	RES	1691

Customer Counts

7856	SMB	102
7857	LCS	14
7857	RES	422
7857	SMB	63
7858	LCS	5
7858	RES	297
7858	SMB	29
7860	LCS	28
7860	RES	2306
7860	SMB	112
7870	LCS	65
7870	RES	2116
7870	SMB	141
7871	LCS	32
7871	RES	1893
7871	SMB	294
7872	LCS	43
7872	RES	2581
7872	SMB	144
7873	LCS	36
7873	RES	147
7873	SMB	99
7874	LCS	29
7874	RES	1402
7874	SMB	68
7875	LCS	20
7875	RES	1568
7875	SMB	121
7876	LCS	5
7876	RES	748
7876	SMB	28
7877	LCS	28
7877	RES	2271
7877	SMB	123
7878	LCS	10
7878	RES	838
7878	SMB	64
7879	LCS	26
7879	RES	1839
7879	SMB	108
7880	LCS	44
7880	RES	968
7880	SMB	86
7881	LCS	12
7881	RES	1869
7881	SMB	76
7890	LCS	31

Customer Counts

7890	RES	1839
7890	SMB	313
7891	LCS	45
7891	RES	834
7891	SMB	104
7892	LCS	30
7892	RES	380
7892	SMB	65
7893	LCS	26
7893	RES	1707
7893	SMB	114
7894	LCS	21
7894	RES	1076
7894	SMB	222
7895	LCS	22
7895	RES	368
7895	SMB	83
7896	LCS	30
7896	RES	1501
7896	SMB	58
7897	LCS	45
7897	RES	1244
7897	SMB	147
8000	LCS	34
8000	RES	2460
8000	SMB	123
8001	LCS	29
8001	RES	774
8001	SMB	84
8002	LCS	24
8002	RES	1489
8002	SMB	162
8003	LCS	42
8003	RES	2502
8003	SMB	265
8004	LCS	36
8004	RES	2015
8004	SMB	134
8005	LCS	62
8005	RES	1622
8005	SMB	164
8006	LCS	46
8006	RES	2376
8006	SMB	177
8007	LCS	33
8007	RES	282
8008	LCS	18

Customer Counts

8008	RES	1611
8008	SMB	58
8009	LCS	45
8009	RES	2085
8009	SMB	126
8010	LCS	23
8010	RES	1366
8010	SMB	135
8011	LCS	16
8011	RES	1442
8011	SMB	76
8018	LCS	10
8018	RES	1332
8018	SMB	64
8019	LCS	30
8019	RES	1556
8019	SMB	66
8020	LCS	84
8020	RES	1784
8020	SMB	123
8021	LCS	23
8021	RES	1068
8021	SMB	67
8022	LCS	30
8022	RES	378
8022	SMB	67
8023	LCS	50
8023	RES	236
8023	SMB	120
8101	LCS	5
8101	RES	233
8101	SMB	19
8102	LCS	9
8102	RES	416
8102	SMB	28
8104	LCS	3
8104	RES	72
8104	SMB	2
8501	LCS	7
8501	RES	237
8501	SMB	17
8601	LCS	12
8601	RES	17
8601	SMB	14
8602	LCS	4
8602	RES	409
8602	SMB	20

Customer Counts

8603	LCS	11
8603	RES	300
8603	SMB	43
8604	LCS	16
8604	RES	1473
8604	SMB	84
8605	LCS	27
8605	RES	1668
8605	SMB	49
8606	LCS	17
8606	RES	541
8606	SMB	17
8607	LCS	45
8607	RES	450
8607	SMB	71
8608	LCS	1
8608	SMB	8
8609	LCS	5
8609	RES	298
8609	SMB	16
8610	LCS	22
8610	RES	940
8610	SMB	268
8611	LCS	5
8611	RES	413
8611	SMB	13
8612	LCS	26
8612	RES	165
8612	SMB	30
8614	LCS	11
8614	RES	300
8614	SMB	40
8615	LCS	24
8615	RES	1004
8615	SMB	143
8616	LCS	23
8616	RES	1445
8616	SMB	79
8617	LCS	24
8617	RES	963
8617	SMB	127
8618	LCS	16
8618	RES	52
8618	SMB	12
8619	LCS	19
8619	RES	1678
8619	SMB	176

Customer Counts

8620	LCS	4
8620	RES	5
8620	SMB	17
8621	LCS	37
8621	RES	1405
8621	SMB	151
8622	LCS	16
8622	RES	611
8622	SMB	53
8652	LCS	11
8652	RES	1
8652	SMB	8
8653	LCS	3
8653	SMB	4
8776	LCS	1
8776	RES	306
8776	SMB	12
8777	LCS	7
8777	RES	552
8777	SMB	21
8904	LCS	56
8904	RES	2010
8904	SMB	192
8905	LCS	20
8905	RES	58
8905	SMB	47
8906	LCS	29
8906	RES	2480
8906	SMB	150
8907	LCS	42
8907	RES	2207
8907	SMB	200
8951	LCS	20
8951	RES	711
8951	SMB	100
8952	LCS	40
8952	RES	782
8952	SMB	135
8953	LCS	5
8953	RES	594
8953	SMB	41
8954	LCS	56
8954	RES	1620
8954	SMB	363
8955	LCS	42
8955	RES	1835
8955	SMB	231

Customer Counts

8956	LCS	33
8956	RES	1558
8956	SMB	235
8957	LCS	43
8957	RES	2212
8957	SMB	314
8961	LCS	18
8961	SMB	38
8962	LCS	16
8962	RES	1336
8962	SMB	92
8963	LCS	25
8963	RES	714
8963	SMB	86
8964	LCS	32
8964	RES	984
8964	SMB	107
8965	LCS	10
8965	SMB	6
8966	LCS	10
8966	SMB	2
8967	LCS	2
8967	SMB	10
8968	LCS	2
8968	SMB	11
NETWORK	LCS	150
NETWORK	RES	1764
NETWORK	SMB	738

Case No. 9888
Baltimore Gas and Electric Co.
Response to OPC Data Request 4
Request Received: August 11, 2026
Response Date: August 25, 2026
Sponsor(s): John C. Frain

Item No.: OPCDR04-04

Refer to Mr. Frain's Direct Testimony at 57:9, which presents the BCA Ratio equation. Please also refer to BGE Conduit BCA Business Case_ Explanatory Model-FINAL.

a. In Model tab "Overall Results", cell L60 indicates the 1.15 BCA Ratio as the product of $40 million in reliability benefits plus $274 million in avoided cost benefits divided by $274 million in costs. Please identify the locations of details that support the values for i) $274 million in avoided cost benefits; and ii) $274 million in costs.
b. Refer to the response to subpart (a) above. Please identify where in the BCA Model the details supporting the value of components (i) and (ii) can be found.
c. In the Model, refer to tab "Cost Summary". Provide a complete description and definition of each item listed in cells F10 to F16 under both i) 2023 Agreement and ii) "As If" scenarios.

RESPONSE:

a. Refer to cell E43 in "Overall Results" tab.

b. Refer to cell E43 in "Revenue Requirement" tab in the "BGE Conduit BCA Business Case_Explanatory Model-FINAL" Excel file. Additionally, the responses to StaffDR17-14, StaffDR17-15, StaffDR17-16, and StaffDR17-17 discuss these values.

c. Components are defined in the table below with details also referenceable in the Company's responses to StaffDR17-04, StaffDR17-06, and StaffDR17-08.

Work Category	Description	2023 Agreement Activities	As-If Activities (Program # within City Plan)
Project	Net new infrastructure to increase capacity and provide conduit in areas of need	• 4kV • Substation • Amtrak • Reliability/System Planning • Feeder Extensions	• Project to Left (BGE Supplementary) • Conduit repair for BGE 4kV Conversion (Program 2) • Parallel Duct Bank (Program 3) • Split Ducts (Program 3) • Conduit replacement in support of DOT highway / bridge, Streetscapes (Program 3)
Obstruction - Planned	Planned conduit repair to fix damaged infrastructure or make improvements	• Amtrak	• Rodding, Slugging, and Roping (Program 2) • Cable Racking (Program 2)
Obstruction - Reactive Repair	Reactive conduit repair to fix damaged infrastructure or make improvements	• Contact Voltage (CV) • Underground Lines (UGL) • Streetlight (ODL) • Fiber-Optic (FC) • Other	• Repair Duct Obstructions (Program 1) [Note: Assume this happens proportionately to activities for 2023 Agreement's Reactive Repair types]
Manhole Rebuild	Rebuild manhole to same size or bigger	• Manhole Rebuilds	• Manhole Reconstruction (Program 3) • Repair Manholes (Program 1)
Other	"Occupancy Survey and Mahole Locking	• N/A	• Manhole Occupancy and Conditional Inspections (Program 2) • Locking Manholes (Program 4)
Common	Shared costs across multiple work types	• Professional and Technical Services (Designs and As-Builts, Permitting and Fees, Team Labor)	• Professional and Technical Services (Comprehensive Facility Management, Other Professional Services - Capital Projects, Subsurface Utility Engineering (SUE) Contract - Including Test Holes) (Program 5)

Case No. 9888
Baltimore Gas and Electric Co.
Response to OPC Data Request 4
Request Received: August 11, 2026
Response Date: August 25, 2026
Sponsor(s): Laura A. Wright

Item No.: OPCDR04-15

Refer to JCF-7 Electric Distribution Plant Additions.pdf, PDF page 6, row for Project 61132, which states the $29,365,627 "Cable Replacement Planned Primary" program prioritizes jobs based on "cable type, number of failures, number of customers affected, critical customers affected, and cost." Please Provide:

a. The formal methodology or algorithm that combines the listed factors (cable type, failures, customers, cost) into a final prioritization score or ranking.
b. For every cable segment replaced under this program from Jan 2024 - Mar 2026, provide the underlying data for each of the prioritization factors listed.
c. A list of the top 100 cable segments in the BGE system that score highest for replacement under the Company's prioritization methodology but are not scheduled for replacement in this period. For each, provide its score, the data for each factor, and estimated project costs.
d. All workpapers, studies, and cost-benefit analyses supporting the decision to replace these cables rather than use life-extension techniques such as cable injection.

RESPONSE:

a. From January 2024 – March 2026, the cable replacement program identified replacement candidates using the following rules:

Planned Replacement Criteria (After Failures Occur)

Feeder Main Cables
Replace a feeder main cable section after two electrical insulation failures (faults) within a 24-month period.
The following cable types were subject to an accelerated criterion and were considered for replacement after one fault:

- 350 kcmil XLP
- 500 kcmil XLP NJ
- 350 kcmil PILC

Tap Cables
Replace a tap cable section after three electrical insulation failures (faults) within a 24-month period.

The following cable types were subject to an accelerated criterion and were considered for replacement after two faults:

- #2 HMW
- #2 XLP NJ
- 1/0 cable

Condition-Based Replacement

- Replace a cable after one fault where significant mechanical damage is suspected over a large portion of the cable.
- Replace a cable when defective concentric neutrals are identified and reported.

Proactive Replacement Criteria (Before Failures Occur)

Feeder Main Cables: Replace cable when the cable type fault rate exceeds 30 faults per 100 conductor miles.

Tap Cables: Replace cable proactively when the cable type fault rate exceeds 40 faults per 100 conductor miles.

b. Please see *OPRDR04-15 Attachment 1* tab B. The Company notes that the work order totals provided in this attachment are based on work order activity associated with the identified project. In contrast, the amounts presented in Company Exhibit JCF-7 reflect additions to plant in service during the period January 2024 through March 2026. The underlying populations of costs reflected in this attachment and in Company Exhibit JCF-7 are not the same and serve different reporting purposes. Work order activity represents the direct costs incurred for a project, whereas the additions to plant in service reflected in Company Exhibit JCF-7 represent only those amounts placed in service during the January 2024 through March 2026 period. Therefore, the amounts shown in OPCDR04-15 Attachment 1 should not be expected to reconcile directly with the additions to plant in service presented in Company Exhibit JCF-7.

c. Please see *OPCDR04-15 Attachment 1* tab C, an Excel workbook containing the identified cable sections and supporting data used in this assessment.

d. No studies were conducted between January 2024 and March 2026 supporting the decision to replace the cables rather than use life-extension techniques, such as cable injections. However, cable injection was evaluated by BGE previously and deemed not effective since the injection fluid cannot pass through hand-wrapped splices that are used on many BGE cables.

