Exhibit No.:	
Issue:	Asset Management Plan; Business Plan
Witness:	John R. Marshall
Type of Exhibit:	Direct Testimony
Sponsoring Party:	Kansas City Power & Light Company
Case No.:	ER-2006-____
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MISSOURI PUBLIC SERVICE COMMISSION

CASE NO. ER-2006-____

DIRECT TESTIMONY

OF

JOHN R. MARSHALL

ON BEHALF OF

KANSAS CITY POWER & LIGHT COMPANY

Kansas City, Missouri
January 2006

"Proprietary" Information has been Removed from Certain Schedules Attached to This Testimony Designated ("P") Pursuant to the Standard Protective Order.

DIRECT TESTIMONY

OF

JOHN R. MARSHALL

Case No. ER-2006-____

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

A: My name is John R. Marshall. My business address is 1201 Walnut, Kansas City, Missouri 64106-2124.

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

A: I am employed by Kansas City Power & Light Company ("KCPL") as Senior Vice President, Delivery Division.

Q: **What are your responsibilities?**

A: My responsibilities include overseeing Customer Operations, Transmission Services, Information Technology and Energy Solutions.

Q: **Please describe your education, experience and employment history.**

A: I graduated from the University of Arkansas at Fayetteville in 1976 with a Bachelor of Science degree in Electrical Engineering. Further education from 1990 through 1997 includes management development at Columbia University, The Aspen Institute, The Wharton School, and Harvard Business School Advanced Management Program. I began employment at KCPL in May 2005. Prior to joining KCPL, I was a Senior Executive Resource for GFI Energy Ventures LLC; Chairman of InfraSource Services Inc.; Chairman of SPL World Group Inc.; and a Director of Power Measurement Holdings, Inc. From 2001-2002, I was Senior Vice President of Customer Service at the Tennessee Valley Authority, and from 1999-2001, I served as President of Duquesne

Light Company, Pittsburgh, Pennsylvania. Prior to joining Duquesne Light, I was Vice President of Entergy Corporation and served in various nuclear and fossil generation, transmission, distribution, customer service, information services and retail operations positions from 1976 through 1999.

Q: Have you previously testified in a proceeding at the Missouri Public Service Commission ("MPSC") or before any other utility regulatory agency?

A: Yes, I have testified in proceedings before the Texas Public Utility Commission.

Q: What is the purpose of your testimony?

A: The purpose of my testimony is to summarize the provisions of the Stipulation and Agreement in Case No. EO-2005-0329 ("Regulatory Plan Stipulation and Agreement") that pertain to KCPL's Asset Management Plan (or the "Plan") and to provide an update explaining what steps KCPL has taken thus far with respect to the Plan. I will discuss the goals and objectives of the Asset Management Plan, including distribution and transmission investments and distribution automation projects. I will also discuss some of the specific elements of the Plan, and the capital budget requirements to support those programs. Additionally, my testimony discusses the Delivery Business Plan and outlines the specific strategies on which we will focus to drive our business forward.

Q: Was KCPL's Asset Management Plan addressed in the Regulatory Plan Stipulation and Agreement?

A: Yes.

Q: Describe the purpose, goals, and benefits of the Asset Management Plan?

A: Asset Management at KCPL is the structured and disciplined process to develop the program of work for system expansion, system improvements, and maintenance (both corrective and preventive). Our objective is to provide a scope of work to achieve three key strategic goals at the most optimal cost: (i) Mitigate risks of major outage events to our customers; (ii) Minimize the System Average Interruption Duration Index ("SAIDI") as it relates to the duration and frequency of outages to our customers; and (iii) Minimize the number of customers with multiple interruptions. In addition to the strategic goals above, KCPL must manage its transmission and substation assets to insure compliance with reliability standards and criteria at the national (*i.e.*, National Energy Reliability Council ("NERC") and Federal Energy Regulatory Commission ("FERC")) and regional (*i.e.*, Southwest Power Pool ("SPP")) levels. Transmission and substation asset management is an important component in meeting these operating requirements.

Q: What are the specific elements of the Asset Management Plan?

A: Our practice at KCPL has historically been to manage identified risks, maintain system capacity levels to meet forecasted growth, and repair facilities as they reach the end of their useful life. This has certain inherent risk because the system is aging and we have known pockets of poor performing facilities. We expect from experiences of other utilities that failure rates of certain components will increase over time.

As part of our Strategic Intent, we have developed plans to address this issue that require additional funds. This Plan allocates resources to address known issues on the system that either present the highest risk of a major system outage or impact customers through multiple outages over relatively short spans of time.

The Plan includes a number of projects and programs. We will conduct a system-wide condition assessment and inventory of the overhead distribution system. We will implement projects to address components that are nearing the end of their useful life and are experiencing high failure rates on both the transmission and distribution systems. Customer outage data will be used to develop programs targeted at improving reliability for the customers that experience the highest number of outages.

We will utilize industry experience along with our inventory and performance data to conduct studies that will lead to targeted asset renewal programs. Maintenance practices will be refined to extend the useful life of existing facilities while optimizing costs.

Implementation of automation programs will enable automated fault detection, isolation, and reconfiguration of the distribution network to improve reliability and minimize outage duration. Additional automation programs will automate substation equipment to reduce momentary outages and monitor key components of our highly reliable but aging downtown and Plaza area underground secondary networks.

By implementing this Plan, we can expect to manage asset replacement schedules and our aging infrastructure. We will also optimize system maintenance programs, improve system design for better long-term performance, and optimize strategic capital and operation and maintenance ("O&M") investments while maintaining Tier 1 reliability performance. Tier 1 is defined as performance in the top quartile (25%) of electric utility companies in peer benchmarking groups.

Q: **Does the current anticipated timing of capital requirements differ from the timing set forth in the Regulatory Plan Stipulation and Agreement?**

A: Yes, it does.

