BEFORE THE

PUBLIC UTILITIES COMMISSION OF OHIO

THE DAYTON POWER AND LIGHT COMPANY

CASE NO. 18-1875-EL-GRD
18-1876-EL-WVR
18-1877-EL-AAM

Distribution Modernization Plan

DIRECT TESTIMONY
OF KATHRYN N. STORM

- ☐ MANAGEMENT POLICIES, PRACTICES, AND ORGANIZATION
- ☐ OPERATING INCOME
- ☐ RATE BASE
- ☐ ALLOCATIONS
- ☐ RATE OF RETURN
- ☐ RATES AND TARIFFS
- ■ OTHER

ON BEHALF OF
THE DAYTON POWER AND LIGHT COMPANY

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1 **I. INTRODUCTION**

2 **Q. Please state your name and business address.**

3 A. My name is Kathryn Storm. My business address is 1900 Dryden Road, Dayton, Ohio.

4

5 **Q. By whom and in what capacity are you employed?**

6 A. I am employed by the AES Corporation as the Director of Transmission and Distribution
7 ("T&D") Asset Management for both Indianapolis Power and Light ("IPL") and The
8 Dayton Power and Light Company ("DP&L" or "Company").

9

10 **Q. How long have you been in your present position?**

11 A. I assumed my present position in February 2018. Prior to my present position, I was the
12 Director of Generation Asset Management for the US Strategic Business Unit.

13

14 **Q. What are your responsibilities in your current position and to whom do you report?**

15 A. I am responsible for optimizing the asset lifecycle for T&D equipment. My team
16 monitors asset health, recommends maintenance practices that complement the asset
17 lifecycle plans for certain pieces of equipment and prioritizes capital projects for both
18 IPL and DP&L. I report to the Senior Vice President, U.S. Utilities Operations.

19

20 **Q. Will you describe briefly your educational and business background?**

21 A. Yes. I received a Bachelor of Science degree in Ocean Engineering from the United
22 States Naval Academy in May 1999. I spent seven years active duty in the Navy as a
23 nuclear qualified Surface Warfare Officer. I joined DP&L in July 2006 as the

Transportation Manager overseeing all the vehicles within the Company's fleet. In May 2007, I became the Manager of Services and Locating, overseeing the day-to-day work of the low voltage service technicians as well as the locators who identify and mark the Company's underground facilities. In July 2008, I became a Project Manager in addition to my role as the Manager of Services and Locating. As a Project Manager, I oversaw construction projects, running crews and ensuring projects were constructed to the Company's standards, on time and within budget. In December 2008, I became the Manager of the Transmission Department, managing the day to day operations of the Transmission Linemen, and retained my Project Management responsibilities. In June 2009, I assumed responsibility for the Customer Dispatch Operations and DP&L's Major Accounts Department. In October 2010, I was promoted to a Director of Operations and became the privatization Project Manager for Wright Patterson Air Force Base and assumed responsibility for the Metering Services Department. The Meter Services department consists of Meter Reading, Locating, Services, Collections, Revenue Protection and Electric Meter. In July 2013, I assumed my role as the Director of Operations over Metering Services for both DP&L and IPL. In addition to my responsibilities with Metering Services I assumed responsibility for the safety departments at IPL and DP&L in 2014. In 2017, I assumed the role of Director, Generation Asset Management for the US Strategic Business Unit. In February 2018, I assumed responsibility for T&D Asset Management for DP&L and IPL.

Q. What is the purpose of this testimony?

A. The purpose of this testimony is to support and explain DP&L's plan for implementing an Advanced Metering Infrastructure ("AMI") including the information and operational systems required for implementation and utilization of the AMI system, impact and benefits to the customers.

Additionally, I will support and explain the Enterprise Asset Management ("EAM") System that will be used to help track and maintain the assets that will be installed as part of the grid modernization plan.

Q. What workpapers are you supporting?

A. I am supporting the following:

- **Workpaper WP-1.1** – Advanced Meter Infrastructure (AMI)
- **Workpaper WP-1.2** – Meter Data Management System (MDMS)
- **Workpaper WP-1.4** – Meter Asset Management System (MAMS)
- **Workpaper WP-2.5** – Enterprise Asset Management (EAM)
- **Workpaper WP-AMI-OPT Out** – AMI Opt Out

II. ADVANCED METERING INFRASTRUCTURE

Q. Can you describe the new functionality provided by AMI?

A. Through "smart meters," AMI transforms the meter from a simple measuring and counting device, to an element of an integrated system of hardware, software, telecommunications, and processes that can be used to better manage the electric

distribution system. AMI is both a tool to capture information about customer consumption of energy and a hardware and software architecture capable of capturing real-time consumption, demand, voltage, current and other information. This valuable information will be relayed back to DP&L to allow DP&L to monitor the status and health of the transmission and distribution system on demand or on a scheduled basis. The AMI network will communicate this data to a central location, sorting and analyzing it for a variety of purposes such as customer billing, outage response and system loading conditions. The AMI network combined with other DMP components, such as the CIS and portal, will have the capability of sharing this information with other systems, customers and to retail suppliers.