Primary Cable Replacement Jobs Jan2024-Mar2026

Work Order#	Address	Cable Age (Yrs)	Conductor Material	Number of Customers	Total Cable Length (ft)	Reason for Replacement	Critical Customer	Cost
14464931	205 E Joppa Rd	27	#2 HMW	6	1195	Proactive replacement - Cable fault rate exceeds 30.0	No	22,390
17358592	965 Rustling Oaks Dr	25	500 Al XLP-NJ	309	2692	1 fault in 24 months, accelerated criterion	No	116,598
17536157	1130 Freeland Rd	41	#2 Al XLP-NJ	3	1170	Two faults in 24 months	No	66,390
16898450	3801 Schnaper Dr	21	#2 Al XLP-NJ	143	3391	Two faults in 24 months	No	60,979
16138981	18102 Central Ave	19	#2 Al XLP-NJ	3	4808	Two faults in 24 months	No	67,967
17949703	3797 Plum Spring Ln	48	#2 Al HMW	80	5829	Proactive replacement - Cable fault rate exceeds 30.0	No	211,188
17949644	273 Oakwood Village	37	#2 Al XLP-NJ	491	11673	Two faults in 24 months	No	196,808
17987522	4350 Garden City Dr	34	500 Al XLP-NJ	8	944	1 fault in 24 months, accelerated criterion	No	278,798
18142283	1022 Chesapeake Dr	57	#2 Cu HMW	90	915	Two faults in 24 months	No	8,308
18141701	548 Old Mill Rd	27	350 Al XLP-NJ	1666	652	1 fault in 24 months, accelerated criterion	No	83,880
18232057	2116 Richardson Rd	42	#2 Al XLP-NJ	3	1403	Proactive replacement - Cable fault rate exceeds 30.0	No	34,907
18267785	3229 Woodstream Lane	43	#2 Al XLP-NJ	24	4294	Two faults in 24 months	No	28,896
18267160	1276 West River Rd	50	#2 Al HMW	1	208	Two faults in 24 months	No	33,898
18267320	2140 Northridge Dr	45	#2 Al XLP-NJ	4	1073	Proactive replacement - Cable fault rate exceeds 30.0	No	64,126
18270286	354 Beaghan Dr	34	#2 Al XLP-NJ	95	2550	Proactive replacement - Cable fault rate exceeds 30.0	No	123,164
18284691	1 Pine Bark Way	47	#2 Al XLP-NJ	34	15416	Proactive replacement - Cable fault rate exceeds 30.0	No	222,264
18297138	7810 Craig Dr	51	#2 Al XLP-NJ	51	3219	Proactive replacement - Cable fault rate exceeds 30.0	No	49,192
18298449	12618 Mt Laurel Ct	44	#2 Al XLP-NJ	24	5566	Two faults in 24 months	No	18,546
18296847	914 Middle River Rd	48	#2 Al XLP-NJ	2	206	Two faults in 24 months	No	15,901
18297011	312 South River Clubhouse Rd	44	#2 Al XLP-NJ	1	531	Two faults in 24 months	No	6,216
18298620	2710 Jeremy Ct	52	#2 Al HMW	428	7392	Two faults in 24 months	No	75,117
18358306	12670 Emory Farm Rd	43	#2 Al XLP-NJ	19	11204	Proactive replacement - Cable fault rate exceeds 30.0	No	459,998
18347286	3310 Transway Rd	44	#2 Al XLP-NJ	1	252	Two faults in 24 months	No	8,903
18357683	1614 Denise Dr	49	#2 Al HMW	202	5326	Proactive replacement - Cable fault rate exceeds 30.0	No	130,511
18357992	7672 Water Oak Point Rd	38	#2 Al XLP-NJ	62	2706	Proactive replacement - Cable fault rate exceeds 30.0	No	16,358
18366351	2757 Bayside Beach Rd	41	#2 Al XLP-NJ	18	4233	Proactive replacement - Cable fault rate exceeds 30.0	No	94,660
18368700	6329 Frostwork Row	48	#2 Al HMW	8	3361	Two faults in 24 months	No	140,597
18480286	607 Trixam Rd	48	#2 Al HMW	19	4088	Proactive replacement - Cable fault rate exceeds 30.0	No	124,525
18487294	4207 Rock Run Place	28	#2 Al XLP-NJ	11	9828	Two faults in 24 months	No	34,380
18491822	914 Holy Cross Rd	50	#2 Al HMW	14	2154	Two faults in 24 months	No	66,074
18487736	15151 Sweitzer Lane	27	500 Al XLP-J	43	1924	Two faults in 24 months	No	193,174
18651171	1319 Streaker Rd	42	#2 Al XLP-NJ	3	610	Two faults in 24 months	No	2,179
18488026	6 Teresa Marie Ct	41	#2 Al XLP-NJ	80	7720	Significant mechanical damage	No	158,292
18474870	9020 Junction Dr	34	#2 Al EPR-J	17	1734	Significant mechanical damage	No	4,325
18513075	2330 Smith Ave	42	#2 Al XLP-NJ	1	222	Two faults in 24 months	No	14,565
18513938	3980 New Castle Ct	42	#2 Al XLP-NJ	7	1605	Two faults in 24 months	No	8,700
18513997	17001 Troyer Rd	37	#2 Al HMW	1	1145	Two faults in 24 months	No	5,865
18516995	11455 Harding Rd	47	#2 Al HMW	3	840	Two faults in 24 months	No	43,680
18568063	3201 Sudath Ln	42	#2 Al XLP-NJ	13	1866	Two faults in 24 months	No	8,831
18574293	2449 Tufton Ave	40	#2 Al XLP-NJ	2	2390	Two faults in 24 months	No	54,178
18568249	4709 York Rd	42	#2 Al XLP-NJ	5	474	Two faults in 24 months	No	24,668
18637285	10111 Mlk Jr Hwy	44	#2 Al XLP-NJ	2	85	1 fault in 24 months, Medical Customer	Yes	6,109
18707130	1521 Jones Station	39	#2 Al XLP-NJ	137	12600	Proactive replacement - Cable fault rate exceeds 30.0	No	373,902
18707759	373 Amberwood dr	47	#2 Al HMW	69	13763	Proactive replacement - Cable fault rate exceeds 30.0	No	571,238
18710420	5700 St. Albans Way	41	#2 Al XLP-NJ	21	4587	Two faults in 24 months	No	134,662
18710620	8336 Tapu Ct	26	#2 Al HMW	145	4171	Proactive replacement - Cable fault rate exceeds 30.0	No	149,790
18746349	1408 Dalewood Dr - Part 2	44	#2 Al HMW	22	5190	Proactive replacement - Cable fault rate exceeds 30.0	No	30,834
18747759	3305 Keyser Rd	38	#2 Al HMW	15	4718	Proactive replacement - Cable fault rate exceeds 30.0	No	33,112
18734474	3809 Springhill Dr	36	#2 Al XLP-NJ	2	735	Two faults in 24 months	No	31,605
18757599	5440 Old Tucker Row	36	#2 Al HMW	2	2001	Proactive replacement - Cable fault rate exceeds 30.0	No	42,189
18778694	5481 Green-dory Ln	54	#2 Al HMW	381	6211	Proactive replacement - Cable fault rate exceeds 30.0	No	257,394
18770550	3402 Carvale Dr	50	#2 Cu HMW	11	2254	Proactive replacement - Cable fault rate exceeds 30.0	No	7,390
18780075	5355 Phelps-Luck Dr	52	#2 Al HMW	158	8768	Proactive replacement - Cable fault rate exceeds 30.0	No	61,458
18795534	8304 Greg Marc St	45	#2 Al XLP-NJ	118	24317	Proactive replacement - Cable fault rate exceeds 30.0	No	186,974
18798840	2219 5th st	36	#2 Al XLP-NJ	2	163	Two faults in 24 months	No	9,912
18808460	301 Farwind Dr	23	#2 Al XLP-NJ	132	2230	Two faults in 24 months	No	10,599
18826925	497 Powell Dr	46	#2 Al HMW	8	2153	Two faults in 24 months	No	7,400
18851059	1 Hunt Farms Ct	21	#2 Cu HMW	8	6804	Two faults in 24 months	No	64,841
18846780	638 Deer Park Rd	19	#2 Al XLP-NJ	3	464	Two faults in 24 months	No	7,499
18857849	8517 David Ave	51	#2 Al HMW	16	1941	Two faults in 24 months	No	11,254
18889505	6347 Windharp Way	50	#2 Al HMW	144	11508	Two faults in 24 months	No	308,584
18910984	4730 Mountain Rd	46	#2 Al XLP-NJ	36	1184	Two faults in 24 months	No	15,498

18911600	7420 Quad Ave	42	#2 Al HMW	1	195	Two faults in 24 months	No	2,765
18914084	14222 Hanover Pike	46	#2 Al XLP-NJ	2	410	Two faults in 24 months	No	2,188
18914197	445 Patterson Mill Rd	41	#2 Al XLP-NJ	2	410	Two faults in 24 months	No	7,724
18949345	Brook Meadow Dr.	57	#2 Al HMW	12	2224	Recommended from Engineering	No	77,861
18932509	2736 Albert-Rill Rd	28	#2 Al XLP-NJ	19	8363	Recommended from Engineering	No	200,917
18932590	8 Trumps Ct	39	#2 Al XLP-NJ	12	491	Two faults in 24 months	No	620
18932744	1722 Tank Rd	18	#2 Al XLP-NJ	3	667	Two faults in 24 months	No	5,602
18943564	1930 Monkton Rd	53	#2 Al HMW	1	307	Two faults in 24 months	No	13,201
18951532	13710 Oster Farm Rd	45	#2 Al XLP-NJ	7	3170	Two faults in 24 months	No	13,832
18954160	10705 Cardington Way	50	#2 Al HMW	137	15139	Proactive replacement - Cable fault rate exceeds 30.0	No	106,445
18954830	2504 Cub Hill Rd	13	#2 Al XLP-J	2	357	Two faults in 24 months	No	7,805
18955882	1116 Parkington Ln	18	#2 Al XLP-J	1	55	Two faults in 24 months	No	16,836
18959533	8524 Reservoir rd	40	#2 Al HMW	29	2563	Two faults in 24 months	No	93,649
18956759	610 Wampler Rd	46	#2 Al HMW	20	145	Two faults in 24 months	No	5,757
18990310	13385 Forsythe Rd	33	#2 Al XLP-NJ	3	396	Two faults in 24 months	No	6,255
18990663	2455 Gibson Rd	51	#2 Al HMW	13	7824	Two faults in 24 months	No	329,491
18990568	3550 Green Spring Rd	43	#2 Al XLP-NJ	7	495	Two faults in 24 months	No	2,480
18990600	347 Sullivan Rd	45	#2 Al XLP-NJ	1	421	Two faults in 24 months	No	3,802
18990639	1703 Cosner Rd	48	#2 Al XLP-NJ	51	486	Two faults in 24 months	No	13,925
18990742	2905 Belhaven Rd	49	#2 Al HMW	46	8258	Two faults in 24 months	No	150,356
18997046	250 Schilling Cir	21	#2 Al XLP-J	2	316	Two faults in 24 months	No	23,315
19019985	8001 Nolpark Ct	52	#2 Al HMW	10	4448	Two faults in 24 months	No	67,013
18991156	13603 Baltimore Ave	9	#2 Al XLP-NJ	2	268	Two faults in 24 months	No	10,902
18993923	7270 Montgomery Rd	33	#2 Al EPR-J	1	476	Two faults in 24 months	No	6,962
18993982	300 Pontiac Ave	45	#2 Al XLP-NJ	1	145	Two faults in 24 months	No	49,608
18994026	1150 Reece Rd	45	#2 Al XLP-NJ	5	508	Two faults in 24 months	No	10,797
18994168	10539 Greenbelt Rd	43	#2 Al XLP-NJ	44	3197	Two faults in 24 months	No	75,133
19010533	7300 McClean Blvd	17	#2 Cu HMW	4	446	Two faults in 24 months	No	10,437
19029946	10301 Broom Ln	42	#2 Al XLP-NJ	117	4937	Two faults in 24 months	No	121,211
19038282	852 Stevenson Rd	43	#2 Al XLP-NJ	6	2056	Two faults in 24 months	No	15,493
19056653	8866 Kelso Dr	52	#2 Al XLP-NJ	16	2945	Two faults in 24 months	No	279,671
19057253	576 Stocketts run rd	36	#2 Al HMW	81	29717	Proactive replacement - Cable fault rate exceeds 30.0	No	700,199
19041176	5401 Old-Court rd	5	#2 Al XLP-J	1	138	Two faults in 24 months	Yes	27,761
19077863	1601 Roam Ct	49	#2 Al HMW	5	5844	Proactive replacement - Cable fault rate exceeds 30.0	No	112,995
19079436	2 Darbytown Ct	40	#2 Al XLP-NJ	25	637	Two faults in 24 months	No	2,344
19079526	12205 Stoney Batter	39	#2 Al XLP-J	4	1290	Two faults in 24 months	No	6,659
19084223	12 Pleasant Valley	16	#2 Al HMW	8	336	Two faults in 24 months	No	1,334
19085413	5160 Talbots landing	31	#2 Al XLP-J	41	830	Two faults in 24 months	No	3,422
19085657	10 Locust st	25	#2 Al EPR-J	94	456	Two faults in 24 months	No	19,608
19087636	1401 Chesaco ave	47	#2 Al XLP-NJ	19	537	Two faults in 24 months	No	3,605
19086139	3706 Crondall Ln	28	#2 Al EPR-J	2	2325	Two faults in 24 months	No	30,332
19078315	16209 Dustin Ct	46	#2 Al XLP-J	2	247	Two faults in 24 months	No	1,162
19103303	2728 Bachman rd	40	#2 Al XLP-NJ	31	582	Two faults in 24 months	No	2,482
19137960	2033 Sue Creek Dr	40	#2 Al XLP-NJ	3	509	Two faults in 24 months	No	5,760
19159960	7907 Ellenham ave	43	#2 Al XLP-NJ	2	195	Two faults in 24 months	No	18,059
19237809	8700 Old Annapolis Rd	21	500 Al EPR	250	2490	Two faults in 24 months	No	217,523
19198537	2038 Powers la	34	#2 Al XLP-J	6	532	Two faults in 24 months	No	17,469
19200702	2155 Blacks-schoolhouse rd	27	#2 Al XLP-J	8	776	Two faults in 24 months	No	33,368
19261295	337 Fox rd	24	#2 Cu HMW	2	330	Two faults in 24 months	No	5,967
19261577	1304 Hickory Springs Cir	46	#2 Cu HMW	63	490	Two faults in 24 months	No	26,534
19261814	2895 Conway rd	46	#2 Al XLP-NJ	7	783	Two faults in 24 months	No	8,519
19262089	3707 Rockdale rd	47	#2 Al XLP-NJ	4	2033	Two faults in 24 months	No	6,415
19277909	4213 Garland ave	46	#2 Al XLP-NJ	45	3092	Two faults in 24 months	No	33,974
19272057	4620 Dave Rill Rd	46	#2 Al XLP-NJ	2	1000	Two faults in 24 months	No	1,523
19272274	161 Jennifer rd	37	#2 Al EPR-J	16	800	Two faults in 24 months	No	23,690
19322147	320 Wembly Way	40	#2 Al XLP-NJ	19	6176	Proactive replacement - Cable fault rate exceeds 30.0	No	341,146
19321966	527 Chatterton rd	47	#2 Al XLP-NJ	440	5658	Proactive replacement - Cable fault rate exceeds 30.0	No	119,516
19330071	6411 Oak-Hill dr	48	#2 Al XLP-NJ	14	2215	Proactive replacement - Cable fault rate exceeds 30.0	No	71,936
19330325	1610 Watervale rd	42	#2 Al XLP-NJ	6	1521	Two faults in 24 months	No	48,078
19330620	2300 Monkton Rd	52	#2 Al HMW	6	530	Two faults in 24 months	No	2,947
19342208	s738 Maryland-rt-3 N	49	#2 Al HMW	4	175	Two faults in 24 months	No	11,159
19344896	8144 Silo Rd	30	#2 Al XLP-NJ	301	14688	Proactive replacement - Cable fault rate exceeds 30.0	No	299,004
19356870	1701 Pomona Dr	47	#2 Al XLP-NJ	285	7376	Proactive replacement - Cable fault rate exceeds 30.0	No	267,370
19358350	8636 Town and Country blvd	57	#2 Cu HMW	203	4159	Proactive replacement - Cable fault rate exceeds 30.0	No	146,538

