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BEFORE

THE PUBLIC UTILITIES COMMISSION OF OHIO

In The Matter of the Application of Duke Energy Ohio for an Increase in Gas Rates	))))	Case No. 07-589-GA-AIR
In the Matter of the Application of Duke Energy Ohio for Approval of an Alternative Rate Plan for its Gas Distribution Service	))))))	Case No. 07-590-GA-ALT
In the Matter of the Application of Duke Energy Ohio for Approval to Change Accounting Methods	))))	Case No. 07-591-GA-AAM

DIRECT TESTIMONY OF

CHRISTOPHER D. KIERGAN

ON BEHALF OF

DUKE ENERGY OHIO

234229

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ATTACHMENTS

CDK-1: Cost Benefit Analysis

1		I. **INTRODUCTION AND PURPOSE**

1   **I.**   **INTRODUCTION AND PURPOSE**

2   Q.   **PLEASE STATE YOUR NAME, POSITION, AND BUSINESS ADDRESS.**

3   A.   My name is Christopher D. Kiergan. I am an Executive Consultant with KEMA, Inc.

4   Established in 1927, KEMA is an international energy solutions firm providing technical

5   and management consulting, systems integration and training services to more than 500

6   electric industry clients in 70 countries. KEMA, with its North American operations

7   headquartered in Burlington, Massachusetts, allows many of its consultants to be home-

8   based when not physically at clients' locations; as such my business address is 1257 W.

9   Wellington Ave., Chicago, IL 60657.

10   Q.   **PLEASE BRIEFLY DESCRIBE YOUR EDUCATIONAL BACKGROUND AND**

11   **PROFESSIONAL EXPERIENCE.**

12   A.   I graduated from the United States Naval Academy in 1983, with a Bachelor of Science

13   in Mechanical Engineering. I served in the United States Navy as an officer and

14   helicopter pilot (Search and Rescue, Antisubmarine Warfare, Instructor). While in the

15   Navy, I attended the Naval War College and earned a diploma in National Security and

16   Strategic Studies. Upon completing ten years of active service, I attended the J.L.

17   Kellogg Graduate School of Management at Northwestern University, graduating in 1995

18   with an MBA with majors in management and strategy, organizational behavior, and

19   marketing. Upon graduation from business school, I entered the field of consulting with

20   Booz Allen & Hamilton, performing operations and process reengineering consulting to

21   manufacturers. Since leaving Booz Allen & Hamilton in 1997, I have worked for several

22   consulting firms (joining KEMA in 2003), focused exclusively on providing consulting

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1   services and delivering solutions to utility clients, primarily electric utilities. I have

2   experience on both strategy and operations engagements, extending from corporate and

3   business unit strategy to operational assessments and business process design. I have

4   detailed involvement with large project financial modeling and business transformation

5   initiatives and performance improvement projects of back-office processes, supply

6   chains, maintenance processes, and construction processes. Additionally, I have

7   extensive experience with electric utility deregulation and restructuring, leading two

8   multi-year projects for western electric utilities.

9   Q.   **DOES KEMA HAVE RELEVANT EXPERIENCE WITH SMART GRID**

10   **TECHNOLOGIES AND ADVANCED METERING INFRASTRUCTURE?**

11   A.   Yes. KEMA's Intelligent Networks and Communications (INC) market issue team is a

12   worldwide leader in planning, designing, and implementing advanced communications,

13   Advanced Metering Infrastructure (AMI), Distribution and Substation Automation, and

14   infrastructure modernization systems. KEMA also provides project management

15   experience to oversee the integration of these projects into utility operational systems. To

16   date, KEMA's consultants have implemented numerous such projects and are presently

17   supporting the implementation of some of the largest initiatives in North America,

18   including programs for Duke Energy Corp. (Duke Energy), Con Edison, Southern

19   California Edison, Public Service Electric & Gas, and Portland General Electric, as well

20   as other Smart Metering or Smart Grid projects in Australia, Europe, and Brazil. KEMA

21   has also previously assisted other key utilities in their automation programs, including

22   Hawaiian Electric Company, Ketchikan Public Utilities, Benton County PUD, and

23   Louisville Gas & Electric Company.

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1   Within the INC market issue team, KEMA's Advanced Metering practice has

2   established itself as a key partner for a number of the leading AMI programs in North

3   America and in other global locales. The practice is comprised of both business

4   strategists and technical specialists who together form a capability to understand all

5   aspects of the business. With a rich combination of direct utility "hands on" experience,

6   strong leadership and participation in industry consortia, and years of consulting project

7   service, KEMA's consultants are well-versed in metering and communications

8   technology, industry standards, regulatory/legislative trends and the strategies and

9   solutions of most of the leading suppliers. Using past and current AMI client

10   engagements, KEMA has developed a library of knowledge regarding specific

11   technology features, capabilities, and pricing, as well as insights into future product

12   development efforts for most of the major North American providers.