Q: **Why has the anticipated timing changed?**

A: The Distribution Automation initiatives for 2005 could not be implemented in 2005 because the Regulatory Plan Stipulation and Agreement was approved late in 2005. In addition, money for some years was moved between programs KA50 and KA52 (defined below) per year and between years per Schedule JRM-1. However, the respective totals for KA50 and KA52 did not change for the sum of the entire period, nor did the total spent on all projects change.

Q: What programs are to be funded under the Asset Management Plan?

A: KCPL has identified three broad programs that will be funded under the Asset Management Plan and have assigned specific budget items to each of these programs. These programs are (i) the "KA50" - Distribution Asset Management Strategic Intent Program; (ii) the "KA52" - Distribution Automation Strategic Intent Program; and (iii) the "BP01" - Transmission and Substations Asset Management Strategic Intent Program. The proposed funding break down for each program is shown in the attached Schedule JRM-1.

Q: What programs are to be funded under the Distribution Asset Management Strategic Intent Program?

A: KCPL has identified three programs that will be funded under the Distribution Asset Management Strategic Intent Program: (i) the High Outage Count Customer Program; (ii) the Underground Renewal Programs; and (iii) the Overhead Distribution System Inventory and Condition Assessment Programs. A detailed description of each of these programs follows:

High Outage Count Customer Program – In addition to providing its customers Tier 1 reliability, KCPL is committed to achieving Tier 1 customer satisfaction. To measure this, our Marketing Research group conducts and publishes annual surveys. One of the conclusions of this research is that customer satisfaction begins to deteriorate as a customer experiences multiple interruptions within recent memory, for example, after two to three interruptions in one year. A tool used to measure this concept is CEMIn, which is the percentage of Customers Experiencing Multiple Interruptions of 'n' or more per year. Because of its customer satisfaction research, KCPL has included as one of its three strategic reliability goals the minimization of multiple customer interruptions, as measured by CEMIn. Given that the threshold before deterioration of customer satisfaction appears to be three outages per year, the appropriate indicator at present is CEMI4. After the program has had some success, one might expect to be able to address the level of CEMI3.

KCPL's program for addressing CEMI4 is directed at the worst-performing laterals and devices. At other utilities such programs are often termed "worst device" or "repeat outage" programs because they focus on the numbered fuse or interrupting device (which could be a recloser) that has multiple interruptions over a given period. At KCPL, this program is called the CEMI program, because repeat outages on laterals are the most common cause of customers experiencing multiple outages.

Note that the other programs listed above mainly impact the other two key reliability goals: avoiding the risk of major outages and minimizing SAIDI. In addition, the feeder-oriented programs will tend to reduce not only SAIDI but also CEMI by reducing mainline outages on those feeders that may have multiple interruptions to the whole feeder. The lateral-oriented programs described here address the remaining source of multiple interruptions: repetitive outages on devices below the feeder mainline level. The two key programs in this regard are the CEMI program, aimed mainly at overhead taps and transformers, and the Underground Residential Distribution ("URD") Cable programs, aimed at underground residential distribution taps. The URD programs are discussed in the next section.

For the High Outage Count Program, an exception report is developed that flags for attention those devices with multiple outages. An analysis is done based on known data about the number and type of outages, number of customers affected, and the length of the lateral behind the device or, if the device is a transformer or the length of secondary wire, if any. Based on this analysis a preliminary ranking is done to suggest which devices should be targeted for remediation based on the overall value, *i.e.*, the number of repetitive customer interruptions avoided per dollar spent. The attached Schedule JRM-2 illustrates the distribution of devices by number of outages. The data shown are for 2004; this will vary from year to year. It includes all outages, *i.e.*, it does not exclude storm outages.

The distribution engineer studies the map, outage history, and system condition, including a site visit, to determine the best program of remediation for the lateral or transformer behind that device, using the guidelines assumed in the original analysis, but with flexibility for what is discovered on the site visit and detailed analysis.

The remediation may be a combination of tree trimming, animal guards, lightning arresters, or rebuilt structures (poles, crossarms, insulators). Fuse coordination may be an issue, or slack spans. For underground laterals, the best solution is usually replacement or injection of the cable (see URD cable replacement below). Based on the situation, the cost of the remediation can vary widely; from as little as a few hundred dollars for an animal guard or fuse coordination, to a few thousand dollars for a single pole replacement or a mile of tree trimming, to over $100,000 to completely rebuild a portion of line.

KCPL's Asset Management team has performed studies and investigations to determine the most efficient way to allocate the available budget resources in order to address those customers experiencing problems, in particular those on the High Outage Count Customers list. KCPL has worked to allocate the available resources to address the High Outage Count Customer issues and will accomplish this task in such a way as to maximize the benefits to our customers given the budget limitations. The work has been prioritized with respect to the number and duration of outages experienced as well as the number of customers affected. Another factor in determining priority of work is number of complaints received in a geographic area regarding outages. The prioritization was done based upon assumptions for the amount of work required to address the problems. As more detailed plans and cost estimates are developed, the prioritization will be revisited and changes will likely be made to the prioritization lists.

Underground Renewal Programs – Underground feeder and URD cable represent an important part of the KCPL distribution system. Significant portions of the underground primary cable are facing end-of-life issues, most notably the older Paper-Insulated, Lead-Covered ("PILC") feeder cable in the older parts of the system and the pre-1983 direct buried URD on our underground laterals. KCPL has developed Underground Renewal Programs to address these issues utilizing a portion of the Distribution Asset Management Strategic Intent funding.