AMI introduces new functionality that will permit DP&L to improve operations and provide greater value to our customers. The availability of near-real time energy data supports time-differentiated rates for customers. In addition, DP&L will have access to more complete and current usage data when addressing customer concerns. Further, interval data and accurate load shapes based on their actual usage can be made available to customers to help them to manage their energy costs. Further customer benefits realized by AMI are discussed by Witness Tatham.

Q. Please describe what you mean by a smart meter.

A. The smart meter is an electric meter used to obtain usage data remotely, a digital replacement of the traditional analog meter. It also allows DP&L to collect interval data for customer's electric usage. The interval data would then enable the development of

several programs, such as Time-of-Use ("TOU") pricing, that would benefit customers. The new electronic meters will provide for improved accuracy and quicker outage detection. They also include tools to detect potential energy theft. Smart meters are also equipped with remote disconnect/reconnect technology for ease and convenience of disconnecting/reconnecting customers.

Q. What types of meters does DP&L currently have deployed?

A. DP&L has electro-mechanical and digital meters deployed in the field. These meters are read manually, utilizing Encoder, Receiver, Transmitter ("ERT") technology, via phone lines or cellularly.

Q. Does DP&L have any smart meters currently installed in its service territory?

A. Yes. DP&L has approximately 2,500 meters with 2-way communication currently in the field. These meters are on commercial and industrial accounts as well as 450 load research meters. These meters have the capability of obtaining reads remotely and of providing interval data.

Q. Can you explain DP&L's proposed AMI communications infrastructure and its purpose?

A. The AMI Communications Infrastructure consists of the communications hardware and software and associated system and data management software. This infrastructure creates a two-way communications network between AMI meters and the backbone communication network which connects to the utility business systems allowing for the

collection and distribution of the AMI information to customers and the utility. DP&L's service territory has a wide variety of coverage requirements from urban to rural and from outdoor meters to those in a basement or metering closet. The infrastructure will provide connectivity to all meters in DP&L's service territory. As with any AMI and Smart Grid deployment, the communications network is indispensable to the ability to share this new valuable information across the distribution system.

Q. DP&L's AMI proposal includes significant investments in technology upgrades. How do these technology systems relate to DP&L's AMI proposal?

A. Effective implementation of AMI requires the installation of several new technology systems such as a Meter Data Management System ("MDMS"), Meter Asset Management System ("MAMS"), and Customer Information System ("CIS").

Witness Gebele provides more detail on the specific technology investments required to enable and support grid modernization, and Witness Narvaez provides more detail on the CIS capabilities and interfaces.

Q. Please explain DP&L's plan for deploying the AMI meters and associated infrastructure.

A. DP&L expects to begin deployment upon approval from the Commission. All meters will be replaced over six years and the enabling telecommunications infrastructure will be fully installed by the end of year two. As meters are installed, they will be phased in to service utilizing the newly installed telecom infrastructure.

Q. Is AMI necessary to support demand response programs and TOU pricing which help customers control peak energy usage?

A. Yes. AMI is a necessary enabling technology for the success of demand response and TOU pricing. AMI enables the collection of reliable interval data, which is necessary to measure and verify load. Additionally, AMI also enables customers to receive information about their own electric usage through a DP&L-provided web portal and mobile applications, which are proposed as part of the grid modernization plan and discussed in more detail by Witness Tatham. This information will allow customers to make intelligent decisions concerning their energy usage along with their participation in DP&L programs.

Q. Is AMI necessary to support grid automation upgrades within the scope of the DMP?

A. Yes, most utilities consider the implementation of an AMI system to be the foundation of a modern and smart grid. Much of the benefit of a Smart Grid relies on capturing detailed interval data. AMI also enables timely communications of the status of the utility distribution system to allow for faster problem identification and resolution. AMI can capture meter-level activities and data for Smart Grid applications. Meter-level outage and restoration notification events can be used to optimize outage restoration efforts.

1 **Q. Please describe what staffing changes will be required to support the**
2 **implementation of AMI.**
3 A. To complete the installation of the AMI meters and infrastructure, DP&L will need to
4 hire additional resources, including field technicians, system engineers, IT architects, and
5 project managers. Throughout the implementation, the staffing will change and adjust
6 based on the type of work that is occurring at a particular time in the project. Currently,
7 DP&L has over 100 meter readers. As smart meters are installed, the number of meter
8 readers required in the field will decrease. Following implementation, the Company will
9 be an organization of individuals who will have a different set of roles and
10 responsibilities than what we have today to support the new infrastructure.
11
12 **Q. Will the Company provide an AMI "Opt-Out" Provision for residential customers?**
13 A. Yes, the Company is including an Opt-Out Provision for residential customers who select
14 to have an ERT meter installed at their premise in lieu of a smart meter. The customer
15 can exercise this option either before the meter is installed or at any point after a smart
16 meter is installed and they will be enrolled in the Opt-Out Program.
17
18 **Q. Can you describe the AMI-Opt Out Provision?**
19 A. Yes. Per Ohio Adm.Code 4901:1-10-05(J), DP&L must provide to residential customers
20 the option to remove an installed AMI meter and replace it with a traditional meter. As a
21 result, the customer must pay the cost incurred by the Company to provide this service.
22