13   In the area of distribution systems, KEMA offers broad and deep subject matter

14   expertise in electric distribution system planning, design, and operations. KEMA has

15   assisted numerous utilities with the assessment, procurement, and implementation of

16   advanced technologies as well as business and operational strategies in this area. These

17   include advanced field instrumentation, relay protection, equipment condition

18   monitoring, feeder, distribution and substation automation, and information systems in

19   support of planning, engineering, and operations.

20   Additionally, KEMA has extensive testing facilities in the Netherlands (Arnhem)

21   and the United States, where it conducts testing of electrical equipment, from consumer

22   products to high voltage electrical equipment. (In Europe, with regards to the electrical

23   safety of products, KEMA is much like Underwriters Laboratory in the Unites States,

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1   providing the testing and certification of products, including the marking on consumer

2   packaging.) In addition to testing electronic kWh and kVar meters on behalf of

3   manufacturers worldwide, KEMA has recently set up a testing facility for Smart Grid

4   technologies.

5 **Q.** **PLEASE EXPLAIN KEMA'S SPECIFIC RESPONSIBILITIES RELATED TO**

6   **THE DUKE ENERGY OHIO, INC.'S SMARTGRID INITIATIVE.**

7 **A.** KEMA has been on-site with Duke Energy since December 2006, most recently helping

8   to develop and refine the its business case and economic model for several jurisdictions,

9   including Duke Energy Ohio, Inc. (DE-Ohio), and assisting with vendor selection, quality

10   assurance, and technology testing.

11   In 2007, KEMA was involved in developing and assessing the "use cases" put

12   together by Duke Energy. The "use case" methodology was used to identify the services

13   that Duke Energy would want to provide in the future and identify the benefits associated

14   with the implementation of SmartGrid. This methodology pulled together both KEMA

15   and Duke Energy Subject Matter Experts (SME) to create possible "uses" for SmartGrid,

16   including, for example, ██████████████████████████████

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1   KEMA has also been involved with the conceptual design and planning of the

2   demonstration labs, as well as work on the deployment of meters and related equipment

3   for the pilot programs in Ohio and the Carolinas.

4   Q. **PLEASE BRIEFLY DESCRIBE YOUR DUTIES AND RESPONSIBILITIES AS**

5   **AN EXECUTIVE CONSULTANT FOR KEMA.**

6   A. Since joining KEMA, I have worked onsite with utility clients on three long-term

7   projects, providing management consulting services in the form of overall project

8   management, process analysis and design, financial modeling, organizational design, and

9   strategic planning. I spent two years at Cinergy Corp., assisting with the reengineering of

10   the AFIC (After the Fact Interchange Costing) process mandated by the Joint Generation

11   Dispatch Agreement (JGDA) signed in April 2002. In 2005, I began a two-and-a-half

12   year project with the Bonneville Power Administration on an enterprise process

13   improvement project that included current state assessments and analysis (including

14   financial analysis), future state design, and implementation of solutions in several areas

15   including supply chain, construction, and maintenance. Since the beginning of 2008, I

16   have been with Duke Energy working on the SmartGrid cost/benefit model.

17 Q. **WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?**

18 A. The purpose of my testimony is to support the cost/benefit analysis of DE-Ohio's

19   SmartGrid initiative. Specifically, I (1) describe the SmartGrid model; (2) explain how

20   the model analyzes the program costs and benefits input into it; and (3) provide additional

21   information on what specific costs and benefits were provided by DE-Ohio for input in

22   the SmartGrid model. Finally I sponsor Attachment CDK-1, which is a summary of the

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1   cost benefit analysis I performed for DE-Ohio's SmartGrid initiative in terms of inputs,

2   assumptions, and results.