Underground Feeder Cable Replacement Program

Underground feeder cable is a critical component on the KCPL distribution system, since a problem on the feeder cable will affect all customers served by the circuit. In 2004, KCPL experienced 76 feeder cable failures that caused approximately 3,286,000 customer minutes out ("CMO"). On a system basis, feeder cable outages comprised approximately 0.74% of all outages but contributed approximately 10.60% of all non-storm related CMO's. These numbers show the high impact that feeder cable failures can have on system reliability and the importance in reducing these outages and their effects. KCPL has performed an advanced feeder cable study to investigate all feeder cable failures since 1993 and identified correlations between the outages and various feeder cable characteristics and field conditions. This study investigated feeder cable failures on a geographic basis and mapped out feeder cable failures across the system and took into consideration the type, age, and design of feeder cable that failed, where available. The indicators evaluated include age of cable, size of duct bank (4-, 6-, 8-, 10-, or 12-way duct bank), diameter of the ducts, length of the duct bank, construction materials used in the duct bank, loading of the cable, expected temperatures of the cable due to loading, location of the cable in the duct bank, cause of failure (presence of water in the manhole, etc.), and geographic location by substation. Several major correlations between failures and the various indicators were developed as a result of this study. In addition to the correlations between failures and the various indicators, the study was also able to identify several areas where a pattern of cable failures could be identified.

One action item from this study is that the Distribution Engineering and Underground groups will determine the extent of the problems and develop possible solutions to investigate these areas further. In these areas, as well as on a system wide basis, this information may be used to drive a proactive feeder cable replacement program if strong enough correlations are found to exist. The current practice at KCPL is to reactively replace feeder cable as it fails. Until strong correlations can be determined between failures and measurable indicators, the reactive replacement program will remain in place. However, if strong correlations can be determined and accurately applied to installed cable, a proactive feeder cable program may be implemented.

Proactive URD Cable Replacement Program

KCPL has experienced reliability issues with the URD cable system since the late 1980s and early 1990s. Since the issues with URD surfaced, KCPL has had several programs in place to address the issues, some proactively and some reactively. Today's guidelines and programs are reactive in nature and are designed around the second-failure criteria and the prioritization guidelines for URD cable replacements. A proactive URD cable replacement program was implemented in 1991 to increase URD reliability. This program's focus was to research the adjacent cables in a loop of a failed URD cable and to replace all the cables of the same vintage in the loop if the failure rate would warrant it. This guideline proved to be a proactive method to replace aging cables. This guideline was ceased in 1995. KCPL's plan is to initiate a similar program to proactively address URD cable failures before they occur. The guidelines for the proactive replacement program have been developed and target replacements have been identified. This program takes into consideration the type, age, design, number of failures experienced, number of cable sections with failures on a given lateral, and the number of customers affected for the URD cable. Using the URD cable-tagging method as a basis for installation data, KCPL can accurately estimate the age, design, and possibly manufacturer of trended problem cables and identify areas and sections of URD cable that have similar characteristics as the failed cables, thereby providing a means to perform intelligently targeted proactive cable replacement before failure.

URD Cable Injection Program

KCPL recently investigated the feasibility of initiating an injection program for stranded pre-1983 URD cables. The injection process involves a pressure injection of an insulating solution through the stranded conductors so as to fill "treeing" voids in the existing insulation with the intention of restoring the insulation to near new condition and reducing cable failures. This process can only be performed on stranded conductor cables and only if certain characteristics are present on any splices on the cable. The injection process is estimated to cost $10/foot versus approximately $28/foot for new URD cable in duct. KCPL has approximately 3,300 sections of URD cable that would qualify for the cable injection program. KCPL has initiated a cable injection program targeting high outage URD areas.

Overhead Distribution System Inventory Pilot Project

KCPL has identified the need to conduct a distribution system inventory and asset assessment as a key step in enhancing an integrated Asset Management Plan. The extent of the initial pilot project is for the inventory and system assessment on approximately 5% of the overhead electric distribution system. Work on the pilot system inventory commenced in mid-May, 2005 and was performed by INTEC Services, Inc. using a software tool developed for KCPL by EDM, Inc. The pilot project data collection was completed on December 16, 2005. Now that the data collection is complete for the pilot area, Asset Management and Engineering will conduct targeted reliability studies focused on reducing outage minutes caused by problem or failure prone equipment, wildlife, lightning, overhead wire, and inadequate line design and construction. These studies will be performed throughout 2006. It is estimated that the targeted reliability studies will produce savings in CMO of 35-75% in the areas listed above. An additional benefit would be increased customer satisfaction due to reduced outages.

The timeline for the implementation of the Overhead Distribution System Inventory Project is as follows:

- Initial Pilot Inventory Program (5% of the KCPL System) – Completed December, 2005;
- Conduct targeted reliability studies using the Pilot Inventory data and develop work program based upon findings – January 2006 thru December 2006;
- Fine tune inventory program software and data collection requirements for Full System Condition Assessment and Inventory – May 2006 thru September 2006;
- Full System Condition Assessment and Inventory – February 2007 thru December 2008; and
- Conduct targeted reliability studies for the full KCPL system – 2007 thru 2009.

Q: What programs are to be funded under the Transmission and Substations Asset Management Strategic Intent Program?

A: KCPL has identified various programs that will be funded under the Transmission Asset Management Strategic Intent Program. These programs generally fall into transmission-related and substation-related projects. The projects that make up these programs are discussed in more detail below.

Transmission Pole, Arm, Shield Wire and Switch Replacement Program - KCPL's transmission system consists of 1,372 miles of 345 kV, 161 kV and 69 kV lines. Most of these lines were predominantly constructed on wood poles with wood crossarms. Approximately 62% of the line miles were constructed more than 25 years ago with some dating back to the 1940s. We have been replacing poles and arms as they deteriorate, but inspections are showing that many of the poles and arms are reaching end of life and are starting to deteriorate at a faster rate than in the past. The transmission pole and arm replacement program will accelerate the replacement of the worst poles and arms on the transmission system improving line reliability and safety.

