Exhibit No.:	
Issue(s):	*Spire STL Pipeline*
Witness:	*Dennis J. Schumaker*
Sponsoring Party:	*MoPSC Staff*
Type of Exhibit:	*Direct Testimony*
Case No.:	*GR-2021-0127*
Date Testimony Prepared:	*April 28, 2023*

MISSOURI PUBLIC SERVICE COMMISSION

FINANCIAL AND BUSINESS ANALYSIS DIVISION

PROCUREMENT ANALYSIS

DIRECT TESTIMONY

OF

DENNIS J. SCHUMAKER

ON BEHALF OF THE STAFF OF MISSOURI PUBLIC SERVICE COMMISSION

SPIRE MISSOURI, INC.

CASE NO. GR-2021-0127

Jefferson City, Missouri
April 2023

**** Denotes Confidential Information ****

DIRECT TESTIMONY

OF

DENNIS J. SCHUMAKER

SPIRE MISSOURI, INC.

CASE NO. GR-2021-0127

Q. Please state your name, address and occupation.

A. My name is Dennis J. Schumaker. I am a management consultant working with Schumaker & Company. My address is 3101 Walnut Ridge Drive, Ann Arbor, Michigan 48103. I appear in this case as a witness on behalf of the Staff of the Missouri Public Service Commission.

Q. Please provide your background and qualifications for testimony in this proceeding.

A. I have over 35 years of management consulting experience, primarily in the utilities industry. I have substantial experience with U.S. and international utility holding companies and their service companies and subsidiary operating companies. I have worked extensively on utility management and operations issues. My experience in assessing the reasonableness and/or prudency of the construction of utility facilities includes the construction of the Shoreham Nuclear Plant (since cancelled), the Pleasant Prairie Coal Fired Plant in Kenosha, Wisconsin (in operation), Hope Creek Nuclear Station (in operation), South Texas project (in operation), and several other nuclear plants.

I am a Certified Management Consultant and have a Bachelors in Mechanical Engineering and a Masters in Nuclear Engineering from the Ohio State University and an MBA from the University of Michigan.

Attached as Schedule DJS-d1 is my resume that contains a summary of my management consulting experience.

Q. What is the purpose of this testimony?

A. The purpose of my testimony is to sponsor the results of our investigation regarding the prudency of constructing the Spire STL pipeline. A report entitled "Report of the Prudency Review of Spire STL Pipeline for the Missouri Public Service Commission (public and confidential)" on this topic was prepared under my direction and filed as an attachment to Staff's Actual Cost Adjustment Recommendation in this case on May 26, 2022. This report is attached to my direct testimony in this case as Schedule DJS-d2.

Q. What was the overall conclusion of the review as stated in the report?

A. Schumaker & Company consultants found Spire Inc.'s ("Spire") (formerly Laclede Group Inc.) decision making surrounding the Spire STL pipeline was reasonable and consequently prudent based on our review of company documentation of that time. The findings that support this conclusion are summarized in the Executive Summary on page 1 of the report.

Q. Does this conclude your direct testimony?

A. Yes.

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

In the Matter of Spire Missouri, Inc. d/b/a Spire (East) Purchased Gas Adjustment (PGA) Tariff Filing	)))	Case No. GR-2021-0127

AFFIDAVIT OF DENNIS J. SCHUMAKER

STATE OF Michigan)
) ss.
COUNTY OF Washtenaw)

COMES NOW DENNIS J. SCHUMAKER and on his oath declares that he is of sound mind and lawful age; that he contributed to the foregoing *Direct Testimony of Dennis J. Schumaker*; and that the same is true and correct according to his best knowledge and belief.

Further the Affiant sayeth not.

Dennis J. Schumaker

DENNIS J. SCHUMAKER

JURAT

Subscribed and sworn before me, a duly constituted and authorized Notary Public, in and for the County of Washtenaw, State of Michigan, at my office in Ann Arbor, on this 24th day of April 2023.

MILO BONELL
Notary Public - State of Michigan
County of Washtenaw
My Commission Expires Mar 8, 2029
Acting in the County of Washtenaw

Milo Bonell

Notary Public

Mr. Dennis J. Schumaker, CMC®, PMP®, MCSE, MCSA
Project Manager & Lead/Principal Consultant

Background

Mr. Dennis J. Schumaker has over 30 years of business and industry experience with both private and public sector clients, including extensive experience in the electric, gas, telephone, and water utility industries. Mr. Schumaker's consulting experience encompasses expertise in executive management and staffing, strategic and corporate planning, corporate organization and structure, project management, business process re-engineering, materials management, engineering and construction and operations and maintenance (electric, telephone, gas, and water facilities), information technology, cost allocation and affiliated transactions, and quality assurance. He began his career as a *Design Engineer* with the Bechtel Corporation, after which he joined Theodore Barry & Associates (TB&A) as a *Manager*. He acquired more than eight years of consulting experience with TB&A before becoming one of the original founders of Schumaker & Company in 1986.

Education & Certifications

Mr. Schumaker holds both a Bachelor's degree in Mechanical Engineering and a Master's in Nuclear Engineering from the Ohio State University. He also earned an MBA from the University of Michigan. He is a:

- *Certified Management Consultant* (CMC®)
- *Project Management Professional* (PMP®)
- *Microsoft Certified Systems Engineer* (MCSE)
- *Microsoft Certified Systems Administrator* (MCSA)

Consulting Expertise

- Strategic and operations planning
- Management and operations reviews and assessments
- Business process re-engineering
- Project management services
- Quality assurance services
- Competitive analyses including customer surveys
- User requirements definition and needs assessments
- Information systems design and development
- Information technology planning, integration, and optimization
- Workforce management
- Affiliate relations and transactions

Professional Affiliations

- Project Management Institute (PMI)
- Microsoft Project User Group (MPUG) South East Michigan Chapter
- PMI Great Lakes Chapter
- Institute of Management Consultants (IMCUSA)

State & Local Government Experience

Mr. Schumaker has performed numerous assignments for state and local government clients. This work has included strategic and operations planning assistance, management and operations reviews, business process reviews, information technology studies, and information technology systems implementation projects. Some examples include:

- City of Detroit – provided business process reviews and assessment in public works, streets, and fire department.
- City of Ann Arbor – Management and operations review of Ann Arbor Housing Commission
- City of Sturgis, Marshall, Coldwater – management and operations review of all city operations
- City of Dearborn – information technology assessment and parks and recreations assessments
- Wayne County Airport Authority – information technology assessment
- State of Michigan, Department of Environmental Quality – functional requirements definition and document management systems implementation

State government entities include:

- Alaska
- Arizona
- Arkansas
- California
- Colorado
- Idaho
- Illinois
- Indiana
- Iowa
- Kansas
- Kentucky
- Maine
- Maryland
- Massachusetts
- Minnesota
- Mississippi
- Missouri
- Montana
- Nebraska
- Nevada
- New Mexico
- New Jersey
- New York
- N. Dakota
- Ohio
- Oklahoma
- Oregon
- Pennsylvania
- S. Dakota
- Tennessee
- Texas
- Utah
- Washington
- Wisconsin
- Wyoming

Local government entities include:

- City of Ann Arbor Housing Commission (MI)
- City of Coldwater (MI)
- City of Dearborn (MI)
- City of Detroit (MI)
- City of Hillsdale (MI)
- City of Marshall (MI)
- City of Niles (MI)
- City of Philadelphia (PA)
- City of Sturgis (MI)
- City of Tacoma (WA)
- City of Toledo (OH)
- Town of Clinton (MI)
- Town of Middleborough (MA)
- Town of Union City (MI)
- Wayne County Airport Authority (MI)

Utility Commission Experience

Additionally, Mr. Schumaker has performed comprehensive and/or focused performance reviews for regulatory commissions and agencies, including:

Alaska Public Utilities Commission
Arizona Corporation Commission
Arkansas Public Service Commission
California Public Utilities Commission
Colorado Public Utilities Commission
Idaho Public Utilities Commission
Illinois Commerce Commission
Indiana Utility Regulatory Commission
Iowa Utilities Board
Kansas Corporation Commission
Kentucky Public Service Commission
Maine Public Utilities Commission
Maryland Public Service Commission
Massachusetts Department of Public Utilities
Michigan Public Service Commission
Minnesota Public Utilities Commission
Mississippi Public Service Commission
Missouri Public Service Commission
Montana Public Service Commission
Nebraska Public Service Commission
Nevada Public Service Commission
New Mexico Public Regulation Commission
New Jersey Board of Public Utilities
New York Public Service Commission
North Carolina Utility Commission
North Dakota Public Service Commission
Oregon Public Utilities Commission
Pennsylvania Public Utility Commission
Public Service Commission of Wisconsin
Public Utility Commission of Ohio
Public Utility Commission of S. Carolina
Public Utility Commission of Texas
Public Service Commission of Utah
South Dakota Public Utilities Commission
Tennessee Regulatory Authority
Tennessee Valley Authority
WA Utilities & Transportation Commission
West Virginia Public Service Commission
Wyoming Public Service Commission

Utility Company Experience

Some of Mr. Schumaker's electric, gas, water/wastewater, and telecommunications assignments are listed below:

Electric Utilities

AEP/Kentucky
AEP/Indiana Michigan Power
Alpena Power
Arkansas Power & Light Company
Central Maine Power Company
Cleveland Electric Illuminating
City of Hillsdale
City of Niles Utilities Department
Columbus Southern Power Company
Conectiv
Consumers Energy
Detroit Edison
General Public Utilities
Georgia Power Company
GP Energy
Illinois Power Company
Jacksonville Electric Authority
Jersey Central Power and Light
Kingsport Power Company
Long Island Lighting Company
Massachusetts Electric Co. (National Grid)
Michigan South Central Power Agency
Nantucket Electric Company (National Grid)
Nebraska Public Power district
PECO Energy Company
Pennsylvania Power & Light Company
Public Service Company of New Mexico
Public Service Electric & Gas Company
Rockland Electric Company
Sierra Pacific Power Company
Springfield City Utilities
Sunflower Electric Cooperative
Tacoma Power
Tennessee Valley Authority
Toledo Edison Company
Union Electric Company

Duke Energy Carolinas, Indiana, Kentucky and Ohio	New Orleans Public Service	Union Light Heat and Power Company
Entergy	Niagara Mohawk Power Corporation	Upper Peninsula Power Company
El Paso Electric Company	Nova Scotia Power Incorporated	United Power Cooperative
Evergy/KCP&L	NSTAR Electric Company	West Texas Utilities
Florida Power and Light Company	Ohio Power Company	Western Massachusetts Electric Company
	Pacific Gas & Electric Company	Wisconsin Electric Power Company

Gas Utilities

Baltimore Gas and Electric Company	Niagara Mohawk Power Company	South Jersey Gas Company
Columbia Gas of Maryland Inc.	Pacific Gas & Electric Company	Southern California Gas Company
Elizabethtown Gas Company (NUI Corp.)	Peoples Natural Gas Company	Union Light Heat and Power Company
Equitable Gas Company (EQT Corp.)	Philadelphia Gas Works	Washington Gas Light Company
National Fuel Gas Distribution Corporation	Public Service Electric & Gas Company	Western Kentucky Gas Company
New Jersey Natural Gas Company		

Water/Wastewater Utilities

General Waterworks Corporation of Pine Bluffs	Philadelphia Water Department
Kentucky-American Water Company	Tennessee-American Water Company
New Jersey American Water Company	United Water New Jersey
Pennsylvania-American Water Company	Utilities, Inc.,/Twin Lakes
Philadelphia Suburban Water Company	Water Services Corporation of South Carolina

Telecommunications Utilities

ALLTEL Pennsylvania	Illinois Bell Telephone (Ameritech)	West Virginia Frontier Communications
Commonwealth Telephone Company	SBC Ameritech Indiana	Verizon NY
New England Telephone (NYNEX)	US WEST	Verizon PA

Presentations & Articles

- *User Interface Standards - Reports, Smart Access, March 2002* – This article discussed the standards for creating the various reports used within an application. It discusses standards that can be developed not only for the reports themselves but also the user interface from which the user can choose and customize the reports.
- *User Interface Standards - Design Development Documentation, Smart Access, April 2002* – This article discussed the various alternatives for creating maintenance forms that are the core to any business application. It discusses standards that can be developed for implementing these forms and presents the code that makes the user interface work.
- *User Interface Standards, Navigation Smart Access, September 2001* – This article discussed the importance of user interface standards for both programmer and end-user productivity. Using a case study, it presents a discussion of the navigation methods available to an Access programmer and shows how to implement the most useful ones.
- *User Interface Standards - Implementing Business Process Forms, Smart Access, November 2001* – This article discussed the various alternatives for creating business process forms that are the core to any business application. It discusses standards that can be developed for implementing these forms and presents the code that makes the user interface work.
- *User Interface Standards - Implementing Application Maintenance Forms, Smart Access, December 2001* – This article discussed the various alternatives for creating application maintenance forms that are the core to any business application. It discusses standards that can be developed for implementing these forms and presents the code that makes the user interface work.
- *Dose of One's Own Medicine, June 1998* – National Project Management Institute Meeting Presentation: Project management self-assessment and successful implementation of a department's Project Management System.

Technical Exams Successfully Completed

Mr. Schumaker has successfully completed the following Microsoft exams:

- 220 – Designing Security for a Microsoft Windows 2000 Network
- 219 – Designing a Microsoft Windows 2000 Directory Services Infrastructure
- 218 – Managing a Windows 2000 Network Environment
- 217 – Implementing and Administering a Microsoft® Windows® 2000 Directory Services Infrastructure
- 216 – Implementing and Administering a Microsoft® Windows® 2000 Network Infrastructure
- 215 – Installing, Configuring, and Administering Microsoft® Windows® 2000 Server
- 210 – Installing, Configuring, and Administering Microsoft® Windows® 2000 Professional
- 087 – Implementing/Supporting Microsoft® Internet Information Server 4.0
- 076 – Implementing and Supporting Microsoft Exchange Server 5.0
- 073 – Implementing and Supporting NT™ 4.0 Workstation
- 068 – Implementing and Supporting NT™ Server 4.0 in the Enterprise
- 067 – Implementing and Supporting NT™ Server 4.0
- 059 – Internetworking with Microsoft TCP/IP on Windows NT™ 4.0
- 058 – Networking Essentials

Consulting Experience

Project Management Experience

Mr. Schumaker is a *Project Management Professional* (PMP®). He has acted as *Engagement Manager*, *Project Manager*, *Lead Consultant*, or *Technical Consultant* on numerous management reviews at the request of both state and local government entities and directly for companies. These assignments involved the implementation of project management techniques into a business or government entity's internal operations. He is a member of the Project Management Institute (PMI) and has also been a presenter at a national PMI meeting. There, he presented the application of PMI methodologies titled *A Dose of One's Own Medicine*, which involved a large utility client providing services in various states. He is also a member of the mid-western Microsoft Project Users Group.

With over 30 years of consulting experience, Mr. Schumaker has been the Project Manager for over 100 different assignments. Over 25 of these assignments involved the review and implementation of project management techniques to a business or government entity's internal operations. These projects included nuclear and fossil power plant projects, electric and gas transmission and distribution projects, water plant and distribution engineering and construction projects, telecommunications installation projects, and research and development projects.

Mr. Schumaker has implemented project management systems (mainframe and minicomputer-based systems) on assignments ranging from large multi-billion dollar nuclear and fossil generation projects to large ongoing software development projects. Project management software systems used include: Microsoft Project, APECS, Project 2, Artemis, Workbench, Primavera, @Risk for Project, and all Microsoft Office applications, including Word, Excel, PowerPoint, Access, Project, and Microsoft Back Office products, including all versions of Windows, Exchange Server, SharePoint, Internet Information Server, SQL Server, Internet Security and Acceleration Server (ISA), and Systems Management Server (SMS).

Utility Management & Operations Audit Experience

Mr. Schumaker has been an *Engagement Manager*, *Project Manager*, *Lead Consultant*, or *Technical Consultant* on more than 50 management and operations reviews. He has also testified before five regulatory commissions. His specific experience in the electric, gas, water, and telecommunications industries includes assignments at over 75 different electric, water, or gas utilities. Sustaining or improving the reliability of aging assets, while minimizing operational, maintenance, and capital costs is vital to every utility company. Also, managing risks (operational, safety, environmental, etc.) and maximizing worker productivity remain key aspects of any business. In order to maintain a solid return on investment from year to year, utility operations must design and implement a plan for managing their assets.