3   **II.   THE SMARTGRID MODEL**

4   Q.   **PLEASE GENERALLY DESCRIBE THE SMARTGRID MODEL.**

5   A.   The SmartGrid model is a Microsoft Excel-based economic cost/benefit analytical model,

6   which generally captures the overall economics, supports financial analyses, and is used

7   as a tool for management decisions for the SmartGrid project. ████████████████

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13   Q.   **HOW WAS THE DE-OHIO SMARTGRID MODEL CREATED?**
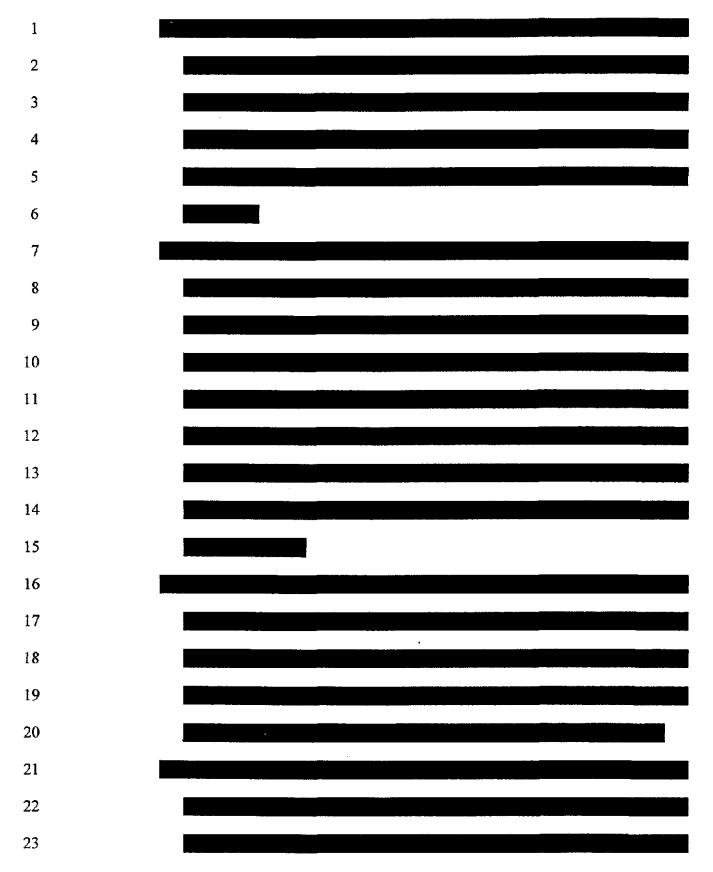
14   A.   The Ohio SmartGrid model was created by DE-Ohio for an advanced metering

15   infrastructure and smart grid pilot project in Ohio. However, over time, as additional

16   costs and benefits were identified, as more-detailed analyses were performed in the areas

17   of information technology, data transfer fees, distribution automation, and O&M

18   expenses, and as SmartGrid technology and equipment considerations became more fully

19   developed and costs became more firm, the model has been improved and is now a more

20   detailed and more accurate depiction of the costs and benefits associated with the