We have identified several lines where the galvanized steel shield wire is suffering increased failures due to vibrational fatigue, lightning damage and corrosion. Several transmission switches have also been identified as unreliable. Failures of these items have caused outages on the transmission system and an increase in customer outage minutes. Selected sections of shield wire and several transmission switches will be replaced under this program.

Substation Programs – The substation programs have three major goals (i) mitigate risks of major outage events to our customers; (ii) minimize the SAIDI and (iii) replace obsolete equipment. Some of the specific projects are:

1) **Overhaul 12kV Breakers** - Distribution breakers throughout the system have reached the end of their life cycle. The estimated life of this type of breaker is 20 years. Currently, KCPL has approximately 180 General Electric distribution breakers with an average age of 37 years. These breakers are decreasing in reliability and causing more unplanned outages and maintenance cost. As these breakers become less reliable, safety and customer outages become more of an issue with faults not being interrupted as they should. These breakers will undergo a complete rebuild with replacement of worn bearing and linkages, refurbishment or replacement

of trip and closing mechanisms and arc shoots. When rebuilt these breakers should have as good or better service life expectations than the original.

2) **Replace PSD Breakers** - KCPL currently has 36 McGraw Edison type PSD breakers left on its system. These breakers are hydraulically operated and have a history of issues that lead to decreased reliability and increased maintenance cost. As these breakers become less reliable, safety and customer outages become more of an issue with faults not interrupted as they should. For this style of breaker it is economical to completely replace the breaker with a new modern vacuum breaker.

3) **SF6 Breaker Change-Out** – We have identified two 345kV SF6 (sulfur-hexafluoride) breakers that continue to leak and repairs have been unsuccessful. The cost of rebuilding is nearly the cost of a new breaker. Installing new breakers will eliminate the need to constantly replace the SF6 gas, which has been identified as a greenhouse gas, and improve system reliability.

4) **Replace 34 & 69 kV Oil Circuit Breakers** - Many 34 kV and 69 kV Oil Circuit breakers are over 50 years old. Parts are scarce or unavailable and the breakers are requiring frequent maintenance to keep them performing reliably. This program will replace some of the worst performing breakers.

5) **Replace Substation Transmission Disconnect Switches** - Many transmission disconnect switches in KCPL's substations are 40 or more years old. The failure rate on these switches has been increasing in recent years. Switches are critical items in the transmission system and high reliability is required to operate and maintain the system. This program will replace the worst performing switches.

6) **Remote Terminal Unit Replacement -** Remote terminal units ("RTUs") are part of every substation in the Kansas City metropolitan area. The RTU informs our control center of the system's condition, including voltage, line loading, breaker and alarm status. Also, the RTU allows for remote operation of substation equipment. We have obsolete RTUs (27% of all our RTUs), and spare parts are no longer available for these units. Replacement of these RTUs will provide spare parts for the remaining units, and provide additional functionality where new units are installed.

Q: What programs are to be funded under the Distribution Automation Strategic Intent Program?

A: The programs that are to be funded include: (i) the network automation project; (ii) the 50 CO relay automation project; (iii) the 34 kV switching device automation and fault indication project; (iv) the power quality monitor project for rural circuits; (v) the "Integrated Circuit of the Future" project; and (vi) the dynamic voltage control project. These programs will enable automated fault detection, isolation, and reconfiguration of the distribution network to improve reliability and minimize outage duration. In addition, service quality and power quality will be improved.

Q: Describe the underground networks on KCPL's system?

A: KCPL has three underground grid network systems with one in the Country Club Plaza and two in the downtown area. In addition, there are 24 local networks (spot networks), so-called because they are small network systems comprised of two, three, or four network transformers and protectors configured together. These underground network systems have been in service for several decades and have been successful and reliable.

However, the existing system does not have provisions to monitor or control this automatic switching activity.

Q: **Describe KCPL's Network Automation Project.**

A: This project provides the rollout of new communicating network protector relays, sensors, and radios to allow operators to obtain system status of the switches and will report abnormal conditions automatically. Monitoring this automatic switching and health of the system is important to ensure there are no overloads during abnormal conditions.

In addition, the project includes the installation of voltage monitors at strategic locations on the networks. These monitors will report voltage problems to allow KCPL to resolve these proactively before customers experience difficulties. When a power outage occurs, the monitors will immediately report this to distribution system operators. This project will also enhance KCPL worker safety by allowing them to remotely perform any manual switching. This will allow the switching to be done without sending the employee into the vault. Safety issues for network protector switching became heightened in 2004 when two underground workers escaped injury as they quickly exited a vault following a fault inside a network protector during switching. The project also is attractive because of hopes to reduce O&M costs related to these grid networks. There have been a significant number of automatic switching events on certain network protectors. This project will allow KCPL to monitor the switching events to determine the cause and effect of these network protectors experiencing excessive switching. Before this project, underground network technicians simply knew there were certain network protectors that have experienced a high number of operations over a yearly cycle. Crews or engineers did not have a way to monitor these and did not know when or what was causing this excessive switching. The excessive switching has caused components to fail and prematurely reach the end of the life cycle. This project will allow underground network technicians and engineers to know when the protectors have cycled and provide clues to lead to causes of this excessive switching.

Early evidence from the network protectors in the Plaza network suggest the following issues are contributing to the excessive switching:

- Changes in impedance due to reconfiguration of substation transformers;
- Changes in impedance due to reconfiguration of primary circuitry; and
- Difference in voltage from various substation buses.

The project includes development of web-based software to allow dispatchers and engineers to access network operating data more efficiently and to track radio reliability. Software developments also include provisions to provide the data to be brought through the outage management system ("OMS") and energy management system ("EMS").