His management audit work has focused on management and operations assessments and performance reviews; business restructuring, business process re-engineering, and process analysis teams; affiliated transactions and cost allocations; customer satisfaction and needs assessments; performance measurement development; and information systems and technology.

Municipal Utility Management and Operations Experience

Mr. Schumaker's evaluation of municipal electric and gas operations includes a review of the organization and staffing of the operations group in relation to its ability to perform its chartered responsibilities in an effective and timely manner. This review investigates work and information flows, staffing levels over time, work order and work assignment procedures, and crew utilization and scheduling techniques.

In particular, Mr. Schumaker has been engaged by municipal power agencies such as the Michigan South Central Power Agency to assist them in various aspects of management and operational changes with the onset of Michigan deregulation and reregulation. Mr. Schumaker provided assistance in performing a competitive assessment and management and

operations review of MSCPA and its member municipalities, provided MSCPA branding redesign, customer relationship management program, and customer relations collateral development. Mr. Schumaker has also provided competitive assessment and management and operations assessments of the following municipalities.

City of Detroit, MI
City of Marshall, MI
City of Coldwater, MI
City of Hillsdale, MI
City of Niles Utilities Dept., MI
City of Sturgis, MI
City of Tacoma, WA
City of Toledo, OH
Jacksonville Electric Authority, FL
Michigan South Central Power Agency
Middleborough Gas and Electric Dept., MA
Nebraska Public Power District, NE
Philadelphia Gas Works
Philadelphia Water Dept.
Springfield City Utilities, MO
Town of Clinton, MI
Town of Union City, MI

Electric and Gas Operations Experience

Mr. Schumaker's evaluation of electric and gas operations includes a review of the organization and staffing of the operations group (electric and gas operations and maintenance and electric and gas construction) in relation to its ability to perform its chartered responsibilities in an effective and timely manner. This review investigates work and information flows, staffing levels over time, work order and work assignment procedures, and crew utilization and scheduling techniques.

Evaluating the current practices of a utility, he investigates the use of decision support systems and information technology in the management of the assets (both transmission and distribution) to determine (a) whether the processes used are consistent with currently accepted levels of technology for utility industry in general, (b) whether these processes are properly designed to support the organization in providing superior service to its customers, and (c) whether the utility attempts to tie expenditures to performance levels.

Additionally, he evaluates the engineering design and construction management functions as these are key areas to the efficient and effective operation and construction of the network that is the basis for the provision of reliable service to the customer. The engineering design and planning function must be capable of determining with accuracy the future requirements for service and making the proper provisions for same through the timely conceptualization and design of future facilities.

City of Niles (Michigan) Utilities Dept.
Columbus Southern Power Company
Dayton Power & Light Company
Duke Energy Indiana
Duke Energy Ohio
El Paso Electric Company
Equitable Gas Company
Jersey Central Power & Light
Kingsport Power Company
Middleborough Gas and Electric Dept.
National Fuel Gas Distribution Corp.
New Orleans Public Service
PECO Energy Company
Pennsylvania Power & Light Company
Pennsylvania Gas and Water Company
Philadelphia Gas Works
Public Service Company of New Mexico
Tacoma Power T&D
Union Light, Heat and Power Company
West Texas Utilities Company
Western Kentucky Gas Company

Electric and Gas Reliability Experience

The efficiency and effectiveness of the management of the transmission and distribution assets within an electric utility and the gas distribution system in a gas utility directly translates into the system reliability experienced by the customer. The decision making regarding the management of these assets should incorporate the use of extensive quantitative data available from within the organizational information technology resources. The overall organization of the various functions related to electric and gas distribution should be efficient and effective with clearly defined roles and responsibilities, staffing levels that are workload driven, and adequate consolidation of activities.

Gas reliability is somewhat different than electric reliability in that the primary focus is that of managing overall system risk. Processes need to be in place to repair (replace) system leaks on an ongoing basis such that the leaks do not result in catastrophic failures of the distribution piping. Mr. Schumaker's investigations in the area of gas reliability focus on the decision support tools used to identify gas repair/replacement projects, tools to rank and prioritize these projects for execution, and the subsequent execution of these projects.

Mr. Schumaker's assessment of electric and gas system reliability performance and related operations includes, but is NOT limited to, the following:

- A review of electric trends as measured by the Customer Average Interruption Duration Index, System Average Interruption Duration Index, System Average Interruption Frequency Index, and Momentary Average Interruption Frequency Index relative to Utility Commission benchmarks and standards, as applicable
- Testing the electric outage management system data collection process to assess the accuracy of the information being captured in the system
- A review of service outage causal factor trends and remedial actions to ensure that preventable outages are maintained at reasonable levels
- A review of electric and gas maintenance activities to determine their overall appropriateness and adherence to internal specifications as well as any applicable regulatory requirements
- A review of gas infrastructure replacement efforts, in particular related to replacement of unprotected bare steel mains
- A review of the Company's damage prevention programs including the electronic mapping of electric and gas system facilities, the trend of third-party line hits, and damage recovery efforts

Electric Utilities

AEP/Kentucky	Florida Power and Light Company	Pacific Gas & Electric Company
AEP/Indiana Michigan Power	General Public Utilities	PECO Energy Company
Alpena Power	Georgia Power Company	Pennsylvania Power & Light Company
Arkansas Power & Light Company	GP Energy	Public Service Electric & Gas Company
Central Maine Power Company	Illinois Power Company	Rockland Electric Company
Cleveland Electric Illuminating	Jacksonville Electric Authority	Sierra Pacific Power Company
City of Hillsdale	Jersey Central Power and Light	Springfield City Utilities
City of Niles Utilities Department	Kingsport Power Company	Sunflower Electric Cooperative
Columbus Southern Power Company	Long island lighting Company	Tennessee Valley Authority
Conectiv	Massachusetts Electric Co. (National Grid)	Toledo Edison Company
Consumers Energy	Michigan South Central Power Agency	Union Electric Company
Detroit Edison	Nantucket Electric Co. (National Grid)	Union Light Heat and Power Company
Duke Energy Indiana	Nebraska Public Power district	Upper Peninsula Power Company
Duke Energy Kentucky	New Orleans Public Service	United Power Cooperative
Duke Energy Ohio	Niagara Mohawk Power Company	West Texas Utilities
Entergy	NSTAR Electric Company	Western Massachusetts Electric Co.
El Paso Electric Company	Ohio Power Company	Wisconsin Electric Power Company

Gas Utilities

Baltimore Gas and Electric Company	New Jersey Natural Gas Company	Public Service Electric & Gas Company
Columbia Gas of Maryland Inc.	Niagara Mohawk Power Company	South Jersey Gas Company Western
Elizabethtown Gas Company (NUI Corp.)	Pacific Gas & Electric Company	Southern California Gas Company
Equitable Gas Company (EQT Corp.)	Peoples Natural Gas Company	Union Light Heat and Power Company
Kentucky Gas Company	Philadelphia Gas Works	Washington Gas Light Company
National Fuel Gas Distribution Corporation		

Electric Adjudications Investigation Experience

Mr. Schumaker has assisted with adjudications, investigating the emergency preparation and restoration of service following storms by electric distribution utilities. His inquiry in these matters focused on the electric companies' compliance with performance standards for emergency preparedness and restoration of service, including:

- Preparation for and management of the restoration efforts with respect to Tropical Storms Irene and snowstorms
- Allocation of company resources in affected communities
- Communications with state, municipal, and public safety officials and with the involved Commission
- Dissemination of timely information to the public
- Identification of company practices that require improvement, if any

Water/Wastewater Utility Experience

Today, new challenges are making water operations a dynamic and rapidly changing environment, requiring increased interaction between the functional areas, new technologies, expanded capabilities from staff personnel, and for some utilities, re-evaluation of utility philosophies.