19358784	11705 Caverly av	53	#2 Al XLP-NJ	28	1796	Proactive replacement - Cable fault rate exceeds 30.0	No	110,055
19364030	123 Wood rd	39	#2 Al XLP-NJ	79	11976	Proactive replacement - Cable fault rate exceeds 30.0	No	621,490
19370797	530 Ridge rd	54	#2 Al XLP-NJ	3	681	Two faults in 24 months	No	129,366
19370862	7210 Aviation blvd	28	#2 Al EPR-J	10	1095	Two faults in 24 months	No	105,259
19394131	2204 Dulany Terr	49	#2 Al XLP-NJ	70	12130	Proactive replacement - Cable fault rate exceeds 30.0	No	303,581
19421722	1328 Jones Station rd	44	#2 Al XLP-NJ	2	1740	Proactive replacement - Cable fault rate exceeds 30.0	No	52,158
19398209	2323 Susanann dr	53	#2 Al HMW	15	4796	Two faults in 24 months	No	27,152
19439435	120 N langley rd	49	750 Al XLP-J	408	1578	Two faults in 24 months	No	140,430
19457147	3736 White-Pine Rd	58	#2 Al HMW	420	7480	Proactive replacement - Cable fault rate exceeds 30.0	No	131,751
19421280	7882 Americana Cir	56	#2 Cu HMW	234	4910	Proactive replacement - Cable fault rate exceeds 30.0	No	159,376
19432331	9409 Riverbrink Ct	40	#2 Al XLP-NJ	149	14234	Proactive replacement - Cable fault rate exceeds 30.0	No	403,948
19443391	1172 Great Oak Ct	47	#2 Al XLP-NJ	10	2157	Two faults in 24 months	No	47,074
19445149	130 Washington rd	49	#2 Al HMW	3	356	Two faults in 24 months	No	17,104
19445458	1611 Mountain rd	15	#2 Al XLP-J	1	1240	Bare concentric neutrals (Exposed)	No	14,959
19452450	4710 Hale-haven dr	38	#2 Al XLP-NJ		1750	Bare concentric neutrals (Exposed)	No	33,750
19453198	9100 Guilford rd	21	500 Al EPR	1	510	Recommended from Engineering	No	63,421
19480934	9127 Summer-park dr	46	#2 Al XLP-NJ	94	5267	Proactive replacement - Cable fault rate exceeds 30.0	No	261,626
19508772	4831 Geeting rd	42	#2 Al HMW	11	4876	Proactive replacement - Cable fault rate exceeds 30.0	No	119,888
19498332	7317 Parkway Dr S	41	#2 Al XLP-NJ	4	955	Two faults in 24 months	No	49,552
19498603	1773 Bayside Beach rd	38	#2 Al HMW	1	145	Two faults in 24 months	No	6,555
19500584	1893 Eden-mill rd	41	#2 Al XLP-NJ	5	2341	Recommended from Engineering	No	64,916
19528328	203 Ridgely av	44	#2 Al XLP-NJ	6	230	Two faults in 24 months	No	19,819
19524431	3864 Ivory rd	37	#2 Al XLP-NJ	1	227	Two faults in 24 months	No	19,188
19531942	399 Singer rd	31	500 Al EPR	1299	865	Two faults in 24 months	No	87,428
19555561	18800 Cooper rd	49	#2 Al HMW	1	530	Two faults in 24 months	No	18,176
19595237	1817 Portal St	38	#2 Al XLP-NJ	3	648	Two faults in 24 months	No	26,149
19613127	514 Priestford Rd	21	#2 Al XLP-NJ	2	884	Two faults in 24 months	No	65,075
19613363	6700 Security Blvd	34	#2 Al XLP-J	2	554	Two faults in 24 months	No	65,485
19615519	7759 Washington Blvd	21	#2 Al XLP-NJ	2	1432	Two faults in 24 months	No	88,745
19615137	7518 Rainflower Way	39	#2 Al XLP-J	17	554	Two faults in 24 months	No	58,439
19615284	915 Baltimore Blvd	41	#2 Al HMW	2	340	Two faults in 24 months	No	17,523
19617335	8572 Fort Smallwood Rd	38	#2 Al XLP-NJ	2	1380	Two faults in 24 months	No	60,648
19619237	1318 N Bend Rd	61	#2 Al XLP-NJ	1	653	Two faults in 24 months	No	20,885
19619446	740 Crandell Rd	39	#2 Al HMW	3	3311	Two faults in 24 months	No	62,966
19649885	16307 Markoe Rd	41	#2 Al HMW	7	3423	Proactive replacement - Cable fault rate exceeds 30.0	No	32,600
18993982	300 Pontiac Ave	46	#2 Al XLP-NJ	1	185	Two faults in 24 months	No	49,608
19685625	18 Straw Hat Rd.	60	#2 Cu HMW	23	169	Two faults in 24 months	No	5,073
19669027	8304 Dogwood Rd.	21	#2 Al XLP-NJ	1	1167	Two faults in 24 months	No	41,783
19669307	314 Darlington Rd	30	#2 Al XLP-NJ	3	769	Two faults in 24 months	No	40,270
19669430	120 Defense Hwy	37	#2 Al EPR-J	36	108	Two faults in 24 months	No	4,688
19675058	878 Stevenson Rd.	53	#2 Al XLP-NJ	1	366	Two faults in 24 months	No	21,026
19671629	1731 Cosner Rd.	27	#2 Al XLP-NJ	1	379	Two faults in 24 months	No	9,892
19707063	2708 Willow-Glen Dr.	55	#2 Al HMW	27	1273	Proactive replacement - Cable fault rate exceeds 30.0	No	51,094
19715398	131 Clarence Ave	38	#2 Al XLP-NJ	16	772	Two faults in 24 months	No	39,508
19721391	11747 Clarksville Pl	19	#2 Al XLP-NJ	4	1859	Two faults in 24 months	No	62,926
19748393	1840 Littlestown Pike	42	#2 Al XLP-NJ	2	987	Two faults in 24 months	No	41,606
20056602	650 River rd	33	#2 Al XLP-NJ	77	10661	Recommended from Engineering	No	538,277
20164292	3711 Green Spring rd	37	#2 Al XLP-NJ	5	3139	Recommended from Engineering	No	45,716
20199275	1 E Joyce Ln	42	#2 Al XLP-J	1	714	Two faults in 24 months	No	24,504
20269972	2812 Haddaway Dr	9	#2 Al XLP-J	0	759	Two faults in 24 months	No	37,635

Top 100 Backlog of Primary Cable Replacement Jobs

Work Order#	Year Created	Address	Feeder	Priority Points*	Cable Age (Yrs)	Conductor Material	Number of Customers	Total Cable Length (ft)	Reason for Replacement	Estimated Direct Cost ($)
21108837	2025	1512 Woodlawn Drive	7703	380.3	5	500 Al XLP-NJ	1713	993	Proactive replacement - Cable fault rate exceeds 30.0	129,735
17214632	2021	461 Deale Rd	7424	299.9	43	500 Al XLP-NJ	890	817	2 or more faults in 24 months	117,648
20086170	2025	14908 Cherrywood Dr	7264	162.9	42	#2 Al XLP-NJ	124	6915	Proactive replacement - Cable fault rate exceeds 30.0	374,516
20103261	2025	4212 Bar-Harbor Pl	7429	155.6	13	#2 Al XLP-NJ	116	9667	Proactive replacement - Cable fault rate exceeds 30.0	523,565
18861933	2023	806 221st St	7788	140.3	39	#2 Al XLP-NJ	158	5887	2 or more faults in 24 months	509,679
20961758	2026	1929 Harbinger Trail	7054	117.7	54	#2 Al HMW	242	10339	Proactive replacement - Cable fault rate exceeds 30.0	506,460
19941581	2025	6812 Maple Leaf Ct	7103	117.4	54	#2 Al HMW	231	13111	Proactive replacement - Cable fault rate exceeds 30.0	709,961
20679821	2025	5639 Thelo Garth	7657	103.5	48	#2 Al XLP-NJ	67	964	Proactive replacement - Cable fault rate exceeds 30.0	52,210
20632258	2025	444 Old Mill Road	7346	99.8	43	#2 Al XLP-NJ	64	5685	Proactive replacement - Cable fault rate exceeds 30.0	307,900
18885921	2023	38 City Gate Ln	7408	96.1	42	#2 Al XLP-NJ	24	1098	2 or more faults in 24 months	95,417
20944385	2025	5434 Phelps Luck Drive	7657	91.3	54	#2 Al HMW	168	9729	Proactive replacement - Cable fault rate exceeds 30.0	526,923
18879530	2023	3811 Hudee Dr	7429	80.1	8	#2 Al XLP-NJ	32	2685	2 or more faults in 24 months	140,309
20699599	2025	5527 Woodenhawk Circle	7607	72.7	53	#2 Al HMW	128	2069	Proactive replacement - Cable fault rate exceeds 30.0	112,057
18828656	2023	Houcks Rd	8052	67.3	38	#2 Al XLP-NJ	43	8344	2 or more faults in 24 months	529,072
19941581	2024	6812 Maple Leaf Ct	7103	66.9	54	#2 Al HMW	231	13111	Proactive replacement - Cable fault rate exceeds 30.0	709,961
20172723	2025	13875 Rover mill rd	7694	65.9	48	#2 Al XLP-NJ	39	10658	Proactive replacement - Cable fault rate exceeds 30.0	577,237
21109656	2025	7 Bethway Drive	8233	56.6	59	#2 Al HMW	96	2423	Proactive replacement - Cable fault rate exceeds 30.0	131,230
19988875	2025	11615 Laurel-Bowie Rd	7298	53.9	41	#2 Al XLP-NJ	31	8205	Proactive replacement - Cable fault rate exceeds 30.0	444,383
19259666	2023	338 Clubhouse rd	7160	42.6	29	#2 Al XLP-NJ	19	5735	2 or more faults in 24 months	246,605
20604144	2025	815 Cold-Spring Road	8521	39.3	20	750 Cu P/L	718	4198	Proactive replacement - Cable fault rate exceeds 30.0	548,469
21031617	2025	6311 Old Washington Road	8230	37.8	53	#2 Al XLP-NJ	21	8320	Proactive replacement - Cable fault rate exceeds 30.0	450,611
21085360	2025	3565 Cemetery Lane	7237	37.8	47	#2 Al XLP-NJ	21	4945	Proactive replacement - Cable fault rate exceeds 30.0	267,821
21056846	2025	6027 Fairfield Lane	8232	37.8	58	#2 Al XLP-NJ	21	4060	Proactive replacement - Cable fault rate exceeds 30.0	219,890
19980342	2025	1901 Lyden Rd	8143	36.0	58	#2 Cu HMW	58	6925	Proactive replacement - Cable fault rate exceeds 30.0	375,058
19993173	2025	445 JEWELL RD	8546	34.5	28	500 Al EPR	474	1470	Proactive replacement - Cable fault rate exceeds 30.0	192,056
20968647	2025	2727 Fridinger Mill Road	8221	34.5	47	#2 Al XLP-NJ	19	7049	Proactive replacement - Cable fault rate exceeds 30.0	381,774
20168094	2025	7001 Bembe beach rd	7491	33.3	51	500 Al XLP-J	254	1030	Proactive replacement	134,570
20999973	2025	3101 Baltimore Boulevard	7244	32.8	61	#2 Al XLP-NJ	18	6788	Proactive replacement - Cable fault rate exceeds 30.0	367,638
20801081	2025	3 Jordan Mill Court	8121	32.8	48	#2 Al XLP-NJ	18	6018	Proactive replacement - Cable fault rate exceeds 30.0	325,935
20551205	2025	9601 Dundawan Rd	8032	32.3	58	#2 Al HMW	52	3259	Proactive replacement - Cable fault rate exceeds 30.0	176,507
20707878	2025	1341 Tall Timbers Drive	8473	31.1	44	#2 Al XLP-NJ	17	3113	Proactive replacement - Cable fault rate exceeds 30.0	168,600
20775768	2025	1244 Crows Nest Court	7488	29.3	47	#2 Al XLP-NJ	16	524	Proactive replacement - Cable fault rate exceeds 30.0	28,380
20378063	2025	4073 Waterview Drive	8410	28.8	15	#2 Al HMW	46	5261	Proactive replacement - Cable fault rate exceeds 30.0	284,936
19488385	2024	3613 Aspen Ct	7443	25.9	47	#2 Al XLP-NJ	14	5852	2 or more faults in 24 months	316,886
19988845	2025	745 Sharpsburg Dr	8385	25.9	30	#2 Al XLP-NJ	14	10776	Proactive replacement - Cable fault rate exceeds 30.0	583,628
20920756	2026	1005 Ivy Hill Road	8125	21.3	48	#2 Al XLP NJ	7	2242	Proactive replacement - Cable fault rate exceeds 30.0	104,972
19315438	2024	9055 Guilford rd	7903	20.5	23	#2 Al XLP-NJ	11	557	2 or more faults in 24 months	30,162
20691096	2025	7979 Drumbeat Place	7774	20.5	45	#2 Al XLP-NJ	11	629	Proactive replacement - Cable fault rate exceeds 30.0	34,067
18868151	2023	1007 Gorsuch Garth	7083	20.5	44	#2 Al XLP-NJ	8	1854	2 or more faults in 24 months	86,688
19984147	2025	3102 Huntmaster Way	8834	19.8	22	#2 Al HMW	31	10763	Proactive replacement - Cable fault rate exceeds 30.0	582,924
18758251	2023	756 Fairview Ave	7489	19.0	58	#2 Cu HMW	91	5894	Recommended from Engineering	262,042
19941444	2024	4010 Dalrymple Rd	7468	19.0	23	#2 Al XLP-NJ	10	3419	2 or more faults in 24 months	185,139
19941444	2025	4010 Dalrymple Rd	7468	18.8	23	#2 Al XLP-NJ	10	3419	2 or more faults in 24 months	185,139
20583068	2025	1 Fairhill Drive	7944	18.7	48	#2 Al XLP-NJ	10	1980	Proactive replacement - Cable fault rate exceeds 30.0	107,237
19797536	2024	2901 Fallston Rd	8048	17.9	14	#2 Al XLP-NJ	19	17554	2 or more faults in 24 months	950,549
20599522	2025	406 S Parrish Street	7832	17.8	23	1/O	117	1200	Proactive replacement - Cable fault rate exceeds 30.0	64,992
20551313	2025	4015 Security Lane	8050	16.9	21	#2 Al XLP-NJ	9	1253	Proactive replacement - Cable fault rate exceeds 30.0	67,862
20753410	2025	1765 Crofton Parkway	8460	16.7	56	#2 Al HMW	26	2608	Proactive replacement - Cable fault rate exceeds 30.0	141,249
18765904	2023	8933 Waltham-Woods Rd	7544	16.6	57	#2 Cu HMW	79	5442	Recommended from Engineering	241,187
19834307	2024	7 Norham Court	7566	15.2	22	#2 Al HMW	193	18360	2 or more faults in 24 months	994,194
20970390	2025	3821 Rinehart Road	8223	15.1	50	#2 Al XLP-NJ	8	3898	Proactive replacement - Cable fault rate exceeds 30.0	211,116
20676883	2025	1030 Henryton Road	7790	13.3	51	#2 Al XLP-NJ	7	2955	Proactive replacement - Cable fault rate exceeds 30.0	160,043
19991706	2025	14907 Athey Rd	7289	13.3	41	#2 Al XLP-NJ	7	7824	Proactive replacement - Cable fault rate exceeds 30.0	423,748
20378153	2025	3315 Mt Carmel Road	7131	11.4	48	#2 Al XLP-NJ	6	3537	Proactive replacement - Cable fault rate exceeds 30.0	191,564
20309917	2025	413 Leppo rd	7236	11.4	38	#2 Al XLP-NJ	6	4046	Proactive replacement - Cable fault rate exceeds 30.0	219,131
21047296	2025	754 Lucabaugh Mill Road	7214	10.4	51	#2 Al HMW	16	3779	Proactive replacement - Cable fault rate exceeds 30.0	204,671
18891616	2023	7120 Furnace Branch Rd	7333	9.8	51	#2 Al HMW	12	301	2 or more faults in 24 months	12,943
20603761	2025	2315 Edwards Lane	8066	9.6	48	#2 Al XLP-NJ	5	762	Proactive replacement - Cable fault rate exceeds 30.0	41,270
20670368	2025	20612 New-Hampshire Avenue	8735	9.6	47	#2 Al XLP-NJ	5	2342	Proactive replacement - Cable fault rate exceeds 30.0	126,843
20976009	2025	1888 Uniontown Road	8217	9.6	48	#2 Al XLP-NJ	5	1932	Proactive replacement - Cable fault rate exceeds 30.0	104,637
20500801	2025	7161 Deep Falls Way	7741	7.9	28	#2 Al XLP-J	177	2944	Proactive replacement	159,447
21047065	2025	1616 Green Mill Road	7241	7.7	20	#2 Al XLP-NJ	4	1628	Proactive replacement - Cable fault rate exceeds 30.0	88,172
20922760	2025	4013 Bixler Church Road	8223	7.7	47	#2 Al XLP-NJ	4	1413	Proactive replacement - Cable fault rate exceeds 30.0	76,528
18887341	2023	408 Webb La	8980	7.5	21	#2 Al XLP-NJ	3	818	2 or more faults in 24 months	36,464
18751877	2023	4215 Webster-Lapidum rd	7944	7.4	30	#2 Al HMW	29	9703	2 or more faults in 24 months	515,656
20396564	2025	515 Albemarle Street	8610	7.0	28	750 Al XLP-J	119	1465	Proactive replacement	191,402
20976354	2026	7760 Notley Road	7786	6.9	47	#2 Al XLP J	59	1754	Recommended from Engineering	174,432