The project includes reviewing and changing the settings on the network protectors to reduce the number of their operations. Also included in the project is a review and refinement of system operating procedures to ensure conditions are satisfactory to reduce the likelihood of conditions that cause excessive network protector operations. Finally, the project includes development of web-based software to allow dispatchers and engineers to access network data more efficiently and to track radio reliability. Software development also includes provisions to bring data back through the EMS and OMS systems. A radio upgrade from analog to digital is part of the project. The communication supplier has recently developed the digital solution and KCPL has ordered a few radios for testing. KCPL hopes to convert their existing network automation system from analog communications to digital GPRS beginning in 2006. This will include sending the existing analog radios back to the supplier for exchange to the new technology that can be deployed thereafter.

Q: Please summarize the benefits of KCPL's Network Automation Project?

A: Here is a list of benefits from this project:

- Increased safety for KCPL employees by facilitating remote control of network protector relays;
- Improved efficiency of quarterly network protector test;
- Annual savings from life extension of spot network transformers;
- Annual savings for summer load readings;
- Avoided network protector patrols due to network feeder outages;
- Avoided equipment failure;
- Avoided annual replacement costs; and
- Deferred maintenance by extending downtown grid repair schedule.

An additional benefit from this project is that technical workshops are being provided to our underground crews, engineers, and dispatchers regarding network systems. The first three-day training session has already been completed. A second three-day session will be scheduled in 2006.

Q: Describe the 50 CO relay automation project.

A: Typically, automated substation overcurrent relays are now installed on any newly built KCPL substation in the metropolitan area. This automation provides a way for KCPL operators to remotely monitor and control a relay scheme. The hardware is wired to effect the relaying configuration for all circuits on a given bus where this feature is installed. The relay protection scheme allows the circuit breaker to open quickly during a fault with the hopes that the fault may be temporary and will clear when the breaker automatically closes. This protection scheme, called "Quick-Trip", allows enabling or disabling the overcurrent relay (50 CO) by remote control.

During storms, there are many temporary faults on utility distribution circuits. An example of a cause of a temporary fault would be a lightning strike on overhead lines or a tree limb that comes into contact with these lines. If the fault is temporary, this relay protection design allows the breaker to open temporarily before the fuse on a lateral line blows. When this occurs, the breaker briefly opens to allow time for the temporary fault to clear. During this brief time period (less than a second), all customers on the affected circuit experience a power interruption. Then, when the circuit breaker closes in (re-close), service is restored to the customers on the entire circuit without any sustained outages.

This relay has worked well during storms, and has prevented many sustained outages by allowing momentary outages as a trade-off to sustained outages. However, KCPL has learned this relay feature causes our customers problems during a typical (fair weather) day.

On a typical day, there are less temporary faults. When a temporary fault on a lateral occurs on a typical day, studies performed by KCPL show that half of the time the lateral fuse will blow anyway since the fault is not always temporary. This project will allow KCPL to retrofit existing substations that are not currently equipped with this relay automation. KCPL operators will then be able to remotely control and monitor this relay feature and ensure the "Quick Trip" is turned off during a typical day.

Preliminary studies show that momentary power interruptions will be reduced by 40% to 50% for each switchgear that is automated. This feature will especially help commercial and industrial customers. The rollout of the project for the metropolitan area will take six years.

Q: Please summarize the benefits of the 50 CO relay automation project.

A: The benefits of this project are as follows:

- Improve customer satisfaction by reducing momentary power interruptions;
- Reduces sustained customer minutes out during a storm by ensuring "Quick-Trip" feature is enabled during a storm;
- Allows remote control of "Quick-Trip" relays; and
- Provides a way to monitor the "Quick-Trip" status (enabled or disabled) to ensure proper status is provided.

Q: Describe the 34-kV switching device automation and fault indication project.

A: KCPL has 34-kV sub-transmission systems in the East and South Districts. These systems help deliver power to cities and substations that transform the power to distribution level voltages. These 34-kV lines are strategic for this power delivery. These lines can be lengthy and in some cases, the circuit may be up to dozens of miles long. This project will provide a way for KCPL system operators to remotely control these switches and obtain operating information from sensors installed at these switches. This will allow KCPL operators to quickly isolate problems and perform remote switching to re-route the power.

Because the 34-kV feeders are much longer than metropolitan feeders and remotely located from service centers, the performance numbers are not as good on these 34-kV circuits as metropolitan feeders. Also, because the 34-kV feeders serve various 12-kV substations and municipalities, the number of customers affected is considerable.

The East and South Districts have also reported operating problems regarding some of the existing manual 34-kV switches. These problems are due to a combination of the age of the switches plus difficulties and O&M costs needed to keep these manual switches serviced and calibrated due to the various mechanical parts.

This project calls for the installation of 34-kV remote controlled switching devices equipped with cost-effective Telemetric RTMs for long-haul communication back to the KCPL operating center. Telemetric will initially provide a website to facilitate monitoring and control of these remote switching devices. The longer-term solution is to integrate this solution into EMS and later, the OMS applications used by Distribution System Operators.

In addition, the distribution automation team will look at the installation of 34-kV radio controlled faulted circuit indicators on the 34-kV system in 2007. These devices will report when they have metered current high enough to be registered as a fault. This will allow dispatchers and field personnel to locate faulted circuit sections much more quickly than traditional manual patrols.

Q: Please summarize the benefits of the 34-KV switching device automation and fault indication project.

A: Itemized benefits include:

- Increased safety and efficiency for switching 34-kV system;

- Reduction in switching costs due to remote switching capabilities;
- Increased customer satisfaction;
- Use of switch sensors for operating information;
- Use of switch sensors for engineering models and studies; and
- Reduction in customer minutes out per event.