In the evaluation of water operations, Mr. Schumaker reviews existing practices and performs a comparison with best practices and relevant benchmarks in the following operational areas:

- Evaluate the performance of design functions and their ability to communicate with field construction personnel
- Review planning procedures and make recommendations to create achievable short- and long-term efficiency goals that satisfy missions

- Review past and current construction projects for performance in planning, scheduling, cost minimization and efficiency
- Evaluate the accuracy of documentation, response time, and performance of operations and maintenance
- Assess the systems reliability in providing water that meets the requirements of the Safe Water Drinking Act (SWDA)
- Evaluate the engineering economics methodology and their ability to coordinate operations in an optimal manner

His analysis determines if the utility's practices promote efficiency and provide their ratepayers with optimal levels of rates and service.

City of Toledo, Department of Public Utilities
General Waterworks Corporation of Pine Bluffs
Kentucky-American Water Company
New Jersey American Water Company
Pennsylvania-American Water Company
Philadelphia Suburban Water Company
Philadelphia Water Department
Tennessee-American Water Company
United Water New Jersey
Utilities, Inc./Twin Lakes
Water Services Corporation of South Carolina

Telecommunication Operations and Audit Experience

Mr. Schumaker has been an *Engagement Manager*, *Project Manager*, *Lead Consultant*, or *Technical Consultant* on more than 75 management and operations reviews and has testified before multiple regulatory commissions. His specific experience in the telecommunications industry includes assignments at: Illinois Bell Telephone Company for the Illinois Commerce Commission; ALLTEL Pennsylvania, Commonwealth Telephone Company, and Verizon PA for the Pennsylvania Public Utility Commission; New England Telephone Company for the Massachusetts Department of Public Utilities; US WEST (Qwest) for the 14-state steering committee of the Regional Oversight Committee (ROC); SBC Ameritech Indiana following a stipulation and settlement agreement with the Indiana Utility Regulatory Commission and other settling parties; Verizon NY for the New York Public Service Commission, and Michigan State Police (Wireless E911). His telecommunications work focuses on management and operations assessments and performance reviews, telecommunications technologies, business restructuring, re-engineering and process analysis, affiliate relationships and cost allocations, customer satisfaction and needs assessments, performance measurement development, and information systems and technology.

Mr. Schumaker audits measurement categories like Pre-Ordering, Network Performance, Billing, Operator Services and Databases, and General. This includes whether data calculations comply with documentation, and whether stored and reported performance measurement results are accurate reflections of documented methodologies. He reviews processes that affect the accuracy of input data e.g., trouble report disposition codes, service order miss codes, etc. He can then determine what procedures, if any, have been instituted to address diagnostic metrics that do not have related remedy payments and do not meet parity or benchmark standards.

With his prior background in engineering and construction, his experience includes network planning and engineering, outside plant engineering and construction, installation and repair, and customer services (call center operations). He is knowledgeable of current telecommunications technologies including both wire based and wireless technologies. He has investigated the network planning and engineering, outside plant operations, customer services, and installation and repair activities. From a financial or cost allocation basis, his experience includes development of microcomputer-based models for measuring the cost impacts and assessing the impact of affiliate transactions.

He was the co-developer of a microcomputer-based regulatory impact model (RIM) (used on US WEST) that tracks the flow of expenses from non-regulated communications company affiliates through the Federal Communications Commission (FCC) Part 32, Part 64, and Part 36 accounting process. It calculates the impact of affiliate expenses at the regulated intrastate level for state regulatory purposes and can predict the impact due to changes in transaction or regulatory assumptions.

He has also performed Section 271 reviews of Verizon PA processes for performance metric development (pre-ordering, ordering, provisioning, maintenance/repair, network performance, billing, operator services, and general standards) from source system inputs (including operational support systems and manual data input) to where performance reporting occurs.

ALLTEL Pennsylvania
Commonwealth Telephone Company
Illinois Bell Telephone Company
Michigan State Police (Wireless E911)
New England Telephone Company
New York Telephone
SBC Ameritech Indiana
US WEST (Qwest)
WV Frontier Communications
Verizon New York
Verizon Pennsylvania

Energy Procurement, Trading, Contracting, and Purchased Power Experience

Mr. Schumaker has performed various assessments of energy procurement (electric and gas) and energy trading and contracting at numerous private and public utilities and agencies. These reviews have included assessment of various electric power supply contracts (purchased power), fuel procurement policies and practices, and energy trading activities. These reviews also included an assessment of generation dispatching and transmission dispatch (tagging) operations. These reviews also included real time, day ahead, and longer term (future) contracting including physical and financial hedging practices.

Mr. Schumaker has been involved in the energy trading activities of numerous different electric companies in both a completely regulated environment and in a deregulated environment. He understands the theories behind economic dispatch and energy trading and has been involved in performing assessment of various aspects of these activities. As an engineer by training, he not only understands the business aspects of energy trading but also the technical aspects as it relates to the various business models within the industry.

City of Sturgis
Dayton Power & Light Company
Duke Energy Ohio
El Paso Electric Company
ISO New England
Jersey Central Power & Light
Michigan South Central Power Agency
Midwest Independent System Operations
New York Independent System Operator
Pennsylvania Power & Light Company
PJM
Public Service Company of New Mexico
Sunflower Electric Cooperative
American Electric Power (Ohio Power Company and Columbus Southern Power)
FirstEnergy (Toledo Edison, Ohio Edison, Cleveland Electric Illuminating)
Union Light, Heat and Power Company (Duke Energy Ohio
West Texas Utilities Company (now AEP)
Various utility energy trading and dispatch operations

Fuels and Purchase Power Experience

Mr. Schumaker has over 30 years of business and industry experience in the electric utility industry. This experience includes stints with Bechtel Corporation, which included the design of both nuclear and fossil power plant (including coal power plants), with Theodore Barry and Associates, which included fuel procurement studies for new power plant siting and approvals, and with Schumaker & Company, which has continued to involve activities relating to fuel management. His ongoing fuel procurement activities of power plants have included all the companies listed here.

Most recently, he has completed a fuel and purchased power cost adjustment clause audits of Public Service Company of New Mexico for the New Mexico Public Regulation Commission, Duke Energy Ohio for the Public Utilities Commission, and Dayton Power & Light. He also performed fuel management audits for state regulatory commissions including eight different assignments in the State of Ohio involving FirstEnergy companies Toledo Edison and Cleveland Electric Illuminating; AEP companies Columbus Southern and Ohio Power; Cincinnati Gas and Electric; and Dayton Power and Light. He understands the management and technical issues involving fuels management but also the procedural and administrative issues involved in performing such a review.

Arizona Public Service Company
Arkansas Power and Light facilities
Central Maine Power facilities
Consumers Power and Detroit Edison (DTE) facilities (MI)
Dayton Power & Light Company
Duke Energy Ohio
El Paso Electric Company
New Orleans Public Services oil-fired facilities
Nova Scotia Power Incorporated
Pennsylvania Power and Light facilities
Public Service Company of New Mexico
Sierra Pacific facilities
Springfield City (MO) Utilities with coal sources from Pittsburg (KS)
TVA facilities (TN)

Georgia Power facilities
Illinois Power facilities
Jersey Central Power & Light
Nebraska Public Power District – Gerald Gentleman Plant
Union Light Heat and Power Company (KY)
West Texas Utilities facilities and Central Power and Light facilities

And:

Electricity Supply Board of Ireland (ESB) facilities, including hydro, natural gas, oil, peat, and a new coal-fired plant
FirstEnergy, including Toledo Edison & Cleveland Electric Illuminating (OH); American Electric Power, including Columbus Southern Power and Ohio Power; Cincinnati Gas and Electric; and Dayton Power and Light facilities
Florida Power and Light and Tampa Electric facilities and Jacksonville Electric Authority facilities
Northern State Power (now Excel Energy) and United Power Cooperative (plant located in North Dakota) (MN)
Sunflower Electric Cooperative, a new coal-fired plant siting and fuel supply (KS)

Customer Service Experience

Mr. Schumaker examines the utility's customer service, billing, and collection functions in detail. Among the areas or issues to be addressed in his examination are:

- The capabilities and effectiveness of customer information and billing systems compared to other electric utilities systems and the training of customer service personnel in system utilization
- The reasonableness of call center staffing levels and the center's overall performance (e.g., call abandonment rate, percentage of call answered within 30 seconds, etc.) to include validation of telephone access statistics, and a determination of the adequacy of interactive voice response (IVR) equipment and telecommunications technology in general
- Customer complaint procedures, including a review of their compliance with utility commission dispute handling procedures
- The trend of consumer complaint rates, justified complaint rates, and complaint response times

ALLTEL Pennsylvania
Central Maine Power Company
Commonwealth Telephone Company
Equitable Gas Company
General Waterworks Corp. of Pine Bluff
Nebraska Public Power District
New Orleans Public Service
Corporation PECO Energy Company
Pennsylvania-American Water Company
Philadelphia Gas Works
Philadelphia Suburban Water Company
Philadelphia Water Department
Tennessee-American Water Company
United Water New Jersey
Verizon New York
Water Services Corp. of South Carolina
Western Kentucky Gas Company

Benchmarking and Analysis Experience

Mr. Schumaker audits the performance metrics that require high-volume transaction processes (service orders and trouble reports) from utility inputs. These measurements include those involving ordering, provisioning, maintenance, and repair. Process service order and trouble report inputs are independently calculated from the results measurements of these inputs. This analysis provides the means to recreate designated performance measurement results for the participating utility and evaluate the accuracy of reported results. The utilities own statistical methods may determine Mr. Schumaker's statistical sampling approaches.