19315571	2024	7226 Orth rd	7572	5.9	45	#2 Al HMW	9	225	2 or more faults in 24 months	12,184
19315522	2024	1912 Ednor rd	7251	5.8	35	#2 Al XLP-NJ	3	644	2 or more faults in 24 months	34,873
19718994	2024	7805 Parke west dr	8314	5.8	16	#2 Al XLP-NJ	3	609	2 or more faults in 24 months	32,977
20820033	2025	5400 Landing Road	8492	5.8	44	#2 Al XLP-NJ	3	1927	Proactive replacement - Cable fault rate exceeds 30.0	104,366
21035329	2025	421 Obrecht Road	8233	5.8	46	#2 Al XLP-NJ	3	501	Proactive replacement - Cable fault rate exceeds 30.0	27,134
20500801	2025	7111 Beverly Drive	7743	5.8	19	#2 Al XLP-J	128	604	Proactive replacement	32,713
19344379	2024	6015 Wild-ginger Ct	7603	4.9	40	#2 Al XLP-J	95	750	2 or more faults in 24 months	40,613
18226991	2022	510 Hope Chapel Rd	7464	4.0	37	#2 Al XLP-NJ	2	462	2 or more faults in 24 months	24,024
20669545	2025	2521 Bradfield Avenue	8029	4.0	50	#2 Al HMW	6	2190	Proactive replacement - Cable fault rate exceeds 30.0	118,610
19989231	2025	2222 Daisy Rd	7692	4.0	48	#2 Al HMW	6	9302	Proactive replacement - Cable fault rate exceeds 30.0	503,796
20625866	2025	1817 Portal Street	7584	3.9	39	#2 Al XLP-NJ	2	848	Proactive replacement - Cable fault rate exceeds 30.0	45,928
20631942	2025	2011 Phillips Mill Road	8048	3.9	17	#2 Al XLP-NJ	2	658	Proactive replacement - Cable fault rate exceeds 30.0	35,637
20583101	2025	3601 Jarrettsville Pike	8052	3.9	34	#2 Al XLP-NJ	2	483	Proactive replacement - Cable fault rate exceeds 30.0	26,159
21111897	2025	15015 Martlock Road	7692	2.6	51	#2 Al HMW	4	989	Proactive replacement - Cable fault rate exceeds 30.0	53,564
20911916	2025	121 Madison Ave	8150	2.6	51	#2 Al HMW	4	1050	Proactive replacement - Cable fault rate exceeds 30.0	56,868
21099736	2026	160 Funke Road	8313	2.5	33	#2 Cu HMW	2	470	2 or more faults in 24 months	25,346
18891031	2023	1079 Crain HWY	8555	2.4	39	#2 Al XLP-NJ	1	687	2 or more faults in 24 months	29,541
18637171	2023	7201 Rossville Blvd	7591	2.4	42	#2 Al XLP-NJ	1	360	2 or more faults in 24 months	15,480
21060629	2025	206 Gwynnbrook Avenue	7222	2.0	18	#2 Al HMW	3	453	Proactive replacement - Cable fault rate exceeds 30.0	24,534
20378566	2025	2642 Mt Carmel Road	7131	2.0	52	#2 Al HMW	3	1509	Proactive replacement - Cable fault rate exceeds 30.0	81,727
19788721	2024	9380 Gerwig Ln	7653	1.9	23	#2 Al XLP-NJ	1	343	2 or more faults in 24 months	18,573
20562020	2025	1421 Jewell Road	8546	1.9	21	#2 Al XLP-NJ	1	633	Proactive replacement - Cable fault rate exceeds 30.0	34,283
20340407	2025	227 South River Clubhouse Road	7463	1.9	47	#2 Al XLP-NJ	1	523	Proactive replacement - Cable fault rate exceeds 30.0	28,326
20551492	2025	3316 North Furnace Road	8053	1.9	48	#2 Al XLP-NJ	1	415	Proactive replacement - Cable fault rate exceeds 30.0	22,476
20911552	2025	2R 3400 Carlins Park Dr	8000	1.9	45	#2 Al XLP-NJ	1	269	Proactive replacement - Cable fault rate exceeds 30.0	14,569
20127039	2025	672 Harwood rd	7443	1.9	47	#2 Al XLP-NJ	1	263	Proactive replacement - Cable fault rate exceeds 30.0	14,244
21041470	2025	3741 Butler Road	8799	1.9	47	#2 Al XLP-NJ	1	1045	Proactive replacement - Cable fault rate exceeds 30.0	56,597
21O57032	2025	1321 Gorsuch Road	7214	1.9	47	#2 Al XLP-NJ	1	879	Proactive replacement - Cable fault rate exceeds 30.0	47,607
20689564	2025	13570 Brighton Dam	8681	1.9	20	#2 Al XLP-NJ	1	703	Proactive replacement - Cable fault rate exceeds 30.0	38,074
21060326	2025	2116 Sterling Court	7233	1.9	16	#2 Al XLP-NJ	1	662	Proactive replacement - Cable fault rate exceeds 30.0	35,854
21038024	2025	4441 Millers Station Road	8222	1.9	46	#2 Al XLP-NJ	1	564	Proactive replacement - Cable fault rate exceeds 30.0	30,546
21043166	2025	4301 Alesia Road	8222	1.9	40	#2 Al XLP-NJ	1	277	Proactive replacement - Cable fault rate exceeds 30.0	15,002
20572909	2025	5011 Landing Road	8492	1.9	46	#2 Al XLP-NJ	1	181	Proactive replacement - Cable fault rate exceeds 30.0	9,803

*Cable replacement jobs with a lower cost per interruption receive a higher priority score (shown in column E).

Case No. 9888
Baltimore Gas and Electric Co.
Response to OPC Data Request 4
Request Received: August 11, 2026
Response Date: August 25, 2026
Sponsor(s): Laura A. Wright

Item No.: OPCDR04-27

Refer to JCF-7 Electric Distribution Plant Additions.pdf, PDF page 10, row for Project 67883, which describes the $9,556,737 project to replace oil circuit breakers (OCBs) because they are "costly to maintain," pose environmental risks, and parts are "becoming obsolete." Please Provide:

a. A comparison of the annual maintenance cost for an average OCB versus an average replacement vacuum breaker.
b. A list of all OCB failures in the last 10 years, including the cause of failure and any associated environmental cleanup costs. For each failure the CI and CMI associated with the failure.
c. A list of all OCBs replaced under this program since December 31, 2023, including i) age; ii) maintenance history; and iii) replacement cost.
d. A list of all OCBs on the BGE system with a higher maintenance cost or worse condition that were not being replaced since December 31, 2023;
e. A list of all OCB's on the BGE system remaining as of March 31, 2026.

RESPONSE:

a. Using three plus years (2023-2026) of actual CM and PM costs for OCBs and outdoor VCBs, average annual maintenance cost per OCB and VCB is:

Type	PM	CM	Total
OCB	$538.91	$350.49	***$889.39***
VCB	$102.46	$219.30	***$321.76***
Variance	*$436.45*	*$131.19*	***$567.64***

b. See *OPCDR04-27 Attachment 1* "Failure Data" tab for OCB failures in the last 10 years including cause for failure, CI, and CMI associated with each failure. Note: specific environmental cleanup costs could not be separated from the total failure mitigation efforts where they occurred, but they are infrequently necessary for a breaker failure.

c. See *OPCDR04-27 Attachment 2* for requested planned breaker replacement projects which includes age of breaker prior to replacement, number of Preventative Maintenance (PM) and Corrective Maintenance (CM) work orders, and replacement costs.

d. BGE has a methodology that factors in asset condition and excessive maintenance costs to select OCB replacement candidates for each year. OCB replacement candidates are

identified from oil testing (i.e. if oil tests bad enough, the OCB goes on the replacement list for the following year) and are run through BGE's OCB health algorithm. Also considered are additional OCB replacements in the same substation as a troubled OCB to maximize construction and cost efficiency.

e. See OPCDR04-27 Attachment 1 "OCBs - 20260813" tab for the current list of distribution OCBs (as of 8/13/2026).

Failure Data

Date	Substation	Equipment Position	Cause	Customer Interruptions	Customer Interruption Minutes
6/21/2016	Defense Highway	7430	Component Failure	5479	134935
8/16/2016	Bethany	7278	Component Failure	2960	211599
1/23/2017	Dolfield	33633	Stuck Breaker	0	0
3/1/2017	Cedar Park	33668	Stuck Breaker	0	0
7/12/2017	Defense Highway	7432	Stuck Breaker	4474	274765
7/19/2017	Montpelier	7280	Component Failure	3503	291026
8/4/2017	Sudbrook Park	7185	Bushing	0	0
12/13/2017	Riverside	33974	Stuck Breaker	0	0
4/13/2018	Wagner	33711	Component Failure	0	0
6/24/2018	Cedar Park	33668	Stuck Breaker	0	0
11/10/2018	Defense Highway	7430	Component Failure	4002	119888
3/7/2019	Gray Manor	7521	Stuck Breaker	513	26463
5/29/2019	Monument St.	7896	Bushing	1546	95477
7/2/2019	Defense Highway	7431	Stuck Breaker	3987	137809
9/4/2019	Sudbrook Park	33637	Stuck Breaker	3567	41351
10/6/2019	Frederick Road	33643	Stuck Breaker	9570	275257
10/16/2019	Cockeysville	7161	Stuck Breaker	501	454111
1/8/2020	White Rock	33652	Stuck Breaker	0	0
5/22/2020	Sudbrook Park	33637	Stuck Breaker	0	0
11/7/2020	Cockeysville	7161	Stuck Breaker	566	98282
3/18/2021	Texas	33602	Stuck Breaker	0	0
4/17/2021	Gray Manor	7521	Stuck Breaker	0	0
5/26/2021	Defense Highway	7431	Component Failure	5009	114722
8/5/2021	Shipley	33764	Component Failure	0	0
11/15/2021	Texas	33602	Stuck Breaker	0	0
11/22/2021	Sudbrook Park	33637	Stuck Breaker	3469	212440
1/3/2022	NAJ	33685	Stuck Breaker	3436	77913
1/16/2022	Sudbrook Park	33637	Stuck Breaker	15	477
2/25/2022	White Rock	33652	Stuck Breaker	1864	25422
3/26/2022	Cockeysville	7161	Stuck Breaker	1305	54785
6/13/2022	Sudbrook Park	7180	Catastrophic Failure	11596	1077070
9/13/2022	Harrisonville	7174	Stuck Breaker	2102	65830

Failure Data

11/11/2022	**High Ridge**	33730	Stuck Breaker	3	46
12/23/2022	**Sudbrook Park**	33635	Stuck Breaker	37	574
12/23/2022	**White Rock**	33653	Stuck Breaker	0	0
4/28/2023	**White Rock**	33652	Stuck Breaker	2847	64644
8/12/2023	**Rockdale**	7112	Component Failure	2380	14707
9/23/2023	**Ferndale**	7331	Stuck Breaker	3331	91260
1/28/2024	**NAJ**	33685	Stuck Breaker	3750	33843
3/10/2024	**Sudbrook Park**	33635	Stuck Breaker	1156	10211
9/22/2024	**White Rock**	33652	Stuck Breaker	74	21942
11/20/2024	**Cockeysville**	7162	Stuck Breaker	116	11126
11/26/2024	**Sudbrook Park**	7187	Stuck Breaker	885	69508
12/5/2024	**Cockeysville**	7162	Stuck Breaker	121	16424
12/10/2024	**Lipins Corner**	7344	Stuck Breaker	576	29177
2/16/2025	**Meadows**	7705	Stuck Breaker	117	26095
2/16/2025	**Glenarm**	8075	Component Failure	2	773
2/16/2025	**Sudbrook Park**	33635	Stuck Breaker	0	0
3/1/2025	**Carney**	7544	Stuck Breaker	2755	46516
5/16/2025	**Cockeysville**	7164	Stuck Breaker	2211	1671754
7/14/2025	**Wakefield**	8057	Stuck Breaker	951	11664
9/24/2025	**Harrisonville**	7174	Stuck Breaker	878	53996
10/27/2025	**Harrisonville**	7173	Stuck Breaker	670	6320
11/16/2025	**Sudbrook Park**	33635	Stuck Breaker	0	0
12/29/2025	**White Rock**	33652	Stuck Breaker	181	85627
3/15/2026	**White Rock**	33652	Stuck Breaker	22	1752
7/4/2026	**Mitchellville**	7441	Component Failure	0	0
7/31/2026	**Lipins Corner**	7344	Stuck Breaker	1586	231247
Grand Total				**94113**	**6288828**

Location	Name	Replacement Date	Age	CM Work Order Count	PM Work Order Count	Replacement Cost
Carney B1	7546	10/20/2025	59	4	15	$127,491
Carney B10	7543	6/30/2025	56	3	14	$111,283
Carney B3	7540	11/5/2025	54	6	15	$111,891
Carney B6	7544	11/24/2025	53	3	17	$120,469
Carney B7	7542	10/20/2025	59	1	14	$111,539
Carney B9	7545	6/11/2025	52	3	15	$118,306
Cedar Park B3	33667	5/2/2025	54	12	18	$237,622
Cedar Park B4	33669	5/19/2025	54	4	18	$198,712
Cedar Park B7	33665	9/15/2025	55	10	16	$188,210
Cedar Park B8	33666/65 BKR	10/2/2025	55	12	18	$232,148
Cedar Park B9	33666	4/21/2025	57	3	17	$122,817
Dolfield B23	8202	3/27/2024	51	2	20	$493,224
Dolfield B26	13110	3/27/2024	51	0	14	$280,400
Eastpoint B1	33707	11/1/2024	70	3	15	$543,104
Eastpoint B2	33707/703	11/21/2024	70	4	16	$149,351
Eastpoint B3	33703	3/28/2024	69	6	17	$187,039
Eastpoint B4	33709	10/30/2025	71	10	17	$383,413
Eastpoint B5	33702/709	10/30/2025	71	7	18	$582,081
Eastpoint B6	33702	10/30/2025	71	14	17	$202,814
Eastpoint B7	2-3 BUS SECT SW	11/5/2025	69	10	18	$289,883
Gunpowder B10	33616	11/18/2024	54	1	17	$405,834
Gunpowder B2	110-1 TR	9/20/2024	84	2	7	$282,378
Gunpowder B5	33610	10/3/2024	68	13	14	$270,488
Gunpowder B6	110-2 TR	10/2/2024	53	1	20	$222,702
Gunpowder B9	110-3 TR	10/18/2024	68	5	17	$260,218
Long Reach B4	7631	4/1/2024	54	2	15	$211,082
Long Reach B7	7632	4/1/2024	53	2	14	$194,831
Shipley B1	7360	9/16/2024	57	1	14	$250,753
Shipley B4	7361	10/2/2024	57	3	15	$233,506
Shipley B7	7362	10/25/2024	57	4	14	$267,376
Sudbrook B10	7187	3/31/2025	56	6	15	$216,155
Sudbrook B11	7186/7187	4/16/2025	56	2	16	$147,153
Sudbrook B12	7186	5/7/2025	56	6	15	$133,798
Sudbrook B16	7184	5/29/2025	57	9	15	$164,618
Sudbrook B17	7181/7184	6/17/2025	57	2	16	$158,967
Sudbrook B18	7181	7/14/2025	58	4	15	$100,610
Timonium B1	7150	5/15/2024	54	0	14	$213,243
Timonium B4	7151	5/15/2024	54	3	14	$175,648
Wagner B1	33714	5/17/2024	68	10	18	$308,528
Wagner B4	33712	6/3/2024	68	7	17	$312,822