21   SmartGrid initiative in Ohio.

22   Q.   **PLEASE DESCRIBE THE INFORMATION INPUT INTO THE MODEL.**

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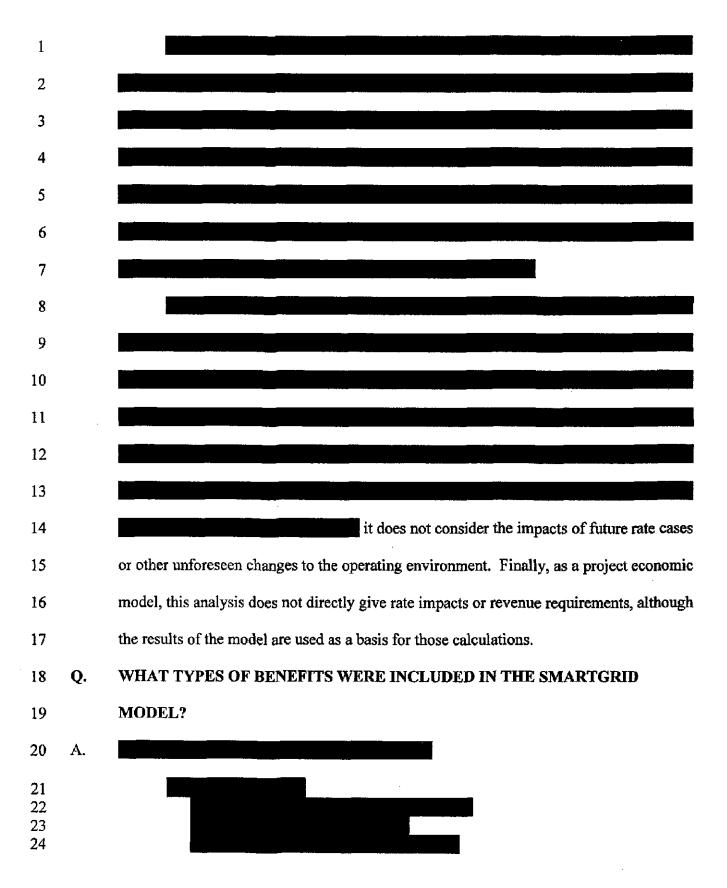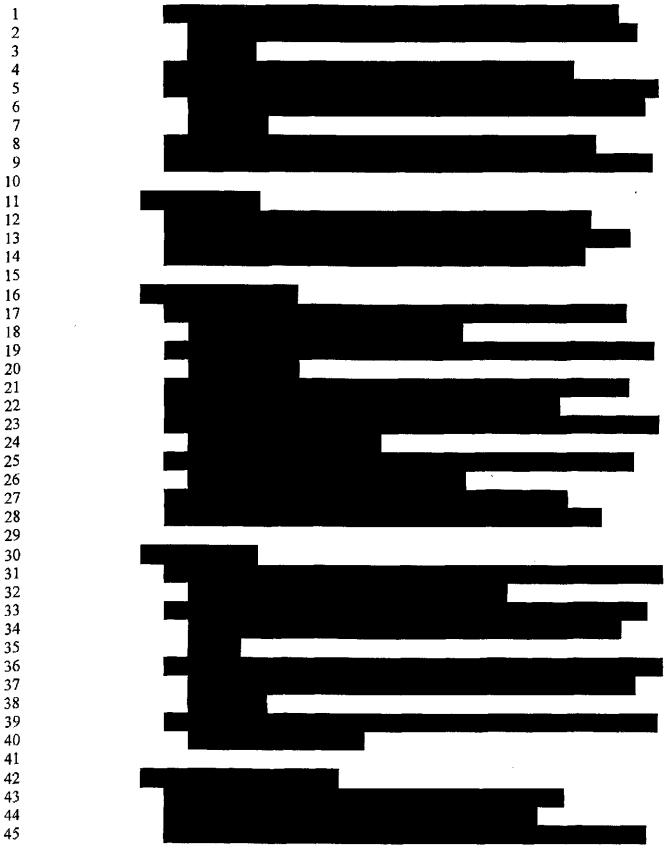3 ████████████████████████████████████

4 Q. WHAT ARE THE SOURCES OF THE DATA INPUT INTO THE MODEL?

5 A. KEMA obtained data from the applicable groups and employees within the Company

6 through a detailed data request template. These groups included Power Delivery, Power

7 Delivery Accounting, System Protection Engineering, Asset Management, Substations

8 and Operations Maintenance, System Operations, Metering, Meter Operations, Meters

9 and Infrastructure, Integrated Resource Planning, Finance, Financial Forecasting,

10 Accounting, Tax, IT, Customer Service, Billing, Energy Efficiency, Regulatory Strategy,

11 and Rates. Follow-up discussions were held when necessary to clarify exactly what data

12 was needed and the level of detail needed. Upon receiving this data, it was analyzed by

13 me and others associated with the modeling process to verify the accuracy of the data in

14 relation to predetermined, high-level estimates. For data that fell outside expectations,

15 discussions and further analysis were conducted to confirm the accuracy of the data.

16 Consensus was reached between me and the providers of data on all data entered into

17 model. Additionally, in the areas associated with O&M costs, current budget amounts

18 were checked with Power Delivery Accounting to ensure accurate and current data was

19 being utilized.