Mr. Schumaker works on the principle that organizations can chart a course to superior economic performance by studying the best business practices, operating tactics, and winning strategies of industry competitive organizations.

As an experienced benchmarking consultant, Mr. Schumaker believes it is important to learn as much as possible before making any direct contact by using desk research including publications and websites etc. This enables him to get a picture of the firm(s) that clients might wish to benchmark and an understanding of what they can bring to the client. From this he develops a shortlist.

Actual data collection from the benchmark can occur in two ways: If it's a one to one exercise then Mr. Schumaker will visit with the organization to understand what it does and how, and; if it's part of a peers/competitors exercise then it will be a data collection process using existing data.

As a result of this experience, all of the information that has been collected over the last ten years has been made available in the *Schumaker & Company Best Practices Knowledge Base*. This is a relational database collection of various pieces of information collected during our projects which have been deemed representative of an industry best practice. Mr. Schumaker has led the development of this computer based repository.

ALLTEL Pennsylvania
Commonwealth Telephone Company
Equitable Gas Company
Philadelphia Suburban Water Company
Philadelphia Water Department
SBC Ameritech Indiana
Verizon New York

Smart Meter Technologies Experience

Mr. Schumaker's AMI-SmartGrid consulting practice area will focus on the selection, deployment, and integration of advanced metering infrastructure (AMI), meter data management (MDM), and demand response (DR) systems and solutions as well as the associated business process redesign required to ensure their effective use.

His relevant experience and familiarity with smartgrid initiatives and their interdependency on the complex interaction of available and emerging automation, communications, and metering technologies assists utility clients to create financial models and develop risk mitigation approaches and strategies to help them manage investment risk, and promote strategies to justify grid modernization investments and solutions.

Mr. Schumaker has been involved in Automatic Meter Reading (AMR) investigations over the last four years. These AMR investigations have included electric, gas, and water companies throughout the United States. As a component of our management and operations review projects, Mr. Schumaker has assessed the results achieved by specific utilities as a result of their implementation of AMR technologies. A sample of his experience includes:

- CellNet fixed network AMR technologies systems that were initially justified based on a reduction in meter reading costs, and since have had cost savings in other areas eclipse the meter reading cost savings
- ITRON mobile system meters read on a monthly basis by a contracted firm. Cost savings identified in the initial business case were exceeded in the look back analysis after implementation.
- ITRON mobile solution meters are read on a monthly basis and due to battery lives not meeting expectations, they are currently undergoing their first battery replacement program.

Review of various implemented AMR technologies within various water operating companies. Follow-up analysis based on the experience on these systems lead to standardized fixed network systems. Implementation of AMR within an operating company was based on a specific business case for that specific operating company. The business cases were developed subject to the business case guidelines promulgated from the company. As a result, whether a fixed or mobile meter reading system was deployed, decisions were based on the total number of customers, meter density, and other parameters for each operating water district.

Equitable Gas Company
Philadelphia Gas Works
PECO Energy Company
Pennsylvania-American Water Company

Business Process Re-engineering and Continuous Improvement Experience

Mr. Schumaker has been *Lead Consultant* on numerous business process reengineering and continuous improvement projects. One of these recently completed assignments was for the State of Michigan Department of Treasury on sales and use tax audits/processing. Another was for the State of Michigan Department of Management & Budget (DMB), Department of Treasury (Treasury), and the Family Independence Agency involving state warrant processing. This project included:

- Review and assessment of current situation and existing policy, processes, and procedures
- Findings, conclusions, and recommendations, including identification of alternative technologies for enhancing quality, controls, and efficiency of operations
- Surveys of other organizations
- Alternatives analysis
- Alternatives cost analysis
- Implementation strategy and plan

The final report recommended certain organizational and business process changes for the printing and handling of state warrants. Warrant processing was transferred to a new organization, composed of individuals from the departments, that was physically located next to the State of Michigan mail center – significantly changing existing business processes, maintaining appropriate fiscal controls, and reducing costs.

He was *Engagement Manager* and *Senior Consultant* for an ongoing re-engineering project at Michigan's Department of Environmental Quality (DEQ) during the implementation of an Electronic Document Management System (EDMS). He led the review and documentation of existing business processes and the creation of a file list, file structure, and indexing for a database of files; established processes and priorities for file conversion; and established processes for electronic imaging of records. The project team, including DEQ personnel, reengineered its records management processes and implemented EDMS in the Storage Tank and Environmental Response divisions. This EDMS uses FileNET for document capture and retrieval and a customized Microsoft SQL database for managing the ongoing file conversion efforts.

Coal Mining Operations Experience

Mr. Schumaker has performed management audits of mining operations as a part of fuel procurement audits and other investigations, including his most recent audit and prudence review of Public Service Company of New Mexico.

Fuel procurement audits of the AEP Ohio Power included a review of both surface mining operations and deep mining operations (long wall mining operations) for mines located in Ohio. Fuel procurement reviews of some of the FirstEnergy companies included captive mining operations.

Investigations at the City of Springfield, Missouri included surface mining operations in Pittsburg, Kansas, and Sunflower Electric Cooperative included surface mining in the Power River Basin, and Nebraska Public Power District included Power River Basin coal sources.

Mine mouth power plant operations have been addressed in Ohio, Texas, Pennsylvania, Kentucky, and North Dakota.

- Electricity Supply Board of Ireland (ESB) facilities, including hydro, natural gas, oil, peat, and a new coal-fired plant
- FirstEnergy, including Toledo Edison & Cleveland Electric Illuminating (OH); American Electric Power, including Columbus Southern Power and Ohio Power; Cincinnati Gas and Electric; and Dayton Power and Light facilities
- Florida Power and Light and Tampa Electric facilities and Jacksonville Electric Authority facilities
- Nebraska Public Power District – Gerald Gentleman Plant
- Northern State Power (now Excel Energy) and United Power Cooperative (plant located in North Dakota, MN)
- Nova Scotia Power Incorporated
- Pennsylvania Power and Light facilities
- Public Service Company of New Mexico
- Springfield City (MO) Utilities with coal sources from Pittsburg, KS
- Sunflower Electric Cooperative, a new coal-fired plant siting and fuel supply (KS)
- Union Light Heat and Power Company (KY)
- West Texas Utilities facilities and Central Power and Light facilities

Contractor Performance Experience

As industry is using more outsourcing and contracting, the controls on and containment of these costs become even more

critical. Additionally, it's important that the work that is performed by external vendors is monitored and controlled on a regular basis to ensure that the work is done with quality and in a timely manner. Proper controls and monitoring procedures need to be in place to evaluate the procedures and policies which govern the identification, evaluation, cost justification, and selection of outside contractors and to ensure that contractors are used in an efficient and effective manner.

In Mr. Schumaker's evaluation of the above aspects he reviews contractor management control mechanisms, including the use of nonconformance reporting systems and determines through the use of additional data/information elements, areas that act as inputs to the planning/budgeting process.

Clients have included: Jersey Central Power & Light, AEP Kentucky, and Philadelphia Gas Works.