1 **Q. What additional charges will customers incur if they choose to utilize the AMI Opt-**
2 **Out Provisions?**
3 A. As part of this proceeding, DP&L is filing a revised Opt-Out Provision in Tariff D7 for
4 residential customers who elect to have an ERT meter installed at their premise in lieu of
5 a smart meter. The Opt-Out Provision will include a one-time fee of $56.49 to install the
6 ERT meter, a one-time fee of $98.89 for IT programming costs, and a monthly meter
7 reading fee of $36.47, which will be added to the customer's bill monthly. If a customer
8 chooses to utilize the Opt-Out Provision before an AMI meter is installed at their
9 residence, then the customer will just pay the monthly meter reading fee and one-time fee
10 for IT programming costs.
11
12 **Q. Can you describe how the one-time fee to install an ERT meter was developed?**
13 A. Yes. As depicted in WP-AMI-Opt Out, which is attached to my testimony as Exhibit A,
14 this was developed by taking the costs of DP&L labor required to process the meter
15 exchange requests as well as the meter technician labor rate to exchange the meter. In
16 addition, the fee includes the transportation costs required to travel to the customer's
17 residence where the meter exchange will occur.
18
19 **Q. Can you describe how you developed the one-time charge for the IT programming**
20 **costs related to the AMI Opt- Out Provision?**
21 A. Yes. In order to offer the AMI Opt-Out Provision, DP&L must program its customer
22 service system to have the ability to flag those customers that participate as well as
23 charge those customers for the cost of participation. DP&L estimates that 0.1% of

1 residential customers, or 464 customers, will utilize the AMI Opt- Out Provision. The
2 one-time fee that results with this level of participation is $98.89.
3
4 **Q. Can you describe how you developed the monthly fee for reading an ERT meter?**
5 A. Yes. As depicted in WP-AMI-Opt Out, the monthly fee is derived from the costs of
6 DP&L labor and transportation costs required to travel to a customer's residence for a
7 meter reading.
8
9 **Q. If a customer opts out of having a smart meter installed and their ERT meter fails,**
10 **will the customer be forced to use a smart meter?**
11 A. No, each customer has the option to have an ERT meter in lieu of a smart meter. In the
12 event that an ERT meter fails or needs to be replaced, customers would receive an ERT
13 meter replacement.
14
15 **Q. In the event that a customer changes their mind and opts for a smart meter, is there**
16 **a fee?**
17 A. No, there is no fee if a customer changes his or her mind and opts for a smart meter at
18 any time. The monthly meter reading fees will be discontinued once the smart meter has
19 been successfully installed.
20

Q. Can you describe the requirement of Ohio Adm.Code 4901:1-18-06(A)(2) regarding notice of disconnection?

A. Yes. Ohio Adm.Code 4901:1-18-06(A)(2) requires an electric utility to provide residential customers with personal notice on the day service is to be disconnected or attach written notice of the disconnection to the premises.

Q. Is the Company seeking a waiver of Ohio Adm.Code 4901:1-18-06(A)(2) regarding personal notice on the day of disconnection?

A. Yes. With the deployment of AMI meters, DP&L will have the ability to disconnect and reconnect service remotely. DP&L is seeking a permanent waiver of Ohio Adm.Code 4901:1-18-06(A)(2) in order to take advantage of the safety and efficiencies enabled of AMI infrastructure.

Q. Are there cost savings associated with the remote disconnect/reconnect capability?

A. Yes. This remote capability of AMI will no longer require the Company to dispatch an employee to provide personal notice of disconnection.

Q. Are these cost savings reflected in the Company's DMP cost estimates?

A. Yes. The cost savings are captured as part of the Company's O&M savings and further supported by Witness Hall.

III. AMI-RELATED TECHNOLOGY SYSTEMS

Q. Please describe DP&L's plan for implementing the supporting technology systems.

A. As part of the DMP initiative, DP&L has developed a detailed, multi-year plan for the upgrade and implementation of supporting technology systems intended to improve back office functions, streamline utility operations, and enhance customer service. Among the systems to be upgraded or implemented under this plan are:

- Meter Data Management System ("MDMS")
- Meter Asset Management System ("MAMS")
- Customer Information System ("CIS")

The system estimates sponsored in this testimony include the hardware, software, associated maintenance and labor required to implement and deliver the MDMS and MAMS systems. As discussed by Witness Narvaez, the new CIS is necessary to allow for billing TOU rates, enable Prepay billing, integrate with MAMS, Advanced Distribution Management System ("ADMS") and enable remote disconnect/reconnect functionality. DP&L will also be installing a customer portal, Customer Relationship Management ("CRM") application and mobile applications as part of its DMP vision; which are explained in the testimony of Witness Tatham. The systems will position DP&L to unlock the benefits of AMI and provide a better customer experience.