Case No. 9888
Baltimore Gas and Electric Co.
Response to OPC Data Request 4
Request Received: August 11, 2026
Response Date: August 25, 2026
Sponsor(s): Laura A. Wright

Item No.: OPCDR04-28

Refer to JCF-7 Electric Distribution Plant Additions.pdf, PDF page 9, row for Project 61349, which describes the $8,893,750 project to upgrade transformer oil containment pits to comply with federal regulations. Please Provide:

a. A list of projects completed since December 31, 2023. For each substation pit upgraded under this program, identify
   i. the specific provision of the Clean Water Act or 40 CFR Part 112 with which it was not in compliance;
   ii. The cost of capital placed into service;
   iii. The relevant body of water requiring compliance, and the distance to that body;
   iv. The gallons of oil stored in the substation's equipment

b. For each upgrade, provide the analysis of alternatives considered (e.g., repair, partial replacement, full replacement) and the cost-benefit analysis that demonstrated the chosen upgrade was the least-cost method to achieve compliance.

RESPONSE:

a. See the table below:

Project Name	Substation	Body of Water	Dist to Body	Stored Oil	Total Cap Cost
MT WASHINGTON 110 4 110 5 XFMR OIL PIT UPGRADE	Mount Washington	Jones Falls	200 ft	12,270 gal	$2,402,116
LONG REACH 33 2 XFMR OIL PIT UPGRADE	Long Reach	Dorsey Run	0.4 miles	1,710 gal	$643,946
FAIRHAVEN 33 1 XFMR OIL PIT UPGRADE	Fairhaven	Lyons Creek	0.3 miles	1,999 gal	$719,839
SUDBROOK PARK 110 1 110 2 XFMR OIL PIT UPGRADE	Sudbrook Park	Tributary of Gywnns Falls	640 ft	27,765 gal	$1,604,144
COLUMBIA 230 4 XFMR OIL PIT UPGRADE	Columbia	Tributary of Lake Elkhorn	0.15 miles	36,837 gal	$1,277,326
LOCHEARN 33 2 XFMR OIL PIT UPGRADE	Lochearn	Gwynns Falls	480 ft	2,550 gal	$693,701
WHITEROCK XFMR OIL PIT UPGRADE	White Rock	Tributary of Piney Run Lake	250 ft	29,317 gal	$1,516,342
Total					**$8,857,415**

NOTE: For all projects above the requirement to provide containment for oil-filled transformers is derived from the EPA Spill Prevention, Control, and Countermeasure (SPCC) regulations in 40 CFR Part 112, specifically 40 CFR §112.7(c), which requires appropriate containment and/or diversionary structures or equipment to prevent oil discharges from reaching navigable waters of the United States or adjoining shorelines.

b. 61349: Distribution Substation Transformer Pit Upgrades address malfunctioning or obsolete pits. Projects are analyzed through inspections and then completed to comply with federal regulations.

Case No. 9888
Baltimore Gas and Electric Co.
Response to OPC Data Request 13
Request Received: August 31, 2026
Response Date: September 16, 2026
Sponsor(s): Laura A. Wright

Item No.: OPCDR13-01

Refer to the Company's response to OPCDR04-01.

a. Although OPC appreciates that some safety benefits might also be available, confirm that improving the reliability of electric service provided to customers in the City of Baltimore is the primary justification for BGE rebuilds of City Conduit that BGE does not own. If this cannot be confirmed, please explain.
b. Please provide a list of all OSHA-reportable safety incidents associated with City Conduit failures from January 1, 2021 through December 31, 2025. Provide the OSHA report for each such incident (with all information that might identify a person or BGE customer removed).
c. Provide any information of which BGE is aware that indicates the reliability, as measured by SAIDI and SAIFI, of electric service provided to customers in the City of Baltimore is substandard relative to that of customers located within the boundaries of other major US cities. Please list the cities and their related reliability statistics.

RESPONSE:

a. BGE evaluates whether a project achieved its intended purpose by confirming that the identified conduit system deficiencies were successfully addressed. This includes verification that obstructions were removed, failed facilities were repaired or replaced, and that outages and service reliability issues were resolved. BGE also confirms that completed projects result in clean and accessible ducts that are available for future cable installations and system needs.

   In addition, the completion of duct bank and manhole reconstruction projects provides tangible operational benefits that are consistent with the objectives assumed in the BCA. Rebuilt manholes are larger, and safer for employee and contractor access, improving working conditions and supporting future system expansion. Reconstructed duct banks and manholes increase available conduit capacity and can accommodate new cable installations, reducing constraints on future reliability and load-serving projects.

   While BGE does not track actual realized reliability benefits on a project-by-project basis for comparison to modeled BCA outputs, successful completion of the planned work and achievement of the underlying project objectives provide evidence that the anticipated reliability, operational, safety, and capacity benefits have been delivered. BGE's continued reliance on the BCA is supported by the fact that the projects address the specific infrastructure conditions, risks, and constraints identified during project development and are completed in a manner consistent with the scope, assumptions, and expected outcomes evaluated in the BCA.

b. See *OPCDR13-01 CONFIDENTIAL Attachment 1.*

c. BGE is not aware of a standardized source of city-to-city SAIDI and SAIFI comparisons and therefore cannot provide a list of major U.S. cities with comparable reliability statistics.

Case No. 9888
Baltimore Gas and Electric Co.
Response to OPC Data Request 13
Request Received: August 31, 2026
Response Date: September 16, 2026
Sponsor(s): Laura A. Wright

Item No.: OPCDR13-10

Refer to the project justification for Project 61523 in JCF-7, which states the project is needed when "A duct line cable fails or has exceeded its useful life." Also refer to: The Company's response to OPCDR04-11(a), which states "the criteria under which a cable should be replaced on an emergent basis is unrelated to its expected useful life."

a. An explanation for the direct contradiction between the project justification filed in JCF-7 and the response provided in OPCDR04-11(a).
b. Explain how the Company determines that a cable cannot be safely repaired. If so, how was that determined?
c. Has a cable ever been repaired and then it immediately failed? If so, what was the remedy for that section of cable?
d. Were there sections of cable that were repaired and did not fail again for more than a year?
e. What is the age of the oldest cable on the BGE system?
f. What does BGE consider the useful life a cable? What is that based on?
g. How many segments, (complete cable between connection points), were replaced by this project?
h. How many of those segments failed in each of the past 5 years? For each segment, provide the length of the segment and the number of failures that occurred in that segment prior to replacement.
i. An explanation of BGE's primary cable replacement policy, for example '3 failures in a segment then replace the segment' or 3 'failures in a circuit then replace the circuit' or other criteria. Please explain the basis for this policy.
j. Confirm that no spending under Project 61523 was for cable that was replaced because it "exceeded its useful life." If this cannot be confirmed, provide a list of all such replacements.

RESPONSE:

a. As all cable replaced under Project 61523 is failed cable that needs to be addressed on an emergent basis in order to restore service, whether or not the cable has met its useful life expectancy is irrelevant to the need to replace it.

b. The ability to safely repair a cable depends on a variety of factors including cable depth, the location's water table, if the fault is located in a roadway, if the neutral is in good condition, etc. The decision to repair or replace is based on judgement and expertise.

c. Yes. The general practice is to attempt to repair three times and, if the cable continues to fail when energized, to replace the cable.

d. Yes.

e. BGE estimates that the oldest section of cable in operation was installed in 1938.

f. The useful life of cable depends on factors such as cable composition and installation conditions.

g. There were 300 work orders for cable replacement completed under Project 61523 between January 1, 2024 and March 31, 2026.

h. The manual research and compilation of data that would be required to respond to this question is not achievable within the time frame allotted for discovery. Prior faults are visually mapped in BGE's Geographical Information System (GIS) and once a cable is replaced the fault visual markers are removed because they no longer apply to the new cable segment that is now in service.

i. When a fault occurs the first step is to attempt repair. If the repair is successful but there are multiple repairs that have been performed on the same segment of cable, the cable will be referred to be replaced. If the repair is not successful and customers are interrupted, the cable will be replaced immediately on an emergency basis.

j. BGE confirms that all cable replaced under Project 61523 was done due to corrective maintenance required and not due to cable age.

Case No. 9888
Baltimore Gas and Electric Co.
Response to OPC Data Request 13
Request Received: August 31, 2026
Response Date: September 16, 2026
Sponsor(s): Laura A. Wright

Item No.: OPCDR13-26

Refer to The Company's response to OPCDR04-28(b), which did not provide the requested analysis of alternatives considered for each pit upgrade. Please provide:

a. For each of the seven projects listed in the response to OPCDR04-28(a), provide the cost-benefit analysis that compared the chosen upgrade solution to lower-cost alternatives, including but not limited to in-place repair or partial replacement of the containment system.
b. If no such analysis was performed for a given project, please confirm that the Company did not analyze lower-cost alternatives before proceeding with the upgrade. If this cannot be confirmed, please provide such analyses.

RESPONSE:

a - b. BGE has previously considered alternatives when initiating the oil pit replacement program in 2015, including the general cost of soft-dig excavation compared to full pit replacement and the longer service life provided by replacing failed liners. Replacing the transformer pits that provide containment for oil-filled transformers delivered a long-term solution that complies with the requirement from the EPA Spill Prevention, Control, and Countermeasure (SPCC) regulations in 40 CFR Part 112; specifically, 40 CFR §112.7(c), which requires appropriate containment and/or diversionary structures or equipment to prevent oil discharges from reaching navigable waters of the United States or adjoining shorelines.

Additionally, BGE notes that while costs are certainly an important factor when evaluating potential projects, it is not the only factor when deciding what projects are necessary to support fulfillment of BGE's obligation to provide safe and reliable electric service to customers.

Case No. 9888
Baltimore Gas and Electric Co.
Response to OPC Data Request 14
Request Received: August 31, 2026
Response Date: September 16, 2026
Sponsor(s): Laura A. Wright

Item No.: OPCDR14-01

Refer to OPCDR04-03 CONFIDENTIAL Attachment 3, which provides a list of 264 non-network circuits that serve the City of Baltimore on lines 5 through 268. For each of these 264 circuits, please provide, or estimate:

a. The total length of the circuit (in miles), regardless of Baltimore City Limits;
b. The length of the circuit overhead (in miles), regardless of Baltimore City Limits;
c. The length of the circuit underground (in miles), regardless of Baltimore City Limits; and
d. The length of underground circuit miles provided in response to subpart (c) that are installed in City Conduit (in miles).

RESPONSE:

a.-c. See *OPCDR14-01 Attachment 1.*

d. Please see the response to StaffDR42-02.

CUSTOMERS BY FEEDER AND SEGMENT

Sum of customer counts for each feeder, split by customer segment

FEEDER	Large Commerical	Residential	Small Commercial	Grand Total	a. The total length of the circuit (in miles), regardless of Baltimore City Limits;	b. The length of the circuit overhead (in miles), regardless of Baltimore City Limits;	c. The length of the circuit underground (in miles), regardless of Baltimore City Limits
13008	1			1	1.341861974	0	1.341861974
13244	4		7	11	4.779300333	0.008285705	4.771014628
13246	3		15	18	6.582590887	0	6.582590887
13257	1			1	4.047695464	0.321732988	3.725962476
13330	1		13	14	7.360990659	0	7.360990659
13331	1	1	2	4	6.709206222	0	6.709206222
13602	2	226	2	230	5.271250765	1.410341425	3.860909341
13603	1		1	2	5.957937201	0.61873026	5.339206941
13703			1	1	1.211737894	0	1.211737894
13757	1		2	3	4.750542271	4.537569021	0.21297325
13758	7		10	17	9.69485745	8.604944079	1.089913371
13820	3		15	18	3.782183073	0	3.782183073
13821	1			1	0.528607964	0	0.528607964
13842	3			3	4.961326266	0	4.961326266
13843	3			3	3.561465994	0	3.561465994
13888	2	31		33	1.828289291	0.084632264	1.743657028
13889	6	176	11	193	1.828752324	0.09685186	1.731900464
13928	1			1	2.041077588	0	2.041077588
13930	2			2	3.332597636	0	3.332597636
13931	2			2	5.087979458	0	5.087979458
13936	76	28	3	107	4.611750632	0	4.611750632
13946	2			2	5.607034409	3.596188786	2.010845622
13951	1			1	2.130916721	0	2.130916721
13961	1			1	5.443978036	0.805262615	4.638715421
13970	10			10	9.384613382	3.459929031	5.924684351
33635	1		30	31	19.65888789	13.73664248	5.92224541
33636	5		14	19	17.88815565	13.84825138	4.039904266
33703		1	1	2	24.62714821	18.40894072	6.218207493
33704			1	1	20.24079006	15.93852187	4.302268198
33711	2		1	3	22.42200895	18.7245874	3.697421542