Corporate Governance Experience

It's all about how structure specifies the distribution of rights and responsibilities among different participants in the corporation, such as, the board of directors, managers, shareholders and other stakeholders, and spells out the rules and procedures for making decisions on corporate affairs. In this area, Mr. Schumaker reviews the Board of Directors composition and function, organization structure and planning, executive compensation, relationships with affiliated interests, management communications and control, and administrative procedures and controls.

Equitable Gas Company	Pennsylvania American Water Company	West Texas Utilities
PECO Energy Company	Philadelphia Gas Works	Western Kentucky Gas Company
Pennsylvania Power and Light Company	Union Light Heat and Power Company	

Reliability and Storm Preparedness Experience

Mr. Schumaker has engaged in efforts to assist clients in utility workforce management by reviewing operations and staffing for storm preparedness and response. His energy practice is committed to providing quality methods, tools, and experience to advance the effectiveness of the clients' energy delivery businesses.

Success in today's environment depends on an energy company's ability to proactively address regulator and customer expectations, and provide reliable service at the lowest possible cost. Mr. Schumaker works with clients to ensure the availability of accurate and easily accessible reliability data, establish clear accountability for all process participants, and link financial system information to reliability performance in order to enhance the decision-making process. His integrated reliability strategy services include: strategy development, vegetation management, and implementation of several decision support tools. His efforts include, but are not limited to:

- Providing extensive analysis of the transformation initiative for electric transmission and distribution operations (including storm preparedness and response).
- Evaluating distribution automation schemes which affected customers in a local area served by automated loops for improvement in reliability as an attractive investment to supplement other initiatives to improve system-wide reliability.
- Reviewing various ways in which outage statistics are collected, verified, and reported including implementing computerized outage management systems (OMS) to identify the extent of the outage and predict the location of the problem. An outage report is initiated in two basic ways. The standard method for determining the outage start time is from a customer call reporting the outage. The outage start time is defined as the time of the customer call. Calls are received and outage reports are entered into the OMS. Most utilities in the United States rely on this method of identifying the outage start time. With automatic meter reading technology, outages are also reported via an AMR system.
- Assessing how outages are reported, analyzed, dispatched, and closed out.
- Testing the validity of some SAIFI and CAIDI information being reported using reliability reporting sampling wherein each outage record sampled is verified from the start time of the AMR information, includes the number of customers affected and customer minutes, restore time, number of customers restored, and customer hours with information reported in the outage calendar.
- Addressing the workforce and manpower planning process, contract versus in-house decision-making, overtime control, productivity, staffing levels, proposed labor saving investments, and reward systems during an audit in the areas of work management, transmission and distribution (including storm preparedness and response).

- Reviewing existing reliability programs over a previous 12 month period by examining records of actions taken as a result of the analyses from these programs. As a result of these reviews, clients have made changes in their distribution network, including such things as the as the installation of distribution automation schemes, installation of 3-phase and single-phase reclosers, additional animal guards, replacement of equipment determined to be less reliable than newer equipment, reconfiguration of circuits, accelerated vegetation trimming, etc.

Conectiv	PECO Energy	Rockland Electric
Jersey Central Power and Light Company	Public Service Electric & Gas	Tacoma Power
Kentucky Power Company/AEP		

Section 11 & Rate Case Verification Experience

Mr. Schumaker has engaged in efforts to assist Commission Staff in verifying that the requirements of Section 11, Public Act No 286 of 2008 were being satisfied for electric utilities in the state. Regulated energy utilities file rate cases with the Commission for approval. The Commission issues an order after reviewing the testimony and exhibits of the utility, interveners, and the Commission Staff. He conducted orientation meetings with Commission Staff, developed a checklist to guide the review for expected rate design, performed spot checks on cost of service study and rate design calculations made, and drafted a report highlighting background and perspective, findings and conclusions, and recommendations.

Alpena Power Company	Indiana Michigan Power	Wisconsin Electric Power Company
Consumers Energy	Northern States Power Company	Upper Peninsula Power Company
Detroit Edison		

Nuclear Plant Operations Experience

Mr. Schumaker has been an *Engagement Manager*, *Project Manager*, *Lead Consultant*, or *Technical Consultant* on more than 20 management and operations reviews of nuclear power plant construction and operations and maintenance projects. He began his career as a Mechanical/Nuclear Engineer for Bechtel Power Corporation. He worked in the nuclear group at several nuclear plants in the early stages of design and construction, where he held the position of Nuclear Steam Supply System (NSSS) coordinator. The NSSS consists of the reactor vessel, steam generators, reactor coolant pumps and their associated piping, values and instrumentation systems. His experience includes both Westinghouse and Babcox and Wilcox NSSS systems. Later, Mr. Schumaker was involved in reviews of nuclear plant construction projects (at such companies as the Tennessee Valley Authority, FirstEnergy, Pacific Gas & Electric, among others) and the operations and maintenance of nuclear plants (at such companies as FirstEnergy – including Three Mile Island, Georgia Power Company, and Entergy, among others).

Clients include: Bechtel Power Corporation and the following Nuclear Plants.

Arkansas Nuclear One	Clinton	Hatch	Palisades Palo Verde	Turkey Point
Beaver Valley	Davis Besse	Hope Creek	South Texas	St. Lucie
Callaway	Diablo Canyon	Nine Mile Point	Susquehanna	

Utility Industry Restructuring Experience

Mr. Schumaker has conducted restructuring studies, compliance audits, and code of conduct audits of electric and gas utilities. Their purpose was to ensure that the incumbent utilities or their related competitive business segments do not have an unfair competitive advantage over other, non-affiliated purveyors of competitive services, and to evaluate and review the allocation of costs between competitive and non-competitive services of the utilities. He has offered expert opinion, based on appropriate methodology, as to whether there is strict separation and allocation of each utility's revenues, costs, assets, risks, and functions between the utility's electric and/or gas distribution operations and its related competitive business segments. In many cases the audits (1) determined whether there is cross subsidization between utility and non-utility segments within a public utility or holding company; (2) whether the separation of utility and non-utility organizations is reasonable based on the state commission's affiliate relation and fair competition standards; (3) the effect on ratepayers of the use of utility assets in the provision of non-safety-related competitive services; (4) the effect on utility workers; (5) the effect of utility practices on the market for such services; and (6) to ensure compliance with legislation. He has given his opinion on whether any other service(s) offered by the utilities was a competitive service. Clients include:

- Elizabethtown Gas Company, NUI Corporation
- New Jersey Natural Gas Company, New Jersey Resources Corporation
- South Jersey Gas Company, South Jersey Industries Corporation

Electronic Document Management Experience

For Michigan's Department of Environmental Quality (DEQ), he was Engagement Manager and Senior Consultant on a project to provide project management and QA services for the implementation of an Electronic Document Management System. The project began with a diagnostic review of the existing situation, identifying issues currently impeding complete implementation, and suggesting a program for moving the project forward. The project team, assisted DEQ personnel, is in the process of reengineering its records management processes and implementing a pilot electronic document management system (EDMS) in the Storage Tank and Environmental Response divisions. This EDMS is using FileNET for document capture and retrieval and a custom Microsoft SQL database for managing the ongoing and backfile conversion efforts. He led the review and documentation of existing business processes for EDMS re-engineering and the creation of a file list, file structure, and indexing for a database of files; established processes and priorities for back file conversion; and established processes for electronic imaging of records. He is now involved in the hands-on implementation of the document management system and several other enhancements to support the Freedom of Information Act (FOIA) process for which the system is designed to streamline among other business process enhancements.

Customer Surveys and Analyses Experience

Mr. Schumaker has designed and conducted several different customer surveys as a part of several different consulting assignments, including, but limited to:

- A survey to measure customer satisfaction with electric service reliability/quality, clarity of billing, rates, and services.
- An Electric Service Customer Satisfaction Survey Manual to instruct electric service providers how to administer, comprehend, interpret, and present a survey's results.
- A survey to measure customers' satisfaction with current levels of services and to identify what other services customers would be interested in obtaining from the client.
- A customer attitude survey (mail survey to residential and non-residential customers) to identify issues and concerns that needed incorporation in the client's strategic plan.

Clients include: Illinois Commerce Commission, City of Sturgis, Michigan, and the Michigan South Central Power Agency members: Coldwater, Clinton, Hillsdale, Marshall, and Union City.