Q: **Describe the Power Quality Monitor Project for Rural Circuits.**

KCPL has many distribution level substations in our East and South Districts that are served by the 34-kV sub-transmission system. Each substation has transformers, voltage regulators, and circuit protectors and several distribution circuits. Currently, KCPL does not have any provisions to remotely monitor the voltage levels at these substations, or to automatically report outages due to any equipment failure or malfunction in the substations or circuits.

This project provides for the installation of a radio-based voltage monitor to automatically report voltage anomalies and power outages. This will allow KCPL to proactively respond to our customers' service quality needs. Engineers will perform a study to determine if this equipment could best be used in the substation, on the distribution lines, or even a combination of both.

KCPL will work with the supplier to add a voltage imbalance feature to the power quality monitor. An alarm will be automatically generated when the voltage difference between the three phases exceeds a preset value.

The project will also include a review of ways to bring back rural substation electrical data from substation or line regulators and reclosers. The project will also include the installation of faulted circuit indicators for use on the 15-kV circuits in the rural areas.

The faulted circuit indicator will automatically alarm when the metered current exceeds a preset value.

A pilot program will begin in 2006 for radio-controlled voltage monitor installations as a part of the "Integrated Circuit of the Future" project. Based on a successful pilot project, KCPL will consider a rollout of this technology to remaining installations in the rural substations that do not currently have any EMS support. This project will include integration of this data into the EMS and OMS platforms at KCPL. The installation of rural substation regulators, and faulted circuit indicators will begin in 2007.

Q: What are the benefits of the Power Quality monitors of rural circuits?

A: Itemized benefits include:

- Proactive notification of power outages;
- Proactive notification of voltage sags or swells;
- Proactive monitoring for voltage balance;
- Monitor electrical operating characteristics of rural substations;
- Monitor operating status and performance of substation regulators;
- Monitor operating status and performance of line equipment; and
- Monitor and report fault conditions on strategic rural feeders.

Q: Describe the "Integrated Circuit of the Future" Project.

A: KCPL believes there are opportunities to progressively use technology and engineering applications to achieve customer satisfaction, operating and performance objectives and reduce O&M expenses.

KCPL will choose two distribution circuits that connect to each other to demonstrate this technology. The KCPL distribution automation team has a plan in place to begin this study in 2006. However, this endeavor will be progressive and "cutting edge." In addition, the project includes initiatives to integrate various aspects of distribution automation and information technology over a period of years.

We anticipate this project will be dynamic as we learn which applications serve as integrated building blocks to achieve our overall objectives as initially mentioned.

The plans for 2006 include the installation of various radio-controlled switching devices to allow remote control capability to dispatchers. It is important to allow our lineman, dispatchers, and engineers to become comfortable with the operating and safety aspects of the new radio-controlled switching devices. However, we will be constantly looking at ways to augment this application by additional automated processes such as automatic sectionalizing, automatic reconfiguration, or system integration.

In addition, KCPL will install fault detectors and load loggers at strategic points of these two feeders to allow dispatchers to quickly pinpoint circuit anomalies and loading characteristics.

KCPL will install radio-controlled voltage monitors at various points of the circuits to monitor voltage, voltage imbalance, and power outages. These monitors may be installed on strategic equipment on the KCPL feeder or at the customer point of use.

In addition, radio-controlled automation equipment will be installed on capacitor banks with these two circuits. The radio-controlled equipment will bring back vital electrical operating information plus the health and operating status of the capacitor bank.

Metering equipment will be installed on these circuits to allow monitoring of electrical characteristics of the customer usage. This will be strategically valuable because the two circuits chosen include customers targeted for the air-conditioning Demand Side

Management ("DSM") project, also a part of the KCPL Strategic Intent initiative. The metering will allow engineers to aggregate the effects of electrical usage at a higher level than the customer site and will provide valuable information regarding the effectiveness of this DSM project. The overall project management of the DSM air conditioning project will be covered under another Strategic Intent program.

This project will demonstrate how new technology can be used to integrate these applications with Distribution Automation to improve service reliability and meet our customers' needs in the future.

The final objective of the 2006 project is to install automation in the substation to allow KCPL to remotely and automatically regulate voltage through radio-controlled electronic voltage regulator controls. This technology is called Dynamic Voltage Control ("DVC")". KCPL distribution engineers will perform computer modeling of these two circuits. The computer model will identify the customers that may see the lowest voltage on the distribution circuits. Data from the voltage monitors can be used to validate the circuit computer model. Furthermore, the voltage monitors will provide a real-time solution to monitor voltage integrity to specific customers. KCPL hopes the validated computer model will allow ourengineers to predict system operating conditions that will ensure proper operating voltages for all customers on the given circuits.

This project calls for an engineering study and a demonstration of this vision on a KCPL circuit. This project will integrate progressive utility applications such as automatic circuit reconfiguration, sensors to detect faults and voltage problems. In addition, the project calls for ways to monitor the effects of various DSM programs and implement progressive conservation techniques by controlling system voltage.

Q: What are the benefits of the "Integrated Circuit of the Future" Project?

A: Itemized benefits include:

- Improved customer satisfaction;
- Reduction in restoration times following an outage;
- Provides sensors that will bring data to help with sensitivity analysis for DSM studies;
- Provides pilot study for dynamic voltage control; and
- Future functionality will be studied in 2007-2009 with regard to the following topics:
  - EMS capability to support circuit of the future;
  - OMS capability to support circuit of the future;
  - Ways to further leverage the CellNet system;
  - Seamless transfer of data independent of protocol issues;
  - Installation of Pi Historian data warehouse; and
  - Further ways to leverage distribution to meet customer needs and reduce operating expenses.

Future rollouts of all or any portion of this "Integrated Circuit of the Future" study will be based on the results of the 2006 project. One of these projects is the Dynamic Voltage Control Project.

Q: Further Describe the "Dynamic Voltage Control Project".