4020	29	588	80	697	52.0069868	11.40673618	40.60025062
4021	7	4	38	49	28.92656981	0.615123992	28.31144582
4116	17	422	39	478	29.03416285	17.91067235	11.1234905
4118	3	85	9	97	11.48506137	3.192395347	8.292666024
4123	25	159	29	213	23.74443188	7.494342531	16.25008935
4124	9	248	42	299	14.2873544	8.157011321	6.130343081
4421	4	411	8	423	35.51393101	24.33476522	11.17916579
4423	3	603	28	634	37.82209339	26.09653776	11.72555563
4424	6	359	30	395	25.42992395	15.73746394	9.692460002
4425	1	460	28	489	34.33064302	21.64069965	12.68994337
4429	5	427	59	491	33.31538514	30.74005864	2.575326497
4430	1	743	35	779	48.42410466	35.98878505	12.4353196
4431	4	301	47	352	26.22931487	18.50227722	7.727037655
4434	2	153	1	156	13.10249804	9.858429211	3.244068829
4436	4	633	27	664	55.57932863	49.61664358	5.962685053
4574	4	129	14	147	10.28989309	7.84176786	2.44812523
4577	6	462	29	497	35.84720362	25.74528526	10.10191836
4578	5	279	13	297	22.48943269	13.38578828	9.103644408
4581	5	224	30	259	19.77974878	16.14315289	3.636595896
4801	1	106	11	118	9.516391076	7.068751359	2.447639717
4803	4	135	14	153	10.02628792	7.835154676	2.191133247
4804	10	111	14	135	18.20808117	12.97536524	5.23271593
4805	5	163	17	185	20.32187677	14.29023678	6.031639987
4810	9	271	12	292	29.97385987	21.37274254	8.601117334
6040		305	7	312	0.628876019	0	0.628876019
6041		213	10	223	11.28089203	0	11.28089203
6042		54	2	56	12.37544419	0	12.37544419
6043			3	3	1.839726004	0	1.839726004
7000	4	235	86	325	11.40179868	5.804358301	5.597440382
7001	19	1366	134	1519	58.82051967	41.7646705	17.05584917
7002	29	1813	184	2026	93.1896473	64.27608256	28.91356474
7003	68	2724	332	3124	170.7357882	114.3349184	56.40086981
7004	54	631	102	787	34.9595079	8.656012031	26.30349587
7005	91	2042	486	2619	134.9150432	78.41971239	56.49533082
7006	75	2919	303	3297	135.9778676	97.48137516	38.49649245
7007	35	2386	130	2551	159.6112025	109.6257837	49.98541874

7008	28	2544	297	2869	134.9618252	89.55530902	45.40651617
7009	18	542	103	663	30.49396953	11.85249939	18.64147014
7010	43	1882	190	2115	46.04396744	27.22119235	18.82277509
7011	66	2174	339	2579	132.7081965	100.1849942	32.52320235
7012	22	1510	146	1678	77.73992831	47.01621763	30.72371067
7013	8	490	116	614	36.65589593	30.76439036	5.891505568
7014	22	1561	57	1640	110.8355659	89.54768911	21.28787683
7015	7	4	15	26	7.40893172	1.012503019	6.3964287
7017	30	1196	108	1334	80.09341616	39.71921796	40.3741982
7018	50	1187	237	1474	69.22670155	47.93450085	21.2922007
7019	47	2550	181	2778	202.7449821	123.3686584	79.37632375
7020	37	1617	113	1767	144.1286338	92.12861004	52.00002373
7021	26	1873	147	2046	126.1549917	93.3154622	32.83952952
7022	14	1487	76	1577	62.51729025	41.7369691	20.78032115
7023	54	369	199	622	77.43191177	44.4428782	32.98903357
7024	15	338	43	396	53.63866395	30.05373036	23.5849336
7025	15	140	53	208	24.47153706	8.119291503	16.35224555
7026	14	3030	40	3084	147.721476	120.9324441	26.7890319
7027	24	2536	109	2669	158.962079	116.7417437	42.22033531
7028	29	1117	89	1235	80.11465482	59.34948056	20.76517426
7038	25	1750	76	1851	129.7311099	90.95187359	38.77923635
7039	15	2201	51	2267	130.2121635	99.3057139	30.90644957
7040	3	886	1	890	51.86668094	37.56124301	14.30543793
7041	20	2282	73	2375	162.149874	113.955542	48.19433198
7042	19	1494	132	1645	110.8820032	78.2262802	32.65572297
7043	2		3	5	111.5211466	94.55543295	16.96571364
7044	24	2445	80	2549	123.0635399	85.63846267	37.42507727
7045	25	1596	77	1698	90.75902444	62.09707484	28.6619496
7046	16	1993	79	2088	101.3391819	72.1203362	29.21884566
7047	29	1748	114	1891	95.43317923	65.64524919	29.78793004
7048	22	765	29	816	79.48152624	42.16168939	37.31983684
7049	13	1778	71	1862	111.8724186	74.3588132	37.51360538
7101		2		2	75.22960509	75.22960509	0
7103	3	261	17	281	73.88788597	24.18161146	49.7062745
7104	44	1873	100	2017	144.5995119	102.661277	41.93823487
7106	20	783	87	890	86.31808739	55.22811283	31.08997456

7107	19	617	112	748	93.25492562	54.06406274	39.19086289
7108	3	382	19	404	9.007368256	2.544813677	6.462554579
7109	4	345	8	357	38.65178916	30.24228967	8.409499493
7110		24		24	5.235640584	2.171054347	3.064586237
7111	5	990	40	1035	116.4055415	79.17435224	37.23118927
7182	8	696	39	743	76.45896757	53.60186879	22.85709878
7186	33	1836	93	1962	71.46165524	53.96683551	17.49481974
7190	3	501	41	545	22.19515387	0	22.19515387
7191	11	613	49	673	43.92263206	29.14128115	14.78135091
7290	3	654	35	692	178.8837351	154.0206172	24.86311782
7380	14	606	42	662	96.14449584	81.60090118	14.54359466
7381	56	364	65	485	69.04270706	52.4827752	16.55993186
7382	33		45	78	32.19909328	26.49783051	5.701262765
7383	17	796	83	896	66.38128453	50.20257385	16.17871068
7384	10	364	50	424	34.98456743	27.10793315	7.876634282
7390	21	27	111	159	45.77218358	27.75889555	18.01328804
7391	19	1031	69	1119	78.34472666	55.5867585	22.75796816
7394	9	640	74	723	95.66927895	73.68668956	21.98258939
7397	12	380	85	477	104.5434756	93.37216271	11.17131289
7398	10	1654	69	1733	104.0323148	93.73488044	10.29743439
7506	17	2124	91	2232	166.1687225	131.8928759	34.27584665
7507	13	227	8	248	127.3301723	114.1269776	13.20319471
7508	9	1478	57	1544	100.2989647	74.89232825	25.40663641
7509	17	1561	123	1701	138.4932112	113.746203	24.74700819
7511	30	2271	141	2442	171.3859011	137.5724504	33.81345069
7512	19	2229	116	2364	113.7972597	78.6639107	35.133349
7513	29	1720	85	1834	130.0130654	99.21140071	30.80166465
7514	5	366	12	383	109.7106464	87.83763825	21.87300818
7515	11	1900	58	1969	90.74568995	56.20975004	34.53593991
7516	26	1130	146	1302	83.83332272	52.64451743	31.18880529
7517	14	785	36	835	65.32918151	51.75541333	13.57376818
7518	9	647	26	682	41.53905217	29.90434019	11.63471198
7538		15	1	16	102.4192725	88.31220117	14.10707134
7540	13	107	25	145	86.53345477	81.40446581	5.128988956
7581	2	48	5	55	121.370905	92.23724563	29.13365932
7582	2	169	9	180	71.52302647	63.24723192	8.275794546

7583	15	1022	61	1098	102.6850874	81.58099515	21.1040922
7584	4	35	25	64	44.64502187	27.90889561	16.73612626
7702	4	534	14	552	143.5566003	128.488525	15.06807533
7706	18	1096	58	1172	105.1195402	74.50199661	30.61754361
7708	25	1865	83	1973	141.5302655	109.3197673	32.21049814
7709	15	1941	119	2075	153.6020274	110.3691969	43.23283054
7804	22	1500	123	1645	89.62783316	70.41385951	19.21397365
7807	8	529	20	557	38.32673008	23.85505712	14.47167297
7808	15	2421	56	2492	130.1023484	103.2360488	26.86629956
7809	9	752	21	782	64.0591527	53.39302814	10.66612455
7811	30	2981	79	3090	159.5300964	122.7076273	36.82246913
7812		4		4	98.42678779	85.45688453	12.96990326
7817	33	7	44	84	137.7567897	48.23987607	89.51691364
7830	27	360	102	489	38.59549882	9.915503472	28.67999535
7831	35	1928	169	2132	101.3341434	71.66125346	29.67288996
7832	28	1024	91	1143	64.13090695	28.18935688	35.94155007
7833	5	3	13	21	4.550732426	0.463050098	4.087682328
7834	1	431	14	446	3.244522226	0	3.244522226
7835	12	273	19	304	5.564228649	0	5.564228649
7837	8	289	22	319	13.33483576	5.704992307	7.629843453
7838	46	1955	164	2165	123.2161711	63.42973371	59.78643736
7839	6	130	13	149	17.30505885	3.271777332	14.03328152
7840	6	267	9	282	4.62614725	0	4.62614725
7841	10	372	26	408	5.677370109	0.247163892	5.430206217
7844	29	1049	107	1185	50.85556088	21.56440534	29.29115554
7845		31	1	32	2.078943827	0	2.078943827
7846	4	495	58	557	8.926867452	0	8.926867452
7847	4	1	3	8	1.871762673	0	1.871762673
7848	30	1408	192	1630	89.67297688	43.13604066	46.53693622
7849	25	868	111	1004	51.50816332	32.89269474	18.61546858
7850	41	2844	149	3034	162.0614885	121.2765044	40.78498409
7851	33	1224	107	1364	103.1367606	73.68384975	29.45291086
7852	22	747	140	909	61.96047516	39.28086631	22.67960885
7853	15	535	60	610	49.21496767	37.6278822	11.58708547
7854	66	1829	262	2157	165.2977105	107.0202607	58.2774498
7855	41	1347	109	1497	99.41594544	59.46219491	39.95375053

7856	40	1691	102	1833	107.4497828	83.95172245	23.49806033
7857	14	422	63	499	73.4908518	41.69917755	31.79167425
7858	5	297	29	331	70.06902	52.90262433	17.16639567
7860	28	2306	112	2446	153.6742195	89.98255352	63.691666
7870	65	2116	141	2322	115.1802059	86.6362895	28.54391636
7871	32	1893	294	2219	92.83037487	69.84396542	22.98640945
7872	43	2581	144	2768	108.9240074	77.63011458	31.29389284
7873	36	147	99	282	39.50011527	21.23818854	18.26192673
7874	29	1402	68	1499	86.35244837	55.31958875	31.03285961
7875	20	1568	121	1709	64.63573819	37.77642959	26.8593086
7876	5	748	28	781	30.35918365	20.42915697	9.930026676
7877	28	2271	123	2422	83.09229731	54.81101959	28.28127772
7878	10	838	64	912	19.75419153	4.514580472	15.23961106
7879	26	1839	108	1973	84.98078841	55.95560716	29.02518125
7880	44	968	86	1098	80.96237873	48.2252607	32.73711804
7881	12	1869	76	1957	73.28592551	37.90575339	35.38017211
7890	31	1839	313	2183	47.74039292	21.25704816	26.48334477
7891	45	834	104	983	39.07506663	6.860996995	32.21406964
7892	30	380	65	475	53.82564516	3.946746137	49.87889902
7893	26	1707	114	1847	57.13336657	36.5870676	20.54629897
7894	21	1076	222	1319	24.88559904	15.87117891	9.014420125
7895	22	368	83	473	35.78358331	12.28857439	23.49500892
7896	30	1501	58	1589	85.33685886	64.22562299	21.11123587
7897	45	1244	147	1436	50.28967238	16.48150211	33.80817028
8000	34	2460	123	2617	148.1606252	117.1187712	31.04185399
8001	29	774	84	887	57.97677842	39.33107762	18.6457008
8002	24	1489	162	1675	75.88055262	56.0707655	19.80978712
8003	42	2502	265	2809	111.3917197	87.50199404	23.88972571
8004	36	2015	134	2185	162.0713891	98.27459597	63.79679314
8005	62	1622	164	1848	118.5495142	55.51341157	63.03610259
8006	46	2376	177	2599	156.8939036	109.8887401	47.00516357
8007	33	282		315	29.75158622	15.66908755	14.08249867
8008	18	1611	58	1687	51.0841466	22.81408907	28.27005754
8009	45	2085	126	2256	119.9522732	81.47063983	38.48163334
8010	23	1366	135	1524	77.9784326	48.98978037	28.98865223
8011	16	1442	76	1534	56.68365868	37.08955955	19.59409914

8018	10	1332	64	1406	48.26711567	31.11581427	17.15130141
8019	30	1556	66	1652	64.38804867	26.88549759	37.50255108
8020	84	1784	123	1991	116.0953695	80.69615107	35.39921841
8021	23	1068	67	1158	49.99579377	25.38731535	24.60847841
8022	30	378	67	475	69.36005846	49.99200511	19.36805335
8023	50	236	120	406	80.22596629	40.18738705	40.03857924
8101	5	233	19	257	45.78586279	30.62678798	15.15907481
8102	9	416	28	453	72.10333993	36.11625059	35.98708934
8104	3	72	2	77	88.12322588	64.98424013	23.13898576
8501	7	237	17	261	88.38112022	78.79201445	9.589105765
8601	12	17	14	43	5.499596196	0	5.499596196
8602	4	409	20	433	5.826959	0	5.826959
8603	11	300	43	354	20.53882623	0.996167912	19.54265832
8604	16	1473	84	1573	28.49916317	10.25905874	18.24010443
8605	27	1668	49	1744	63.00559	39.71267956	23.29291044
8606	17	541	17	575	22.73850252	0.144636928	22.59386559
8607	45	450	71	566	19.30601841	4.221389326	15.08462908
8608	1		8	9	2.466789597	0	2.466789597
8609	5	298	16	319	4.100648008	0	4.100648008
8610	22	940	268	1230	54.04034309	17.82660165	36.21374143
8611	5	413	13	431	2.638756215	0	2.638756215
8612	26	165	30	221	18.24103372	3.01912951	15.22190421
8614	11	300	40	351	22.45493475	2.089750994	20.36518375
8615	24	1004	143	1171	26.960718	6.935443881	20.02527412
8616	23	1445	79	1547	60.10704157	29.50767908	30.59936249
8617	24	963	127	1114	46.15662433	20.87373854	25.28288579
8618	16	52	12	80	9.088006093	0.004869657	9.083136436
8619	19	1678	176	1873	50.14067225	13.748318	36.39235425
8620	4	5	17	26	5.273650759	0.082059069	5.191591689
8621	37	1405	151	1593	67.4671983	15.35726373	52.10993457
8622	16	611	53	680	13.29050804	1.982298613	11.30820942
8652	11	1	8	20	8.721925338	0.073630387	8.648294951
8653	3		4	7	3.862922132	0	3.862922132
8776	1	306	12	319	86.21088588	69.7292229	16.48166298
8777	7	552	21	580	78.72739615	64.32381533	14.40358081
8904	56	2010	192	2258	156.7671704	131.6133559	25.15381456

8905	20	58	47	125	29.05718753	0.170935194	28.88625233
8906	29	2480	150	2659	175.0421564	144.6135893	30.42856709
8907	42	2207	200	2449	156.7880888	131.9333314	24.85475748
8951	20	711	100	831	30.44987927	1.275108128	29.17477114
8952	40	782	135	957	37.45002598	12.29375018	25.1562758
8953	5	594	41	640	7.795786718	0.971267375	6.824519343
8954	56	1620	363	2039	109.4372598	54.90412868	54.53313111
8955	42	1835	231	2108	60.01481108	30.91217403	29.10263705
8956	33	1558	235	1826	77.60815194	38.67592552	38.93222642
8957	43	2212	314	2569	94.0469601	43.9921077	50.0548524
8961	18		38	56	22.40457124	7.963521628	14.44104961
8962	16	1336	92	1444	53.07131637	21.48271028	31.58860609
8963	25	714	86	825	28.58032354	9.205901358	19.37442218
8964	32	984	107	1123	60.68825859	37.71627134	22.97198725
8965	10		6	16	9.875593648	0	9.875593648
8966	10		2	12	5.625804797	0	5.625804797
8967	2		10	12	8.200809222	1.719046466	6.481762756
8968	2		11	13	8.480923222	0.266768601	8.214154621
NETWORK	150	1764	738	2652	205.7741883	0.107515796	205.6666725
Grand Total	**5118**	**231133**	**20340**	**256591**	**16540.36705**	**10795.86933**	**5744.497712**

Baltimore Gas and Electric Company's Application for Adjustments to Its Electric Base Rate

Case No. 9888

Data Responses Cited in the Direct Testimony of Dennis Stephens from Case No. 9692

BGE Response to OPC Data Request 12-30

Case No. 9692
Baltimore Gas and Electric Co.
Response to OPC Data Request 12
Request Received: April 18, 2023
Response Date: May 02, 2023
Sponsor(s): Laura Wright

Item No.: OPCDR12-30

Directed to Witness Apte

Refer to Mr. Apte's Testimony, page 48, line 8 which states "Unlike transformers, however, OCBs are not required or designed with containment measures that limit the effects of oil leaks and spills. Failures due to age, which can be catastrophic in nature, can result in spills that negatively impact the environment and community we serve."

a. Provide a list of the OCB oil spills the resulted in reportable incidents by year from 2018–2022.
b. Provide a list of the catastrophic events related to OCB failures which occurred by year from 2018–2022.
c. Provide a count of OCB in service on December 31 of each year from December 31, 2018 through December 31, 2022.