Information Technology and Systems Experience

Mr. Schumaker has led the development and implementation of information technology plans for companies as large as a multi-billion dollar electric and gas utility, to a small 100-person municipality. These information technology plans have attempted to position an entity to capitalize on the evolving capabilities of modern information technology (hardware and telecommunications), without pursuing a technology that "stalls" the entity – either from a financial or technology perspective.

Mr. Schumaker has been responsible for the overall project management and/or quality assurance of large client/server and web-based systems. He has also directed the technical aspects of both client/server and web technology projects for a variety of clients. This includes the design and development of object-oriented relational database systems for applications as diverse as the Electronic Document Management System for the Michigan Department of Environmental Quality, a physician and provider database for M-Care, a Construction Management System for O'Neal Construction, a CRM/business intelligence system for Holcim, an Auto Wash Billing System for Baltimore Cass Auto Wash, and several internal document tracking systems, time and billing, technology asset management, and project management systems. On the Middleborough project, he developed and implemented an information technology (IT) plan that migrated the municipality to a Windows network with a standard set of office automation software (Microsoft Office), electronic mail, and GroupWare applications. For O'Neal Construction, he migrated the organization to newer Windows technology environment and recommended and implemented improvements as part of developing a formal IT plan.

He has designed and implemented both Netware and Windows networks for a variety of clients including Schumaker & Company's internal network. He consults on the integration of technologies to solve an entity's business problems, such as the installation and programming of applications for increasing the productivity of an entity's workforce and providing an interface to the Internet for browsing and electronic mail capabilities.

During reviews, Mr. Schumaker interviews information technology managers to identify what controls and design features are in place to limit cross-company access to computer systems and information. He consults on the integration of technologies to solve an entity's business problems, such as the installation and programming of applications for increasing the productivity of an entity's workforce and providing an interface to the Internet for browsing and electronic mail capabilities. He has also directed the technical aspects of both client/server and web technology projects for a variety of clients.

Ann Arbor Housing Commission	Consumers Power Company	Wayne County Airport Authority
Ann Arbor Plastics	Kingsport Power Company	Water Services Corp. of S. Carolina
Baltimore Cass Auto Wash	M-Care	Thorondor International
Bosquette & Company	Michigan Department of Environmental Quality	Town of Middleborough (MA)
City of Sturgis (MI)	Middleborough Gas & Electric	
Commonwealth of Pennsylvania	O'Neal Construction	

And:

State of Michigan, Department of Treasury, Department of Management & Budget, & Family Independence Agency

Assignment Experience

The following pages contain Mr. Schumaker's relevant client list.

Electric Utility Assignments

Evergy/Kansas City Power & Light Company *Lead Consultant* ♦ Affiliate relationships and transactions	Performed a management audit of affiliate relationships and transactions, including direct charges and cost allocations involving Kansas City Power & Light Company, Greater Missouri Operations, and Westar Energy, Inc., including compliance to the Affiliate Transaction Rule (4 CSR 240-20.015), plus other reasonably used methodologies of other utilities, on behalf of the Missouri Commission.
Consolidated Edison Company and Avangrid *Project Manager & Lead Consultant* ♦ Tax accounting	Performed a management audit because the New York State Public Service Commission (NYSPSC) has directed that an independent third-party consultant be retained to perform consulting services to investigate the income tax accounting of certain New York State utilities, including Consolidated Edison Company of New York, Inc. (CECONY) and Orange and Rockland Utilities, Inc. (O&R), and New York State Electric & Gas Corporation (NYSEG) and Rochester Gas and Electric Corporation (RG&E) for the New York State Department of Public Service (NYSDPS).
Long Island Power Authority *Project Manager & Lead Consultant* ♦ Field operations ♦ Safety	Assisted Long Island Power Authority (LIPA) by performing utility consulting services involving a safety assessment involving the appropriateness and effectiveness of the safety initiatives of LIPA's Service Provider, PSEG Long Island LLC (PSEG-LI), including its safety standards and procedures.
Arizona Public Service Company *Lead Consultant* ♦ Coal costs and plant operations ♦ Gas for electric power production ♦ Nuclear fuel expense ♦ Purchased power expense and sales for resale	Assisted Arizona Corporation Commission (ACC) with a in the matter of a fuel and purchased power procurement audit of the Arizona Public Service Company, which included an audit of APS fuel clause filings and APS' policies, practices, procedures, rules, accounting practices, and cost allocations, including reports, audits, analyses, and opinions of third party entities, agencies, and auditors who have reviewed relevant aspects of APS's business operations. Focus areas included: coal costs and plant operations, gas for electric power production, nuclear fuel expense, purchased power expense and sales for resale, fuel clause computations, and fuel clause related policies, procedures, rule, cost allocations and manuals.
Duke Energy Kentucky *Lead Consultant* ♦ Competitive business segment advantage over other, non-affiliated purveyors ♦ Allocation of costs between the utilities' competitive and non-competitive services ♦ Management and operations assessments involving affiliate transactions and cost allocations	Assisted Duke Energy Kentucky (DEK) with an affiliate management audit in response to the necessity of an affiliate management audit of DEK every two years as ordered by the Kentucky Public Service Commission (KPSC) in Case No. 2005-00228. In 2006, Cinergy Corp., the parent company of Union Light, Heat and Power Company, subsequently re-named Duke Energy Kentucky, merged with Duke Energy Corporation. As part of its approval of the merger, the KPSC established forty-six merger commitments in Case No. 2005-00228, of which three (3), specifically Commitments 11- proper accounting of costs, 12- maintaining appropriate cost allocation procedures

	and committing to third-party audits, and 13- protecting against cross-subsidization specifically related directly to this audit. Schumaker & Company consultants looked for economies, efficiencies, or improvements to benefit DEK and its ratepayers.
Duke Energy Indiana *Lead Consultant* ♦ Wholesale and generation operations ♦ Common property ownership with affiliated wholesale power marketers ♦ Name and logo sharing, tying, space/equipment/system sharing ♦ Availability of goods and services to (non-)affiliated third parties	Provided an affiliate standards audit of Duke Energy Indiana (DEI) for the Indiana Office of Utility Consumer Counselor (OUCC). This audit was required by the approved Settlement Agreement in Cause No. 42873 (Settlement) concerning affiliate company transactions, including compliance with the affiliate standards approved in Cause No. 42873, such as the training and controls that DEI has in place to prevent affiliate cross-subsidization. Schumaker & Company consultants focused on key areas and associated deliverables while allowing for more in-depth analysis of those areas that held opportunity for improvements.
Massachusetts Electric Company/Nantucket Electric Company d/b/a National Grid (National Grid), NSTAR Electric Company (NSTAR), Western Massachusetts Electric Company (WMECo) *Project Manager & Lead Consultant* ♦ Hearing assistance ♦ Electric operations ♦ Emergency preparation and restoration ♦ Emergency response ♦ Communications	Provided the Commonwealth of Massachusetts, Department of Public Utilities (DPU) staff on three DPU adjudications investigating the emergency preparation and restoration of service following storms by the electric distribution utilities in Massachusetts, specifically Massachusetts Electric Company and Nantucket Electric Company d/b/a National Grid (National Grid), NSTAR Electric Company (NSTAR), and Western Massachusetts Electric Company (WMECo). Our inquiry in these matters focused on the companies' compliance with the DPU's performance standards for emergency preparedness and restoration of service, including: ♦ Preparation for and management of the restoration efforts with respect to Tropical Storm Irene and/or the October 2011 Snowstorm ♦ Allocation of company resources in the affected communities ♦ Communications with state, municipal, and public safety officials and with the DPU ♦ Dissemination of timely information to the public ♦ Identification of company practices that require improvement, if any
Nova Scotia Power Incorporated *Engagement Manager & Executive Consultant* ♦ Coal operations ♦ Examination of access control for coal inventory	Assisted Nova Scotia Power Incorporated (NSPI) in undertaking an audit to examine the solid fuel inventory management function and provide meaningful recommendations for improvement. The review addressed adherence to good utility practice and consistency with the policies and procedures governing fuel management as described in the NSPI Fuel Manual. The scope of the audit included testing the assertions of existence and valuation and an examination of access control for NSPI's coal inventory. The process audited spanned the receipt of the physical inventory through to financial reporting, with a particular focus on adjustments and/or discrepancies between the physical inventory and the inventory records.
El Paso Electric Company *Engagement Manager & Executive Consultant I* ♦ Coal costs and plant operations ♦ Nuclear fuel expenses ♦ Line losses ♦ Purchased power expense and sales for resale	Assisted the New Mexico Public Regulation Commission (NMPRC) staff in a prudence review and audit of the fuel and purchased power cost adjustment clause (fuel clause) and related documentation of the electric business operations of El Paso Electric Company (EPE), specifically to provide professional auditing and prudence review services of EPE's fuel and purchased power costs, fuel clause filings and related documentation for the period of January 1, 2010 through December 31, 2010. This review