A: If the trial installation of this technology works successfully, KCPL will deploy additional substations with this capability. Load tap changers of KCPL metropolitan substations are controlled by a single electronic regulating control that affects all three phases. Settings to the voltage control will be monitored and adjusted using a radio interface. This will further ensure proper voltage is supplied from the substation. In addition, radio-controlled voltage monitors could be installed on some circuits served from this setup. The installation of these voltage monitors would be targeted to a few strategic installations for the circuits served from the DVC source. These select monitors would be installed at the secondary service to the targeted customer locations.

Q: How secure is this proposed plan based on KCPL's past experience with distribution automation?

A: KCPL's Distribution Automation initiatives have been very dynamic and changeable through their development process over the past ten years. However, once the benefits, costs, and technology options have been studied, defined, tested, and refined, KCPL has adhered to a consistent and successful implementation strategy. KCPL looks forward to moving ahead with the proposed projects with enthusiasm, but anticipates the results of these studies and the resulting application experience will bring about unexpected future changes in response to future findings. These unexpected findings also include added unforeseen benefits.

Q: What has KCPL done to date concerning the implementation of its Asset Management Plan?

A: The Asset Management Strategic Intent program funded one project in 2005, the Overhead System Inventory and Condition Assessment Pilot project. The KCPL Asset Management team has identified the need to conduct a distribution system inventory and asset assessment as a key step in enhancing an integrated asset management plan. The extent of the initial pilot project is for the inventory and system assessment on approximately 5% of the overhead electric distribution system. Once the data collection is complete, Asset Management and Engineering will conduct targeted reliability studies focused on reducing outage minutes caused by problem or failure prone equipment, wildlife, lightning, overhead wire, and inadequate line design and construction. These studies will be completed in the remaining months of 2005 and throughout 2006. It is estimated that the targeted reliability studies, which will be performed once the distribution system inventory and asset assessment is completed, will produce savings in CMO of 35-75% in the areas listed above. These CMO reductions are estimated to result in savings of approximately $1,000,000 annually once the entire KCPL system is inventoried and assessed. An additional benefit would be increased customer satisfaction due to reduced outages. After a review of results of this pilot project and the resulting reliability improvement projects, Asset Management will evaluate whether a second similar project will be authorized for completing an inventory and asset assessment on the remaining 95% of the KCPL overhead distribution system.

During the year 2005 the following progress was achieved for this project.

1) KCPL contracted with EDM to develop a System Inventory/Condition Assessment tool (ALPS) for use in collecting data for this project. Development of this tool was completed by the end of May 2005.
2) KCPL procured the data collection tools required for this project. These tools included a mobile computing system and bar-code scanners.
3) KCPL hired a Quality Assurance/Quality Control ("QA/QC") contractor to ensure that the accuracy of the data collected meets KCPL's requirements. The QA/QC contractor was hired on March 1, 2005.

4) KCPL awarded INTEC, Inc. the data collection contract in early May 2005. The contract is structured for payment on a "per item" basis with payment made upon delivery and acceptance of the data. Ramp-up for the project and training of the data collection personnel was on-going through June 30, 2005. As of December 31, 2005, INTEC had completed the data collection on all 27 circuits and has submitted them to KCPL. KCPL has reviewed the circuits and has accepted the data submissions for all 27 circuits. A follow-up "After Action" report was developed to evaluate the inventory process and make recommendations for the full inventory to follow.

5) The KCPL Information Technology group has contracted with Intergraph to develop the interface to import the inventory data into Koppel's AM/FM system. The interface has been developed and the data import will be completed by January 2006.

Q: What costs has KCPL incurred in these efforts?

A: Through 2005, KCPL has incurred $508,111.

Q: How did KCPL determine that these specific projects should be undertaken as part of the Asset Management Plan?

A: The Asset Management team at KCPL followed a disciplined and structured process to program scope of work for system expansion, system improvements, and maintenance – both corrective and preventive. The scope of work is formed with three key corporate strategic goals:

- Mitigating risks of major outage events to our customers;
- Minimizing the duration and number of outages that our customers experienced as measured by the SAIDI index; and

- Minimize the percent of our customers with multiple interruptions, as measured by the CEMIn index.

The process of Asset Management and selection of appropriate projects and funding is accomplished through the integration of three main activities – option development, project prioritization, and project management. Option development involves continuously assessing the system condition, developing and maintaining standards, identifying potential projects to maintain or improve the system, and evaluating alternative solutions for a given problem. This overall assessment involves identifying those utility assets with the greatest challenges and those that can best achieve the corporate goals. Project prioritization involves ranking all the possible projects and developing a level of funding and a project schedule that is consistent with the Company's objectives for reliability, financial return, customer satisfaction, regulatory, compliance, etc. Project management ensures that the results, in terms of cost and system performance, are what were expected when the projects were approved. This step also involves benchmarking and goal setting, which then feeds back into the first step in a continuous loop.

Distribution Assets

1) Proactively rebuild and replace overhead lateral in failure prone areas where customers are experiencing multiple outages;
2) Replace and rebuild failure prone areas identified through the System Inventory and Condition Assessment Pilot Project;
3) Proactively replace URD in failure prone areas; and
4) Inject stranded URD in failure prone areas.

Distribution Automation

1) Complete automation of network protectors;

2) Automate substation buses to control relays to reduce momentary outages;

3) Automate switches for the 34-kV sub-transmission system;

4) Install Power Quality Monitors, wireless reporting;

5) Implement integrated solution to demonstrate Circuit of the Future; and

6) Install Substation Dynamic Voltage Control.