Q. Please explain how DP&L derived cost, benefit, resource, and timing estimates for the AMI-related technology systems.

A. DP&L formed a team consisting of internal DP&L technology resources and resources from an external consulting firm to generate the necessary system estimates included in

this filing. As part of that team, the Company compiled data and conducted interviews, meetings and workshops to collaborate with key stakeholders within the business units and functions served. The estimates resulting from these collaborative efforts provided the basis for several of the assumptions included in this filing and have been subjected to recent reviews and updates based on more up to date information gathered from vendors, along with recent experiences and input from internal and external subject matter experts.

Q. What components are included in DP&L's estimates for its technology systems?

A. DP&L's estimates include the initial costs of implementing a system completely through delivery to the end user. The estimates also include the costs of ongoing maintenance (e.g., hardware, software, and labor) to support the DMP operations going forward.

The estimates also include the hardware, applications, and operating software necessary to satisfy the requirements as defined by the business. Generally, the hardware and software included are:

i. Proprietary vendor software and associated licenses required for the operation of the AMI meters and communications infrastructure;

ii. Server hardware;

iii. Operating system software (e.g., Microsoft Windows); and

iv. Ancillary tools and products needed in support of the implementation and ongoing operations of the systems (e.g., development tools, backup and recovery software, system monitoring tools).

Q. What resources will be needed to implement the AMI-related technology systems?

A. The implementation team will be comprised of a mix of internal staff as well as external consultants. Implementation is expected to be completed within the first seven years of the program. The implementation of these systems will require a variety of resources including project managers, technology specialists, technical architects and business process designers.

Q. How will the increase in software and equipment affect the technology department's overall O&M expenditures once these systems are implemented?

A. DP&L has estimated that upon completion, additional technology employees will be required to support the new technology architecture and operating platforms. These additional resources are necessary to support the increase in network and data center infrastructure hardware and software that will be implemented and must then be maintained and periodically upgraded. Ongoing support of the implemented systems is included in future O&M projections.

Q. Are the implementation estimates and timelines appropriate and reasonable?

A. Yes, DP&L has adopted a multi-year implementation strategy that takes into consideration the relative complexities and interdependencies of the various systems and interfaces that will be required to achieve the DMP vision. Some parts of the plan, such as the technology infrastructure improvements, are targeted for completion earlier in the project timeline. Other parts of the plan will come on-line later in the project timeline

and will benefit from new functionality that will be provided by the AMI system. DP&L's overall approach is designed to build upon previous phases.

IV. METER DATA MANAGEMENT SYSTEM ("MDMS")

Q. Can you describe the MDMS?

A. Yes. DP&L will utilize a new MDMS to provide a repository designed specifically to accommodate the massive amounts of data that will be obtained from the AMI system. The MDMS will evaluate meter readings provided by the AMI system through use of its Validation, Estimation and Editing ("VEE") function. In addition, it will generate the billing determinants to be sent to the customer system that provides the ability to bill time-differentiated rates. As the repository for historical energy usage data, the MDMS can be accessed by other applications to review consumption patterns of various classes of customers, thereby improving trend analysis and accuracy of rate design and load forecasting. Over time, DP&L has plans to eliminate its current MV-90 system and store all interval reads in the MDMS.

Q. Does DP&L currently have an MDMS?

A. No, DP&L does not have an MDMS.

Q. **How does DP&L currently manage its meter data?**

A. DP&L meters are read either manually at the meters, via an ERT meter signal, via a phone line or via a cellular modem. Reads are sent through the Field Control System

(FCS) or MV-90 to DP&L's current billing system. In that system, the reads are validated and used to produce a customer bill.

Q. What benefits will customers receive from the implementation of an MDMS?

A. The MDMS will be the system that ultimately captures and stores all the interval read information from the meters. This system will store and then offer up the detailed usage information to customers and other third-party providers. The system will also interface with the ADMS to support outage restoration functionality as described by Witness Gebele. This information will also form the basis for advanced rate structures like TOU rates. These advanced rates are expected to provide direct benefits to DP&L customers as well as to society at large. Witness Hulsebosch provides a more in-depth description of the benefits to customers and society in his testimony.

Q. Please explain DP&L's plan for implementing the MDMS project.

A. DP&L plans to implement a software solution for the MDMS over a two-year period. A comprehensive, formal RFP process will be followed to evaluate and select MDMS software solutions that will best meet the Company's current and future operating requirements. A project team consisting of both internal DP&L employees and external consultants with experience specific to MDMS implementations will be selected to develop and execute a project plan that will follow the standard system development lifecycle (analyze, design, build, test, deploy) methodology utilized by DP&L for large-scale technology projects. Business processes will be created or re-designed to minimize system customizations and maximize upgradeability and adaptability to future

requirements. A project management team will be used to manage cross-project goals, and to eliminate conflicts related to time, budget, functionality and risk. Critical success factors will be established to continually measure the success of the project and to ensure that it is meeting DP&L's objectives. As DP&L proceeds with the implementation of the AMI system, the availability of the MDMS is essential to capture the full range of AMI benefits.