20 Savings percentages (expected reductions in current budget amounts) associated

21 with benefits were analyzed through a collaborative process including discussions with

22 the affected groups and savings seen or projected in similar projects around the country.
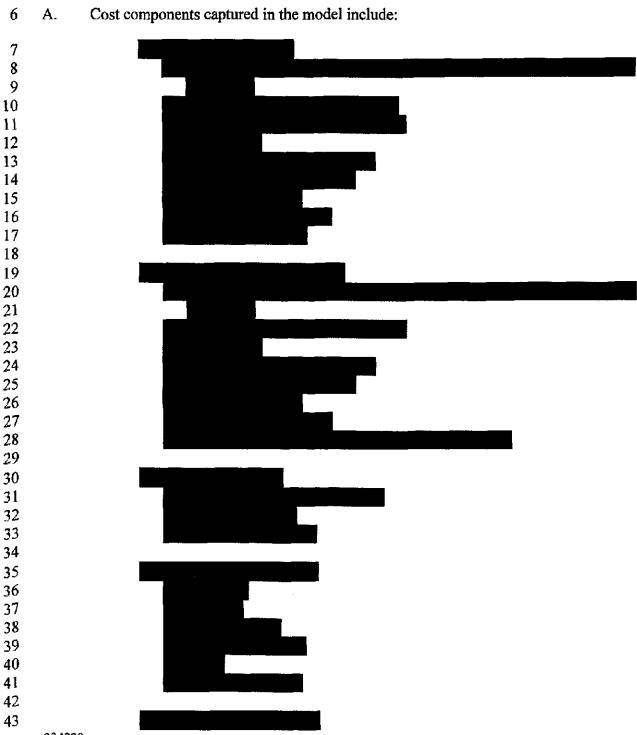
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1   Costs associated with new equipment (meters, communications, etc.) were

2   obtained from the potential vendors of the equipment being considered for the SmartGrid

3   project. This data was then reviewed to ensure that the costs modeled were the expected

4   costs and not necessarily the current costs associated with small pilot programs or small

5   purchase orders. These costs are best estimates since contracts for large purchases are

6   not yet in place.

7 **III.**   **COST BENEFIT ANALYSES PERFORMED BY THE SMARTGRID MODEL**

8 **Q.**   **PLEASE DESCRIBE HOW COST AND BENEFITS ARE ANALYZED BY THE**

9   **SMARTGRID MODEL.**

10 A.   A project Net Present Value (NPV) was calculated based on the costs, benefits, and

11   assumption input into the model. Benefits were calculated for each of the twenty years in

12   the model (2009-2028) and treated the same whether they were a direct budget expense,

13   an avoided cost, or an increase in revenue. (Benefits are placed into these categories to

14   facilitate further analysis such as revenue recovery/rates calculations and overall O&M

15   increase/decrease calculations, but they are all treated alike for purpose of the project

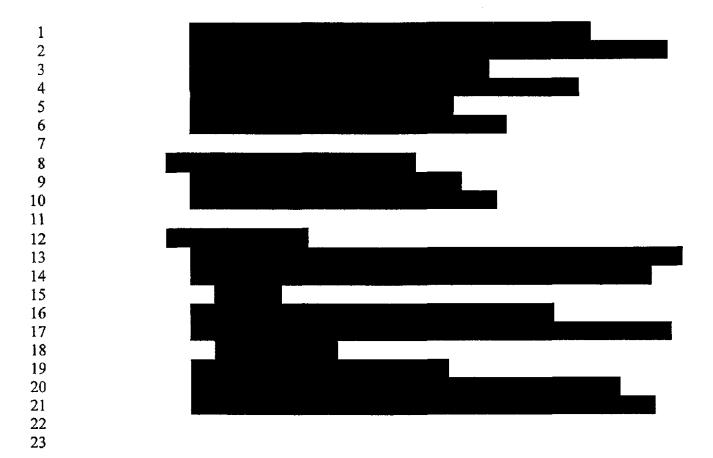16   NPV calculations.)

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14 ████████████████████████ it does not consider the impacts of future rate cases

15 or other unforeseen changes to the operating environment. Finally, as a project economic

16 model, this analysis does not directly give rate impacts or revenue requirements, although

17 the results of the model are used as a basis for those calculations.

18 **Q.** **WHAT TYPES OF BENEFITS WERE INCLUDED IN THE SMARTGRID**

19 **MODEL?**

20 **A.** █████████████████████████████████

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Q. WHAT GENERAL CATEGORIES OF COSTS WERE INCLUDED IN THE
SMARTGRID MODEL?