Transmission and Substation

1) Overhaul 12kV Breakers;

2) Sugar Creek-Hawthorn-Sub H- LaFarge Junction, Shield Wire Rebuild;

3) Replacement of RTUs;

4) Replace PSD Breakers;

5) 161kV Trans. Arm Replacements;

6) 345kV Trans. Arm Replacement;

7) Hawthorn-Moberly poles;

8) Montrose ABCD Line Pole Top Replacement;

9) Replace transmission disconnect switches;

10) Replace 69 kV circuit breakers;

11) Craig R8-11 SF6 Breaker Replacement;

12) GOAB switch at Higginsville; and

13) GOAB switch at Corder.

Q: **How will KCPL recover these costs?**

A: The capital expenditures towards the assets in the scope of work under the Strategic Intent for Distribution Assets, Distribution Automation, and Transmission and Substation will be recovered after the work is completed and the assets are cleared into plant and service.

Q: Is KCPL on track to meet the goals for the Asset Management Plan?

A: KCPL is on course to achieve the goals in the Asset Management Plan in 2006. As the plan unfolds over the years 2006 through 2010, Asset Management will periodically assess the priorities and scope of the overall Plan for Distribution Assets, Distribution Automation, and Transmission and Substation. Asset Management will assess the system assets and identify the best projects at that point in time that help maintain or improve the system and those that can best achieve the corporate goals. Projects will continuously be ranked and funding will be determined; projects will follow a time schedule that is consistent with the Company's objectives for reliability, financial return, customer satisfaction, regulatory, compliance, etc. Projects will be managed to ensure the expected results were achieved in terms of cost and performance.

Q: What additional projects will KCPL undertake in the future to implement its Asset Management Plan?

A: At this time the projects that are described herein have been selected based on a structured and disciplined asset management approach. Projects related to system expansion, system improvements and maintenance have been considered that fulfill the key strategic goals at the most optimal cost. The Asset Management team will continue to assess the roster of projects and, if there are other projects that offer an even better solution than those currently identified, the Asset Management team will include these in the five-year schedule.

Q: What will be the accounting processes and procedures regarding the planned and actual costs that are incurred during the implementation of the Asset Management Plan?

A: KCPL will provide quarterly status updates on the infrastructure project described in this direct testimony. The updates will include detailed information regarding actual expenditures in comparison to planned expenditures and a description of any and all the efforts by KCPL to efficiently and reasonably procure equipment and services related to the investments. In addition, KCPL will continue its current process of working with the parties in its long-term resource planning efforts to ensure that its current plans and commitments are consistent with the future needs of its customers and the energy needs of the State of Missouri.

Q. Please describe the progress KCPL has achieved through its Delivery business.

A. KCPL's Delivery business strives for excellence in four key areas, namely, safety, reliability, customer satisfaction and cost. As outlined in the Delivery Business Plan, attached as Schedule JRM-3 **(P)**, KCPL expects to be Tier 1 or better in all four areas by 2008.

Q. Does KCPL have a strategy to achieve Tier 1?

A. Yes. KCPL has already achieved Tier 1 in reliability and safety, and achieving a world-class safety culture is within reach. Our goal is to attain Tier 1 performance in customer satisfaction benchmark by 2008. Based on the current proposed 2006 O&M budget targets, Delivery will attain Tier 1 cost performance in 2006. The combined performance should result in KCPL ranking as the top performing delivery operation in Missouri and Kansas and Tier 1 on a national basis.

As outlined in detail in Schedule JRM-3 **(P)**, over the next three years, our game plan will build on the following seven strategy areas. Within each strategy, a number of specific initiatives are defined that will enable us to achieve the desired performance and results.

- Customer
- Community
- Communications
- Regulatory & Governmental
- Infrastructure & Asset Management
- Information Technology
- Transmission Services

The Delivery Business Plan focuses on:

- Achieving Tier 1 performance in safety, reliability, customer satisfaction and cost.
- Partnering with customers to deepen our understanding of their needs and expanding the solutions we provide to meet those needs.
- Participating in the communities we serve to build and strengthen customer loyalty and company image, and enhance customer satisfaction.
- Supporting the overall implementation of the KCPL Comprehensive Energy Plan.
- Achieving industry leadership by embracing demonstrated technology and best practices to best meet customer and system needs today and in the future.
- Continued leadership and skills development, and employee engagement that will build high performance individuals and teams in an evolving Winning Culture.

Q. Does Schedule JRM-3 (P) cover any other strategy you wish to discuss?

A. Yes. The Schedule discusses a Winning Culture strategy. The Winning Culture is based on a continuous learning philosophy, leadership and skills development, and engaging employees to build a high performance workforce. The Winning Culture strategy and the staffing and development of our workforce are strategically intertwined; creating a diverse workplace that mirrors the communities in which we serve.

Q: Does that conclude your testimony?

A: Yes, it does.

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of the Application of Kansas City Power & Light Company to Modify Its Tariffs to Begin the Implementation of Its Regulatory Plan	)))	Case No. ER-2006-____

AFFIDAVIT OF JOHN R. MARSHALL

STATE OF MISSOURI)
) **ss**
COUNTY OF JACKSON)

John R. Marshall, being first duly sworn on his oath, states:

1. My name is John R. Marshall. I work in Kansas City, Missouri, and I am employed by Kansas City Power & Light Company as Senior Vice President, Delivery Division.

2. Attached hereto and made a part hereof for all purposes is my Direct Testimony on behalf of Kansas City Power & Light Company consisting of thirty-five (35) pages and Schedules JRM-1 through JRM-3, all of which having been prepared in written form for introduction into evidence in the above-captioned docket.

3. I have knowledge of the matters set forth therein. I hereby swear and affirm that my answers contained in the attached testimony to the questions therein propounded, including any attachments thereto, are true and accurate to the best of my knowledge, information and belief.

John R. Marshall

Subscribed and sworn before me this 27th day of January 2006.

Carol Sivils
Notary Public

My commission expires: ____

CAROL SIVILS
Notary Public - Notary Seal
STATE OF MISSOURI
Clay County
My Commission Expires: June 15, 2007