Q. When does DP&L expect work on the MDMS project to begin and to be completed?

A. Based on the proposed plan, DP&L will begin to implement an MDMS solution upon approval by this Commission and complete this implementation two years thereafter.

Q. Is there a Workpaper associated with the MDMS project?

A. Yes, **Workpaper WP-1.2** summarizes project costs including the capital costs associated with the hardware, software and implementation costs. Additionally, it includes a summary of the O&M costs to maintain the software over a 20-year period.

V. METER ASSET MANAGEMENT SYSTEM ("MAMS")

Q. Can you describe the MAMS?

A. Yes. MAMS will track and maintain data regarding asset location and other meter-specific details such as installation, removal, exchange, and testing information. There is currently no MAMS system to track and monitor the life cycle of the new smart meters that will be deployed throughout the DP&L territory. Therefore, implementing MAMS

will allow for a more accurate and efficient tracking of all meter asset information and allow for integrations with other systems.

Q. How does DP&L currently track its meter assets?

A. Today this is done manually.

Q. Please explain DP&L's plan for implementing MAMS.

A. The MAMS software deployment timeline is two years. DP&L will be conducting a formal RFP process to evaluate and select the new MAMS software solution that will meet DP&L's requirements, as well as have the potential to expand to meet future needs. The MAMS software will be implemented through a team of internal DP&L employees and external consultants with industry expertise and knowledge around the implementation of the MAMS selected. The system implementation will follow the standard development lifecycle (analyze, design, build, test, deploy) currently used by DP&L. During the implementation, business processes will be created to allow for as much out-of-the-box features possible from the selected MAMS, allowing for lower customization cost and redesign, as well as easier future upgrades and scalability. A team will be selected to manage the project. The team will be responsible for managing the project timeline, goals, budget, milestones, and risks. Key performance indicators will be established to measure the progression and success of the project.

Q. Is there a Workpaper associated with the MAMS project?

A. Yes, **Workpaper WP-1.4** summarizes the capital costs associated with the MAMS implementation as well as the O&M costs to maintain the system over a 20-year period.

VI. ENTERPRISE ASSET MANAGEMENT ("EAM")

Q. Please describe the EAM project.

A. EAM will be the central data repository for all asset information and the corresponding maintenance and reliability records for those assets incorporated within the DMP. EAM enables DP&L to use more efficient asset management practices such as planned preventive and predictive maintenance. This will, in turn, lead to more reliable assets by reducing failures and prolonging asset life as well as reduced and/or shorter outages for customers.

Q. Does DP&L currently have an EAM?

A. No, DP&L does not currently have an Enterprise Asset Management System.

Q. **How is DP&L currently managing information related to the Company's assets?**

A. Currently, there is not a consolidated repository for asset information. Data is stored in several different systems and applications including excel worksheets and analytics are performed by different users using their separate information.

Q. Why is EAM needed for the DMP?

A. With the proliferation of new assets due to grid modernization, it is critical that a central repository of all asset information be maintained to enable predictive analytics to make data driven decisions around maintenance and replacement strategies based on asset health, risk and criticality. The EAM will generate a reduction in inventory requirements and decrease the amount of working capital tied up in inventory and field services overtime due to a more proactive management of assets.

Q. When does DP&L expect work on the EAM project to begin and to be completed?

A. DP&L expects to begin implementation of the EAM project in the first year following Commission's approval of the DMP and full implementation of the EAM solution to occur over a one-year window.

Q. Is there a Workpaper associated with the EAM project?

A. Yes, **Workpaper WP-2.5** represents the breakdown of EAM costs. The capital cost includes the hardware, software and labor required to implement and deliver a new system. O&M cost includes the ongoing licensing and maintenance of the system over a 20-year period.

VII. COSTS AND BENEFITS

Q. What capital investments are required to implement AMI?

A. Capital investments attributed to the AMI implementation are shown in **Workpaper WP-1.1**, and are divided between the AMI Head-End (e.g., hardware and software to

receive AMI data) and the AMI Infrastructure (e.g., meters). Additional details are provided in WP-1.1.

Q. What O&M expenditures are required to implement AMI?

A. DP&L O&M expenses required to support AMI are illustrated in **Workpaper WP-1.1**. The expected O&M expenses for AMI are broken down into maintenance for smart meters and the communications infrastructure.

Q. Are these capital and O&M investments reasonable and prudent?

A. Yes, the capital and O&M expenses were derived from Requests for Proposals ("RFPs"), vendor-solicited quotes and our internal capital work-order estimating process. The remaining costs were solicited from vendors working in the Smart Grid field.

Q. What capital investments and O&M expenditures are required to implement MDMS?

A. **Workpaper WP-1.2** summarizes project costs associated with the installation and on-going costs of an MDMS. The Workpaper shows the capital installation costs of the MDMS, including the hardware, purchase and implementation costs. Additionally, it represents the on-going maintenance O&M costs over a 20-year horizon.