RESPONSE:

a. BGE has had one (1) reportable OCB leak between the years 2018-2022.

Substation	Date	Gallons of Oil	Comments
Sudbrook Park	6/13/2022	60 gallons impacting substation stone	Breaker failure/ fire

b. See the response to subpart (a) above.

c. Please see OPCDR12-30-*Attachment 1* for a list of In-Service breaker failures.

Penelec Rejuvenates Underground Cable to Help Enhance Service Reliability

Injection Process Adds Years of Life to Older Cable Without Damaging Yards and Driveways

ERIE, Pa., July 8, 2020 -- Penelec, a FirstEnergy Corp. (NYSE: FE) utility, recently injected sections of an aging underground distribution line in Erie County with a silicone-based fluid that should prolong its useful life by decades. This method allows the cable to support continued reliable electric service for a fraction of what it would have cost to replace it and eliminates the need to dig trenches through landscaped yards and driveways for cable replacement.

Over time, water and corrosive soil materials can penetrate underground wire through tiny cracks and fissures, causing power outages. Rather than disturbing dirt to replace nearly 1.5 miles of aging underground cable along Fieldcrest Drive and Townsend Drive in Fairview Township,

Penelec hired an electrical contractor that specializes in restoring buried cable without excavation.

This is the first time Penelec has used fluid injections to rehabilitate underground electric cable. The company may consider the process for more widespread application in coming years. The approximately $80,000 project is part of the company's ongoing efforts to strengthen the durability of its electric system and enhance service reliability for its customers.

"Underground electrical equipment is in many ways better protected from the elements than overhead wires, but when an outage occurs it often takes longer for our crews to pinpoint where the underground problem is and make repairs," said Nick Austin, regional president of Penelec. "The underground cable rejuvenation process only costs about half as much as replacing the cable – plus, it's far less time consuming and disruptive for neighborhoods."

Accessing de-energized wires through underground vaults, the contractor forced pressurized silicone-based fluid into the cable, filling the cracks and spaces in the worn insulation encasing the wire with new material. The fluid provides a shot in the arm, strengthening the existing cable and helping it perform well for another 20 to 30 years.

Penelec plans to replace another 30,000 feet of aging underground cable in 2020. Much of that cable has been spliced and repaired too many times for those line sections to be good candidates for fluid injection.

The work is part of Penelec's Long Term Infrastructure Improvement Plans (LTIIP II), a $200 million initiative to accelerate capital investments over five years to help ensure continued electric service reliability for the company's 585,000 customers.

Penelec serves approximately 585,000 customers within 17,600 square miles of northern and central Pennsylvania. Follow Penelec on Twitter @Penelec and on Facebook at www.facebook.com/PenelecElectric.

FirstEnergy is dedicated to safety, reliability and operational excellence. Its 10 electric distribution companies form one of the nation's largest investor-owned electric systems, serving customers in Ohio, Pennsylvania, New Jersey, West Virginia, Maryland and New York. The company's transmission subsidiaries operate approximately 24,500 miles of transmission lines that connect the Midwest and Mid-Atlantic regions. Follow FirstEnergy online at www.firstenergycorp.com and on Twitter @FirstEnergyCorp.

Editor's Note: Photos of underground cable rejuvenation work in the Penelec service area are available for download on Flickr.

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Report Outage Online

Report by Text Message

Text "OUT" to 544487

Report by Phone

1-888-LIGHTSS (1-888-544-4877)

My Account
Payment Assistance
Pay Bill
Analyze Usage
Text & Email Alerts
Outages
Safety
Save Energy
Scams & Fraud
Start, Stop or Move Requests

Ohio Edison
Illuminating Company
Toledo Edison
Jersey Central Power & Light
Mon Power
Met-Ed
Penelec
Penn Power
West Penn Power
Potomac Edison

The City of Baltimore Reaches Conduit Agreement with Baltimore Gas & Electric

on **February 14, 2024**

BALTIMORE, MD. (Tuesday, February 7, 2023) - The City of Baltimore has reached an agreement with Baltimore Gas & Electric (BGE) for the next iteration of BGE's conduit occupancy agreement.

The City's 700-mile conduit system is an underground network of critical electric and fiber-optic cables that powers a majority of the city. The agreement would require BGE to continue to pay an occupancy fee, as it has done in the past, but also to undertake capital improvements to the City's conduit. The City continues to retain full ownership of the conduit.

"The proposed agreement with BGE allows for a shared responsibility in increased improvement efforts to the 700-mile capital structure, ultimately reducing the amount of money that the City pays year after year for conduit maintenance," **said Mayor Brandon M. Scott**. "This is a sensible agreement that gives the City an opportunity to demonstrate good stewardship over this valued and vital asset."

The City of Baltimore will maintain full ownership of the conduit and any improvements made to the system while still reserving the right to collect occupancy fees from other users and conduct its own capital improvements.

"This agreement will lead to an increased investment into our conduit, a decrease in administrative costs and liability for the City, all while allowing the City to maintain 100% ownership of the conduit, consistent with the 2022 Charter Amendment," **said Acting Solicitor Ebony Thompson**. "This is a great example of a successful public-private partnership and a huge win for the City."

Under the agreement, BGE will contribute $134 million in capital improvement to the conduit over the next four years. BGE will also pay an occupancy fee of $1.5 million annually. Overall, this means an average of approximately $34.5 million invested into the conduit each year as a result of this amended agreement, a substantial and much-needed increase for the conduit system.

"As the Department of Transportation, we are dedicated to supporting the growth and development of our City," **said Department of Transportation Interim Director Corren Johnson**. "We will work tirelessly to ensure that every stage of planning, design, and construction aligns with the City's high standards and delivers the best possible outcomes for all members of our community. We are eager

to collaborate with BGE and all other entities operating in the right of way to make this vision a reality."

The proposed agreement also outlines BGE's liability for any conduit system failures or other damages caused by or as a result of the improvements or other work conducted under its purview. There is no clause outlining the utility company's commitment to minority and women-owned businesses, as they already hire and continue to employ businesses owned by minorities and women.

The proposed agreement will go before the City's Board of Estimates on February 15, 2023. To view the full contract, click here [/media/document/amendmenttosettlementagreementbetweenbgeandbaltimorepdf] .

Related Articles

Mayor Scott Announces Recipients of ARPA-Funded $3.6 Million

Mayor Brandon M. Scott announced the recipients of the $3.6 million Diversity in Arts Grant.

Mayor Brandon M. Scott Posted April 16, 2024

[/mayor/news-media/press-releases/2024-04-16-mayor-scott-announces-recipients-of-arpa-funded-36-million]

ATTACHMENT 3

AACE International Recommended Practice No. 18R-97

COST ESTIMATE CLASSIFICATION SYSTEM – AS APPLIED IN ENGINEERING, PROCUREMENT, AND CONSTRUCTION FOR THE PROCESS INDUSTRIES

Acknowledgment:
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Recommended Practice No. 18R-97

Cost Estimate Classification System – As Applied in Engineering, Procurement, and Construction for the Process Industries

February 2, 2005

PURPOSE

As a recommended practice of AACE International, the Cost Estimate Classification System provides guidelines for applying the general principles of estimate classification to project cost estimates (i.e., cost estimates that are used to evaluate, approve, and/or fund projects). The Cost Estimate Classification System maps the phases and stages of project cost estimating together with a generic maturity and quality matrix, which can be applied across a wide variety of industries.

This addendum to the generic recommended practice provides guidelines for applying the principles of estimate classification specifically to project estimates for engineering, procurement, and construction (EPC) work for the process industries. This addendum supplements the generic recommended practice (17R-97) by providing:

- a section that further defines classification concepts as they apply to the process industries;
- charts that compare existing estimate classification practices in the process industry; and
- a chart that maps the extent and maturity of estimate input information (project definition deliverables) against the class of estimate.

As with the generic standard, an intent of this addendum is to improve communications among all of the stakeholders involved with preparing, evaluating, and using project cost estimates specifically for the process industries.

It is understood that each enterprise may have its own project and estimating processes and terminology, and may classify estimates in particular ways. This guideline provides a generic and generally acceptable classification system for process industries that can be used as a basis to compare against. It is hoped that this addendum will allow each user to better assess, define, and communicate their own processes and standards in the light of generally-accepted cost engineering practice.

INTRODUCTION

For the purposes of this addendum, the term process industries is assumed to include firms involved with the manufacturing and production of chemicals, petrochemicals, and hydrocarbon processing. The common thread among these industries (for the purpose of estimate classification) is their reliance on process flow diagrams (PFDs) and piping and instrument diagrams (P&IDs) as primary scope defining documents. These documents are key deliverables in determining the level of project definition, and thus the extent and maturity of estimate input information.

Estimates for process facilities center on mechanical and chemical process equipment, and they have significant amounts of piping, instrumentation, and process controls involved. As such, this addendum may apply to portions of other industries, such as pharmaceutical, utility, metallurgical, converting, and similar industries. Specific addendums addressing these industries may be developed over time.

This addendum specifically does not address cost estimate classification in nonprocess industries such as commercial building construction, environmental remediation, transportation infrastructure, “dry” processes such as assembly and manufacturing, “soft asset” production such as software development, and similar industries. It also does not specifically address estimates for the exploration, production, or transportation of mining or hydrocarbon materials, although it may apply to some of the intermediate processing steps in these systems.

The cost estimates covered by this addendum are for engineering, procurement, and construction (EPC) work only. It does not cover estimates for the products manufactured by the process facilities, or for research and development work in support of the process industries. This guideline does not cover the significant building construction that may be a part of process plants. Building construction will be covered in a separate addendum.

This guideline reflects generally-accepted cost engineering practices. This addendum was based upon the practices of a wide range of companies in the process industries from around the world, as well as published references and standards. Company and public standards were solicited and reviewed by the AACE International Cost Estimating Committee. The practices were found to have significant commonalities that are conveyed in this addendum.

COST ESTIMATE CLASSIFICATION MATRIX FOR THE PROCESS INDUSTRIES

The five estimate classes are presented in figure 1 in relationship to the identified characteristics. Only the level of project definition determines the estimate class. The other four characteristics are secondary characteristics that are generally correlated with the level of project definition, as discussed in the generic standard. The characteristics are typical for the process industries but may vary from application to application.

This matrix and guideline provide an estimate classification system that is specific to the process industries. Refer to the generic standard for a general matrix that is non-industry specific, or to other addendums for guidelines that will provide more detailed information for application in other specific industries. These will typically provide additional information, such as input deliverable checklists to allow meaningful categorization in those particular industries.

	Primary Characteristic	***Secondary Characteristic***			
ESTIMATE CLASS	**LEVEL OF PROJECT DEFINITION** Expressed as % of complete definition	**END USAGE** Typical purpose of estimate	**METHODOLOGY** Typical estimating method	**EXPECTED ACCURACY RANGE** Typical variation in low and high ranges [a]	**PREPARATION EFFORT** Typical degree of effort relative to least cost index of 1 [b]
Class 5	0% to 2%	Concept Screening	Capacity Factored, Parametric Models, Judgment, or Analogy	L: -20% to -50% H: +30% to +100%	1
Class 4	1% to 15%	Study or Feasibility	Equipment Factored or Parametric Models	L: -15% to -30% H: +20% to +50%	2 to 4
Class 3	10% to 40%	Budget, Authorization, or Control	Semi-Detailed Unit Costs with Assembly Level Line Items	L: -10% to -20% H: +10% to +30%	3 to 10
Class 2	30% to 70%	Control or Bid/ Tender	Detailed Unit Cost with Forced Detailed Take-Off	L: -5% to -15% H: +5% to +20%	4 to 20
Class 1	50% to 100%	Check Estimate or Bid/Tender	Detailed Unit Cost with Detailed Take-Off	L: -3% to -10% H: +3% to +15%	5 to 100

Notes: [a] The state of process technology and availability of applicable reference cost data affect the range markedly. The +/- value represents typical percentage variation of actual costs from the cost estimate after application of contingency (typically at a 50% level of confidence) for given scope.

[b] If the range index value of "1" represents 0.005% of project costs, then an index value of 100 represents 0.5%. Estimate preparation effort is highly dependent upon the size of the project and the quality of estimating data and tools.

Figure 1. – Cost Estimate Classification Matrix for Process Industries

CHARACTERISTICS OF THE ESTIMATE CLASSES

The following charts (figures 2a through 2e) provide detailed descriptions of the five estimate classifications as applied in the process industries. They are presented in the order of least-defined estimates to the most-defined estimates. These descriptions include brief discussions of each of the estimate characteristics that define an estimate class.

For each chart, the following information is provided:

- **Description:** a short description of the class of estimate, including a brief listing of the expected estimate inputs based on the level of project definition.
- **Level of Project Definition Required:** expressed as a percent of full definition. For the process industries, this correlates with the percent of engineering and design complete.
- **End Usage:** a short discussion of the possible end usage of this class of estimate.
- **Estimating Methods Used:** a listing of the possible estimating methods that may be employed to develop an estimate of this class.
- **Expected Accuracy Range:** typical variation in low and high ranges after the application of contingency (determined at a 50% level of confidence). Typically, this results in a 90% confidence that the actual cost will fall within the bounds of the low and high ranges.
- **Effort to Prepare:** this section provides a typical level of effort (in hours) to produce a complete estimate for a US$20,000,000 plant. Estimate preparation effort is highly dependent on project size, project complexity, estimator skills and knowledge, and on the availability of appropriate estimating cost data and tools.
- **ANSI Standard Reference (1989) Name:** this is a reference to the equivalent estimate class in the existing ANSI standards.
- **Alternate Estimate Names, Terms, Expressions, Synonyms:** this section provides other commonly used names that an estimate of this class might be known by. These alternate names are not endorsed by this Recommended Practice. The user is cautioned that an alternative name may not always be correlated with the class of estimate as identified in the chart.