A. Cost components captured in the model include:

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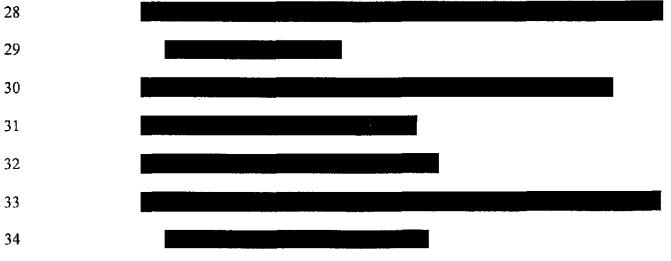15
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24 **Q. PLEASE DESCRIBE ANY ADDITIONAL DATA USED IN THE MODEL.**

25 A. In addition to the costs and benefits associated with the SmartGrid Initiative, the model

26 also considers DE-Ohio service territory-specific data, specific financial assumptions,

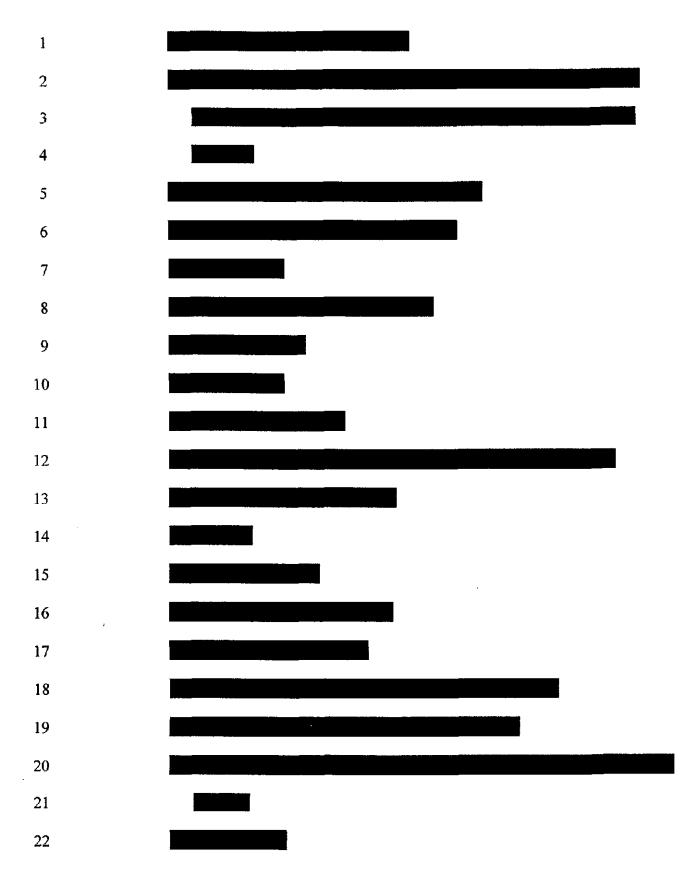27 and relevant operating characteristics. These include:

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1　　　　[redacted]

2　Q.　HOW IS THIS ADDITIONAL DATA USED BY THE MODEL?

3　A.　This additional data is used to calculate benefits, costs, and NPV across the twenty years

4　　　of the model.

5　Q.　PLEASE DESCRIBE ATTACHMENT CDK-1.

6　A.　Attachment CDK-1 is a summary of the cost benefit analysis I have described in my

7　　　testimony, including specific assumptions, inputs, and results.

8　Q.　WAS ATTACHMENT CDK-1 PREPARED BY YOU AND UNDER YOUR

9　　　DIRECTION AND CONTROL?

10　A.　Yes.

11　Q.　WHAT WERE THE RESULTS OF THE MODEL?

12　A.　[redacted]

13　[redacted]

14　[redacted]

15　[redacted]

16　[redacted]

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8 Q. DID YOU PREPARE A MORE DETAILED EXHIBIT CONTAINING THE

9 COMPONENTS AND RESULTS OF YOUR MODEL?

10 A. Yes. My report is attached is CDK-1and is filed under seal.

11 IV. CONCLUSION

12 Q. DOES THIS CONCLUDE YOUR PREPARED DIRECT TESTIMONY?

13 A. Yes, it does.

14