Q. What capital investments and O&M expenditures are required to implement the MAMS?

A. **Workpaper WP-1.4** "Meter Asset Management System" depicts the summarized capital cost associated with implementing a MAMS as well as the on-going software maintenance O&M costs over a 20-year period.

Q. What capital investments and O&M expenditures are required to implement the EAM system?

A. **Workpaper WP-2.5** "Enterprise Asset Management" depicts the summarized capital and O&M costs associated with implementing an EAM system including the capital expense for installation and the on-going 20-year O&M costs related the maintenance of the system.

Q. How is "AMI Head-End Hardware/Software" calculated in Workpaper WP-1.1?

A. AMI hardware and software costs involve the system needed to support the communication of meter data between the meters and the head end as well as the cost of the head end itself. These costs were obtained through vendor quotes.

Q. How is "AMI Field Equipment Cost" calculated in Workpaper WP-1.1,?

A. DP&L provided AMI vendors information regarding the location of the existing meters as well as a requirement for coverage. Coverage is equated to the number or percent of meters that are connected to the network. This information was utilized by the vendors to generate an estimate of the type and amount of infrastructure that would be required to

meet DP&L's requirement. These models then formed the basis of the cost estimates provided by the vendors and were ultimately included in the Workpaper.

Q. How is the "Software Maintenance Fee" calculated in Workpaper WP-1.1?

A. The software maintenance fee involves the third-party licensing costs after capital investments are made for AMI, including software updates as necessary to maintain functionality. The maintenance is calculated using an estimated 20% of the software purchase price. This percentage is an industry standard estimate for a software maintenance fee.

Q. How is "Infrastructure O&M Cost" calculated in the Workpaper WP-1.1?

A. Infrastructure O&M cost involves the fees applicable to maintain equipment out of warranty and other third-party maintenance costs. The industry standard of 5% is applied to the AMI infrastructure.

Q. How are "Total Residential Meter Hardware and Installed Costs", "Total Polyphase C&I Meter Hardware and Installed Costs" and "Total Other Meter Hardware and Installed Costs" calculated in Workpaper WP-1.1?

A. The cost of smart meters were broken down into various categories (residential, C&I, three-phase, and other) due to the different costs of materials and installations. The hardware and installation cost of each category of meters were obtained through vendor quotes.

Q. How are "Outsourced Consulting and Engineering Costs" calculated in Workpaper WP-1.1?

A. The Consulting and Engineering costs comprise third-parties needed for the deployment of the AMI system. Third-party expertise will be needed to bring industry best practices in the project management and engineering design of the AMI stations and smart meter installation. The hourly rate and FTE counts are estimates for an implementation of this size.

Q. How is "Smart Meter Cost of Existing Equipment" calculated in Workpaper WP-1.1?

A. The value of the replaced meters is an estimate based on the number of electro-mechanical meters that will be discarded as they are replaced by smart meters.

Q. How are "Increased Call Center Costs" calculated in Workpaper WP-1.1?

A. While DP&L expects calls to its call center to decrease over time for the reasons discussed above, DP&L expects a short-term increase in call center costs associated with customers asking questions around the new AMI technology. These inquiries can vary in complexity and topic, including questions around installation schedules, inquiries about safety, or any other questions related to their bill or service.

Q. How are "Solution Implementation Costs" calculated in Workpapers WP-1.2 and WP-1.4, and "EAM Software Implementation Costs" calculated in WP-2.5?

A. Solution Implementation Costs / EAM Software Implementation Costs under the Capital Costs heading for each system are comprised of capitalized labor costs (both internal and external), representing the labor required to implement that system. Capitalized labor costs are calculated by applying a labor rate to the estimated number of days required to implement the given system. The number of estimated work days to implement the system is calculated based on analysis of the specific business requirements developed during team sessions. The labor rate is a blended rate of internal staff rates and external consulting rates specific to the skills and staff required to support a specific system implementation.

Q. How are "Hardware Costs" calculated in Workpapers WP-1.2 and WP-2.5?

A. Hardware purchases to support each of the project system implementations include component costs and the associated taxes to purchase equipment such as servers, network equipment, work stations, printers, storage, etc. for production, development, and disaster recovery environments. The hardware purchase figures were driven by the information technology department philosophy of standardization of platforms, open systems, and open standards. Servers and storage were estimated utilizing industry best practices to determine hardware capacity and user requirements for typical system implementations. The team then took an enterprise view of the hardware purchases required for each system and utilized methods such as virtualization and consolidation to ensure that the

servers and storage are sized efficiently without wasted capacity while ensuring adequate growth capability.

Q. How are "Software Costs" calculated in Workpapers WP-1.2 and WP-2.5?

A. Software purchases to support each of the project system implementations include application and database software licenses and ancillary end user data query tools and the associated taxes. The software purchase figures were driven by the information technology department philosophy of standardization of platforms, open systems, and open standards. The figures used for our Capital cost Summary are vendor-neutral and represent a blended cost of reputable industry-established software packages.