CLASS 5 ESTIMATE	
Description: Class 5 estimates are generally prepared based on very limited information, and subsequently have wide accuracy ranges. As such, some companies and organizations have elected to determine that due to the inherent inaccuracies, such estimates cannot be classified in a conventional and systemic manner. Class 5 estimates, due to the requirements of end use, may be prepared within a very limited amount of time and with little effort expended—sometimes requiring less than an hour to prepare. Often, little more than proposed plant type, location, and capacity are known at the time of estimate preparation. **Level of Project Definition Required:** 0% to 2% of full project definition. **End Usage:** Class 5 estimates are prepared for any number of strategic business planning purposes, such as but not limited to market studies, assessment of initial viability, evaluation of alternate schemes, project screening, project location studies, evaluation of resource needs and budgeting, long-range capital planning, etc.	**Estimating Methods Used:** Class 5 estimates virtually always use stochastic estimating methods such as cost/capacity curves and factors, scale of operations factors, Lang factors, Hand factors, Chilton factors, Peters-Timmerhaus factors, Guthrie factors, and other parametric and modeling techniques. **Expected Accuracy Range:** Typical accuracy ranges for Class 5 estimates are - 20% to -50% on the low side, and +30% to +100% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances. **Effort to Prepare (for US$20MM project):** As little as 1 hour or less to perhaps more than 200 hours, depending on the project and the estimating methodology used. **ANSI Standard Reference Z94.2-1989 Name:** Order of magnitude estimate (typically -30% to +50%). **Alternate Estimate Names, Terms, Expressions, Synonyms:** Ratio, ballpark, blue sky, seat-of-pants, ROM, idea study, prospect estimate, concession license estimate, guesstimate, rule-of-thumb.

Figure 2a. – Class 5 Estimate

CLASS 4 ESTIMATE	
Description: Class 4 estimates are generally prepared based on limited information and subsequently have fairly wide accuracy ranges. They are typically used for project screening, determination of feasibility, concept evaluation, and preliminary budget approval. Typically, engineering is from 1% to 15% complete, and would comprise at a minimum the following: plant capacity, block schematics, indicated layout, process flow diagrams (PFDs) for main process systems, and preliminary engineered process and utility equipment lists. **Level of Project Definition Required:** 1% to 15% of full project definition. **End Usage:** Class 4 estimates are prepared for a number of purposes, such as but not limited to, detailed strategic planning, business development, project screening at more developed stages, alternative scheme analysis, confirmation of economic and/or technical feasibility, and preliminary budget approval or approval to proceed to next stage.	**Estimating Methods Used:** Class 4 estimates virtually always use stochastic estimating methods such as equipment factors, Lang factors, Hand factors, Chilton factors, Peters-Timmerhaus factors, Guthrie factors, the Miller method, gross unit costs/ratios, and other parametric and modeling techniques. **Expected Accuracy Range:** Typical accuracy ranges for Class 4 estimates are -15% to -30% on the low side, and +20% to +50% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances. **Effort to Prepare (for US$20MM project):** Typically, as little as 20 hours or less to perhaps more than 300 hours, depending on the project and the estimating methodology used. **ANSI Standard Reference Z94.2-1989 Name:** Budget estimate (typically -15% to + 30%). **Alternate Estimate Names, Terms, Expressions, Synonyms:** Screening, top-down, feasibility, authorization, factored, pre-design, pre-study.

Figure 2b. – Class 4 Estimate

CLASS 3 ESTIMATE	
Description: Class 3 estimates are generally prepared to form the basis for budget authorization, appropriation, and/or funding. As such, they typically form the initial control estimate against which all actual costs and resources will be monitored. Typically, engineering is from 10% to 40% complete, and would comprise at a minimum the following: process flow diagrams, utility flow diagrams, preliminary piping and instrument diagrams, plot plan, developed layout drawings, and essentially complete engineered process and utility equipment lists. **Level of Project Definition Required:** 10% to 40% of full project definition. **End Usage:** Class 3 estimates are typically prepared to support full project funding requests, and become the first of the project phase “control estimates” against which all actual costs and resources will be monitored for variations to the budget. They are used as the project budget until replaced by more detailed estimates. In many owner organizations, a Class 3 estimate may be the last estimate required and could well form the only basis for cost/schedule control.	**Estimating Methods Used:** Class 3 estimates usually involve more deterministic estimating methods than stochastic methods. They usually involve a high degree of unit cost line items, although these may be at an assembly level of detail rather than individual components. Factoring and other stochastic methods may be used to estimate less-significant areas of the project. **Expected Accuracy Range:** Typical accuracy ranges for Class 3 estimates are -10% to -20% on the low side, and +10% to +30% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances. **Effort to Prepare (for US$20MM project):** Typically, as little as 150 hours or less to perhaps more than 1,500 hours, depending on the project and the estimating methodology used. **ANSI Standard Reference Z94.2-1989 Name:** Budget estimate (typically -15% to + 30%). **Alternate Estimate Names, Terms, Expressions, Synonyms:** Budget, scope, sanction, semi-detailed, authorization, preliminary control, concept study, development, basic engineering phase estimate, target estimate.

Figure 2c. – Class 3 Estimate

CLASS 2 ESTIMATE	
Description: Class 2 estimates are generally prepared to form a detailed control baseline against which all project work is monitored in terms of cost and progress control. For contractors, this class of estimate is often used as the "bid" estimate to establish contract value. Typically, engineering is from 30% to 70% complete, and would comprise at a minimum the following: process flow diagrams, utility flow diagrams, piping and instrument diagrams, heat and material balances, final plot plan, final layout drawings, complete engineered process and utility equipment lists, single line diagrams for electrical, electrical equipment and motor schedules, vendor quotations, detailed project execution plans, resourcing and work force plans, etc. **Level of Project Definition Required:** 30% to 70% of full project definition. **End Usage:** Class 2 estimates are typically prepared as the detailed control baseline against which all actual costs and resources will now be monitored for variations to the budget, and form a part of the change/variation control program.	**Estimating Methods Used:** Class 2 estimates always involve a high degree of deterministic estimating methods. Class 2 estimates are prepared in great detail, and often involve tens of thousands of unit cost line items. For those areas of the project still undefined, an assumed level of detail takeoff (forced detail) may be developed to use as line items in the estimate instead of relying on factoring methods. **Expected Accuracy Range:** Typical accuracy ranges for Class 2 estimates are -5% to -15% on the low side, and +5% to +20% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances. **Effort to Prepare (for US$20MM project):** Typically, as little as 300 hours or less to perhaps more than 3,000 hours, depending on the project and the estimating methodology used. Bid estimates typically require more effort than estimates used for funding or control purposes. **ANSI Standard Reference Z94.2-1989 Name:** Definitive estimate (typically -5% to + 15%). **Alternate Estimate Names, Terms, Expressions, Synonyms:** Detailed control, forced detail, execution phase, master control, engineering, bid, tender, change order estimate.

Figure 2d. – Class 2 Estimate

CLASS 1 ESTIMATE	
Description: Class 1 estimates are generally prepared for discrete parts or sections of the total project rather than generating this level of detail for the entire project. The parts of the project estimated at this level of detail will typically be used by subcontractors for bids, or by owners for check estimates. The updated estimate is often referred to as the current control estimate and becomes the new baseline for cost/schedule control of the project. Class 1 estimates may be prepared for parts of the project to comprise a fair price estimate or bid check estimate to compare against a contractor's bid estimate, or to evaluate/dispute claims. Typically, engineering is from 50% to 100% complete, and would comprise virtually all engineering and design documentation of the project, and complete project execution and commissioning plans. **Level of Project Definition Required:** 50% to 100% of full project definition. **End Usage:** Class 1 estimates are typically prepared to form a current control estimate to be used as the final control baseline against which all actual costs and resources will now be monitored for variations to the budget, and form a part of the change/variation control program. They may be used to evaluate bid checking, to support vendor/contractor negotiations, or for claim evaluations and dispute resolution.	**Estimating Methods Used:** Class 1 estimates involve the highest degree of deterministic estimating methods, and require a great amount of effort. Class 1 estimates are prepared in great detail, and thus are usually performed on only the most important or critical areas of the project. All items in the estimate are usually unit cost line items based on actual design quantities. **Expected Accuracy Range:** Typical accuracy ranges for Class 1 estimates are -3% to -10% on the low side, and +3% to +15% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances. **Effort to Prepare (for US$20MM project):** Class 1 estimates require the most effort to create, and as such are generally developed for only selected areas of the project, or for bidding purposes. A complete Class 1 estimate may involve as little as 600 hours or less, to perhaps more than 6,000 hours, depending on the project and the estimating methodology used. Bid estimates typically require more effort than estimates used for funding or control purposes. **ANSI Standard Reference Z94.2 Name:** Definitive estimate (typically -5% to + 15%). **Alternate Estimate Names, Terms, Expressions, Synonyms:** Full detail, release, fall-out, tender, firm price, bottoms-up, final, detailed control, forced detail, execution phase, master control, fair price, definitive, change order estimate.

Figure 2e. – Class 1 Estimate

COMPARISON OF CLASSIFICATION PRACTICES

Figures 3a through 3c provide a comparison of the estimate classification practices of various firms, organizations, and published sources against one another and against the guideline classifications. These tables permits users to benchmark their own classification practices.

INCREASING PROJECT DEFINITION

AACE Classification Standard	ANSI Standard Z94.0	AACE Pre-1972	Association of Cost Engineers (UK) ACostE	Norwegian Project Management Association (NFP)	American Society of Professional Estimators (ASPE)
Class 5	Order of Magnitude Estimate -30/+50	Order of Magnitude Estimate	Order of Magnitude Estimate Class IV -30/+30	Concession Estimate	Level 1
				Exploration Estimate	
				Feasibility Estimate	
Class 4	Budget Estimate -15/+30	Study Estimate	Study Estimate Class III -20/+20	Authorization Estimate	Level 2
Class 3		Preliminary Estimate	Budget Estimate Class II -10/+10	Master Control Estimate	Level 3
Class 2	Definitive Estimate -5/+15	Definitive Estimate	Definitive Estimate Class I -5/+5	Current Control Estimate	Level 4
Class 1		Detailed Estimate			Level 5
					Level 6

Figure 3a. – Comparison of Classification Practices

AACE Classification Standard	Major Consumer Products Company (Confidential)	Major Oil Company (Confidential)	Major Oil Company (Confidential)	Major Oil Company (Confidential)
Class 5	Class S Strategic Estimate	Class V Order of Magnitude Estimate	Class A Prospect Estimate	Class V
			Class B Evaluation Estimate	
Class 4	Class 1 Conceptual Estimate	Class IV Screening Estimate	Class C Feasibility Estimate	Class IV
			Class D Development Estimate	
Class 3	Class 2 Semi-Detailed Estimate	Class III Primary Control Estimate		Class III
			Class E Preliminary Estimate	
Class 2	Class 3 Detailed Estimate	Class II Master Control Estimate	Class F Master Control Estimate	Class II
Class 1		Class I Current Control Estimate	Current Control Estimate	Class I

INCREASING PROJECT DEFINITION

Figure 3b. – Comparison of Classification Practices

AACE Classification Standard	J.R. Heizelman, 1988 AACE Transactions [1]	K.T. Yeo, The Cost Engineer, 1989 [2]	Stevens & Davis, 1988 AACE Transactions [3]	P. Behrenbruck, Journal of Petroleum Technology, 1993 [4]
Class 5	Class V	Class V Order of Magnitude	Class III*	Order of Magnitude
Class 4	Class IV	Class IV Factor Estimate	Class II	Study Estimate
Class 3	Class III	Class III Office Estimate		Budget Estimate
Class 2	Class II	Class II Definitive Estimate		
Class 1	Class I	Class I Final Estimate	Class I	Control Estimate

INCREASING PROJECT DEFINITION

[1] John R. Heizelman, ARCO Oil & Gas Co., 1988 AACE Transactions, Paper V3.7
[2] K.T. Yeo, The Cost Engineer, Vol. 27, No. 6, 1989
[3] Stevens & Davis, BP International Ltd., 1988 AACE Transactions, Paper B4.1 (* Class III is inferred)
[4] Peter Behrenbruck, BHP Petroleum Pty., Ltd., article in Petroleum Technology, August 1993

Figure 3c. – Comparison of Classification Practices

ESTIMATE INPUT CHECKLIST AND MATURITY MATRIX

Figure 4 maps the extent and maturity of estimate input information (deliverables) against the five estimate classification levels. This is a checklist of basic deliverables found in common practice in the process industries. The maturity level is an approximation of the degree of completion of the deliverable. The degree of completion is indicated by the following letters.

- None (blank): development of the deliverable has not begun.
- Started (S): work on the deliverable has begun. Development is typically limited to sketches, rough outlines, or similar levels of early completion.
- Preliminary (P): work on the deliverable is advanced. Interim, cross-functional reviews have usually been conducted. Development may be near completion except for final reviews and approvals.
- Complete (C): the deliverable has been reviewed and approved as appropriate.

	ESTIMATE CLASSIFICATION				
General Project Data:	**CLASS 5**	**CLASS 4**	**CLASS 3**	**CLASS 2**	**CLASS 1**
Project Scope Description	General	Preliminary	Defined	Defined	Defined
Plant Production/Facility Capacity	Assumed	Preliminary	Defined	Defined	Defined
Plant Location	General	Approximate	Specific	Specific	Specific
Soils & Hydrology	None	Preliminary	Defined	Defined	Defined
Integrated Project Plan	None	Preliminary	Defined	Defined	Defined
Project Master Schedule	None	Preliminary	Defined	Defined	Defined
Escalation Strategy	None	Preliminary	Defined	Defined	Defined
Work Breakdown Structure	None	Preliminary	Defined	Defined	Defined
Project Code of Accounts	None	Preliminary	Defined	Defined	Defined
Contracting Strategy	Assumed	Assumed	Preliminary	Defined	Defined
Engineering Deliverables:					
Block Flow Diagrams	S/P	P/C	C	C	C
Plot Plans		S	P/C	C	C
Process Flow Diagrams (PFDs)		S/P	P/C	C	C
Utility Flow Diagrams (UFDs)		S/P	P/C	C	C
Piping & Instrument Diagrams (P&IDs)		S	P/C	C	C
Heat & Material Balances		S	P/C	C	C
Process Equipment List		S/P	P/C	C	C
Utility Equipment List		S/P	P/C	C	C
Electrical One-Line Drawings		S/P	P/C	C	C
Specifications & Datasheets		S	P/C	C	C
General Equipment Arrangement Drawings		S	P/C	C	C
Spare Parts Listings			S/P	P	C
Mechanical Discipline Drawings			S	P	P/C
Electrical Discipline Drawings			S	P	P/C
Instrumentation/Control System Discipline Drawings			S	P	P/C
Civil/Structural/Site Discipline Drawings			S	P	P/C

Figure 4. – Estimate Input Checklist and Maturity Matrix

REFERENCES

ANSI Standard Z94.2-1989. **Industrial Engineering Terminology: Cost Engineering**.
AACE International Recommended Practice No.17R-97, **Cost Estimate Classification System**.