Q. How is "Software Maintenance" calculated in Workpapers WP-1.2 and WP-2.5?

A. Software Maintenance includes the fees payable to the software company to provide maintenance and support needed to maintain current system functionality. Software maintenance is calculated using 10%-20% of the pre-tax Software Purchases Costs. This figure is a widely-recognized standard amount charged by software vendors for ongoing maintenance of their systems.

Q. How are "Maintenance Labor" and "Ongoing Support Labor" calculated in Workpapers WP-1.2, and WP-2.5, respectively?

A. Maintenance Labor / Ongoing Support Labor include the incremental DP&L labor costs needed to maintain the systems necessary to fulfill the DMP vision. The calculations for maintenance labor for each system are based on a fully-loaded hourly rate multiplied by

1 the number of FTEs required to support the specific systems. This total number of
2 additional resources is necessary to support the increase in technology infrastructure,
3 databases and associated equipment, and to provide ongoing application support.
4
5 **Q. Can you identify the operational benefits that can be achieved through the AMI and**
6 **AMI-related technology deployment?**
7 A. Yes, total quantifiable operational benefits from AMI over the twenty years of our
8 proposal are illustrated in **Workpapers WP-A** and **WP-B**. A brief explanation of some
9 key quantifiable and non-quantifiable benefits is provided below:
10 i. **Deferral of Metering Capital Costs**
11 Deployment of AMI will defer the capital investments associated with
12 replacement of meters and other manual meter-reading equipment (e.g., vehicles)
13 that would otherwise have been required due to the aging meter assets.
14 ii. **Reduction in "No Outage" Calls**
15 Deployment of AMI will result in a reduction of service calls to investigate a
16 customer's meter that the customer believes is not performing properly. Since the
17 AMI solution provides the DP&L customer operations team with the ability to
18 look at a real-time view of the meter status, there will be a reduction in customer-
19 generated service calls.
20 iii. **Reduction of Call Center Contacts for Bill-Related Calls**
21 Estimated meter readings often generate customer calls associated with billing
22 issues. With more frequent readings from AMI, these missed readings and

associated estimated bills can be reduced, thereby decreasing customer call volume and call center agent time spent handling these billing inquiries.

iv. **Reduction in Meter Reading Expense**

AMI will eliminate manual and mobile meter reading. The benefit includes a reduction or elimination of all direct meter-reading labor expense, vehicles, equipment, associated building leases, and other miscellaneous materials. Also included are maintenance/upgrade expenses for current meter-reading devices and annual salary increases for meter readers.

v. **Reduction of Field Service Personnel**

Since the AMI system can obtain daily reads from all customers, a reduction in the number of field services personnel can be achieved. A high percentage of field work in this category involves obtaining missed meter readings and physically performing disconnects and reconnects. AMI network services with remote disconnect/reconnect functionality and production of daily readings can accomplish these functions without the need for field visits, thereby bringing about a significant reduction in the number of personnel used for this purpose. The implementation of the AMI system will make the process of disconnects, reconnects, and off-cycle reads much easier. The on-demand reading capability will enable the Company to read meters to issue final bills or initiate service remotely. The increased process efficiency and reduced time to execute the requests will make the Company much easier to do business with and enhance the overall customer experience.

1 vi. **Reduction of Bill Processing Costs due to Fewer Exceptions**

2 An important AMI benefit is a reduction in billing department resources needed to
3 investigate billing problems and process adjustments. Daily reads from AMI
4 eliminate the need to calculate bill estimates caused by service contract disputes,
5 backdated cancellations, and service disconnects and reconnects. Keypunch
6 errors and atypical usage patterns (often associated with theft) are eliminated or
7 quickly detected by AMI, reducing the need for many of the more difficult billing
8 problems that can occur, and which often take significant clerical time to resolve.

9 vii. **Reduction in Energy Theft**

10 AMI reduces energy theft in three ways. First, during deployment, DP&L's
11 vendor will be removing every existing meter and replacing it with a new smart
12 meter, and the installers will be trained to notice irregularities that can be
13 investigated as potential theft. Second, the tamper-detection capability of the new
14 meters will virtually eliminate meter tampering as a source of energy theft. The
15 new meters will provide a tamper notification that will be analyzed and
16 potentially investigated for theft. Third, the more sophisticated MDMS will allow
17 DP&L to better detect bypass and partial-bypass theft through data mining.

18 viii. **Reduction in Uncollectible Expenses**

19 With the ability to offer a Prepay program to customers (as described in Witness
20 Tatham's testimony) and the ability to perform disconnects faster via AMI
21 technology, reducing uncollectible expenses.

1 ix. **Improvement in Meter Accuracy**

2 Evidence shows that electro-mechanical electric meters begin to under record
3 usage with age due to wearing of the moving parts. Smart meters do not generally
4 have this problem, and, therefore, average meter accuracy will improve as electro-
5 mechanical meters are replaced. Moreover, smart meters fail more conspicuously
6 than electro-mechanical meters and are, therefore, more readily identified.

7 x. **Reduction of Uncollectible Expenses from Unoccupied Premises**

8 With the ability to perform daily or more frequent readings, consumption from
9 premises that are supposed to be unoccupied can be more quickly identified and
10 addressed. DP&L will be deploying remote disconnect relays on all residential
11 AMI meters, enabling meters to be shut off. This capability is expected to limit
12 utility exposure to write-offs of charges for consumption registered on "inactive"
13 advancing meters on accounts closed after customers inform DP&L that they are
14 moving out.

15 xi. **Reduction of Load Research Costs**

16 AMI can provide data for load research studies, thereby decreasing the need for
17 more costly load research metering equipment and services, such as telephone
18 lines or cellular modems and costly field maintenance.

19 xii. **Reduction of Meter Testing Costs for New Meter Shipments**

20 During the deployment period of the AMI network, there will not be a need to test
21 a sample of the new meters shipped to DP&L. The cost of providing factory test
22 information and system validation of all AMI meter deployments is included in
23 the capital investment in the AMI solution.

1 xiii. **Enhanced Safety and Reduction of Claims for Meter Reading**

2 Safety for employees will be enhanced and costs for workers' compensation
3 associated with injuries incurred by employees during meter reading can be
4 reduced upon adoption of an AMI system, as meter readers would no longer be
5 exposed to high-crime areas, dogs, fences, adverse weather, etc. Costs associated
6 with vehicular accidents occurring during travel between meter-reading locations
7 in the field and utility premises would also be eliminated with AMI systems.

8

9 **Q. Can you identify the customer benefits that can be achieved through the AMI and**
10 **AMI-related technology deployment?**

11 A. AMI and AMI-related technology creates a number of customer benefits because it is a
12 foundational technology that enables multiple customer-facing products and systems. As
13 a result of granular data generated by AMI technology, customers will be able to take
14 advantage of advanced rate options such as prepay and TOU and reduced duration of
15 outages, which are quantified by Witness Hulsebosch. Customers will also be
16 empowered with more information about their electric usage that is more easily
17 accessible (e.g., portal and mobile application).

18

19 **VIII. CONCLUSION**

20 **Q. Please summarize your testimony.**

21 A. In summary, DP&L expects to implement its AMI in conjunction with its technology
22 systems to achieve its DMP vision. The combination of smart meters and supporting
23 systems will enable DP&L's customers to receive near-term benefits and will also lay the

foundation for the implementation of additional smart grid technologies with new capabilities that provide even greater operational efficiencies, increased reliability and new customer services.

In addition to enabling DP&L to implement a wide range of customer facing programs, these systems will provide real-time data pertaining to DP&L's distribution network extending all the way to the customer's premise. The availability and use of this data will provide DP&L with a comprehensive view and better understanding of our distribution system. Working together, the proposed supporting technology systems will make it possible to establish new rates based on time-differentiated consumption data, and for DP&L to improve outage detection and restoration capabilities through AMI.

With the implementation of these systems, DP&L will be able to continue the modernization process in the future and create more value for the Company's customers.

Q. Does this conclude your direct testimony?

A. Yes.

1318749.1

Exhibit A

The Dayton Power and Light Company

Case No. 18-1875-EL-GRD

AMI Opt Out

Monthly Fee

Line No.	Description	Total	Source
(A)	(B)	(C)	(D)
1	Meter Technician - .75 Hour	$34.04	Company Records Fully Loaded Hourly Rate
2	Transportation - .75 Hour	$2.43	Company Transportation Records
3			
4	Total Monthly Cost	**$36.47**	Line 1 + Line 2

The Dayton Power and Light Company

Case No. 18-1875-EL-GRD

AMI Opt Out

Meter Exchange - One Time Fee

Line No.	Description	Total	Source
(A)	(B)	(C)	(D)
1	Technical Clerk - .25 Hour	$11.94	Company Records Fully Loaded Hourly Rate
2	Meter Technician - 1.0 Hour	$41.31	Company Records Fully Loaded Hourly Rate
3	Transportation - 1.0 Hour	$3.24	Company Transportation Records
4			
5	Total One Time Cost - AMI Meter Exchange	**$56.49**	Line 1 + Line 2 + Line 3

The Dayton Power and Light Company

Case No. 18-1875-EL-GRD

AMI Opt Out

IT Fee

Line No.	Description	Total	Source
(A)	(B)	(C)	(D)
1	IT Upgrades	$45,886	Company Estimate
2	Total Residential Customers	463,846	Company Records
3	AMI-Opt Out Participation (%)	0.10%	Company Estimate
4	AMI-Opt Out Participation (Count)	464	Line 2 * Line 3
5			
6	Total IT One Time Fee	**$98.89**	Line 1 / Line 4

Summary: Testimony Direct Testimony of Kathryn N. Storm electronically filed by Mr. Jeffrey S Sharkey on behalf of The Dayton Power and Light Company