	investigated whether EPE's calculation of the fuel clause was accurate and the costs included in the fuel clause included only allowed costs and EPE's current accounting and internal control policies, management practices, and operational procedures, as they pertain to EPE's administration of the fuel clause, were effective and met related requirements.
Jersey Central Power & Light *Project Manager & Executive Consultant I* ♦ Fuel procurement and purchasing ♦ Market conditions ♦ Recommendations and review of previous analysis ♦ Remediation costs ♦ Distribution and operations maintenance ♦ Extensions and upgrades to provide regulated services ♦ Clean energy ♦ Contractor performance	Assisted the New Jersey Board of Public Utilities in an audit of the affiliated transactions between Jersey Central Power and Light (JCP&L) and its affiliates, and a comprehensive management audit of JCP&L. Task areas included an examination of affiliate relationships and cost allocation methodologies, executive management and corporate governance, organization structure, human resources, strategic planning, finance, accounting and property records, cash management, procurement and purchasing of energy, distribution and operation management, extensions and upgrades to provide regulated services, clean energy, market conditions, contractor performance, customer service, external relations, support services, and a review of actions taken by JCP&L regarding prior audits. As part of the audit, Schumaker & Company reviewed and assessed affiliate cost allocation methodologies to determine accounting and allocation procedures for separating the costs of inter-company transactions. Analysis determined if current accounting and allocation procedures were equitable, fair, and did not favor certain affiliates over JCP&L and its ratepayers. Additionally, examination assessed the electric generation policies, distribution policies, and assignment strategies of JCP&L and its affiliates.
Dayton Power & Light Company *Project Manager & Executive Consultant I* ♦ Fuel procurement procedures and practices ♦ Operations and maintenance practices ♦ Management performance	Provided fuel cost recovery rider audit co-sourcing assistance to Dayton Power and Light Company (DP&L) to prepare DP&L for its annual review and audit to take place in the first quarter of 2011 for calendar year 2010. Items covered in the scope of work included fuel prices, allocation between wholesale and retail, sharing of gains and losses, coal handling costs, environmental compliance, PJM-related charges, power plant performance, and utility industry perspective.

State of Maine Public Advocate *Engagement Manager & Executive Consultant I* ♦ Regulatory and reliability merger implications	Provided regulatory and litigation support to the Public Advocate in its intervention in a petition filed on March 18, 2010 at the Maine Public Utilities Commission by Bangor Hydro-Electric Power Company, Maine Public Service Company, Maine Electric Power Company, Inc., and Chester SVC Partnership requesting an approval of reorganization (35-A M.R.S.A. §§ 708 and 1103) financial provisions. Specifically, Schumaker & Company consultants were responsible for analyzing all pertinent data and presenting overall recommendations on the regulatory (including reliability) implications of the proposed merger.
Duke Energy Ohio *Engagement Manager & Executive Consultant I* ♦ Coal costs and plant operations ♦ Power interruptions ♦ Midwest ISO charges analysis	Assisted the Public Utilities Commission of Ohio (PUCO) staff in a management/performance and financial audit of the fuel and purchased power and system reliability tracker riders of Duke Energy Ohio, Inc. Specifically, conducted an audit of the company's fuel costs (including any renewable energy costs) plus an audit of system reliability costs. This audit addressed the management/performance and financial aspects of the recovery mechanism. It consisted of a three-year audit cycle (2009-2011) with a complete and thorough audit being conducted in each year of the audit cycle. The initial audit included the actual cost for Rider PTC-FPP and SRT for the months January through December 2009.
Public Service Company of New Mexico *Engagement Manager & Executive Consultant I* ♦ Coal costs and plant operations ♦ Nuclear fuel expenses ♦ Line losses ♦ Purchased power expense and sales for resale	Assisted the New Mexico Public Regulation Commission (NMPRC) staff in a prudence review and audit of the fuel and purchased power cost adjustment clause (fuel clause) and related documentation of the electric business operations of Public Service Company of New Mexico (PNM). In specific, to provide professional auditing and prudence review services of PNM's fuel and purchased power costs, fuel clause filings and related documentation for the period of June 1, 2008 through June 30, 2009. This review provided documented evidence on the following: ♦ PNM's calculation of the fuel clause is accurate and the costs included in the fuel clause include only allowed costs ♦ PNM's current accounting and internal control policies, management practices, and operational procedures as they pertain to PNM's administration of the fuel clause are effective and meet related requirements
New Jersey Board of Public Utilities ***Jersey Central Power and Light Company*** ***GPU Energy*** ***Public Service Electric & Gas Company*** ***Rockland Electric Company*** ***Conectiv*** *Engagement Manager & Lead Consultant* ♦ Electric system reliability ♦ Workforce management ♦ Transmission/distribution operations and maintenance	Engaged to assist Board of Public Utility (BPU) staff in reviewing and monitoring the implementation of recommendations resulting from an investigation of New Jersey's electric utilities' system reliability. Assisted BPU staff in the review and investigation of the information supplied by each of New Jersey's four electric utilities, in connection with the implementation of the selected recommendations as ordered by the Board. Particular emphasis was placed on each utility's activities to improve and/or maintain CAIDI and SAIDI indicators at acceptable levels. In particular, issues regarding utilities work force management, electric system distribution planning and engineering practices, transmission and substation maintenance practices and procedures were addressed during our investigations. Worked closely with and at the direction of the BPU staff in reviewing the implementation of the recommendations.
AEP/Kentucky *Project Manager & Lead Consultant*	Performed an assessment of the reliability of service within AEP/Kentucky's distribution system in its Hazard service territory (a forested mountainous terrain), which has historically experienced a greater number of electric service

- Asset management
- Engineering and construction
- Transmission and distribution operations
- Vegetation management

interruptions than other AEP/Kentucky service areas and, additionally, these interruptions have tended to be longer in duration.

Pennsylvania Power & Light Company *Engagement/Project Manager and Lead Consultant* ♦ Executive management and organization ♦ Strategic planning ♦ Power production ♦ Fuels management ♦ Transmission and distribution ♦ Engineering and construction	Performed a management and operations review of all areas of PP&L's operations. This study included an in-depth investigation of affirmative action/EEO programs; salaries, wages, and benefits; staffing plans and levels; corporate-wide information technology; power plant materials management; nuclear de-commissioning; competitive position of in-house construction and maintenance work forces; and others. Total estimated annual and one-time savings and/or increased efficiency associated with recommendations were in excess of $70 million (annual) and $40 million (one-time).
Kingsport Power Company *Engagement Manager and Lead Consultant* ♦ Electric operations and distribution ♦ Executive management and human resources ♦ Cost allocation ♦ Information technology	Performed a comprehensive management and operations review which focused on executive management and human resources, electric operations (transmission, distribution, and substation) and information technology. Reviewed activities performed at Kingsport Power Company and its affiliate, Appalachian Power Company (in Virginia) and American Electric Power Service Corporation (in Ohio).
PECO Energy Company *Project Manager and Lead Consultant* ♦ Project planning/scheduling ♦ Data and statistics research and benchmarking analysis ♦ Executive management ♦ Gas supply ♦ Electric/gas operations/reliability ♦ Emergency response ♦ GIS ♦ Corporate governance ♦ Customer service ♦ Shareholder proposals ♦ Merger agreement review	Performed a stratified management and operations audit of PECO Energy Company (PECO) for the Pennsylvania Public Utility Commission (PaPUC) in with the primary focus areas being PECO, Exelon Energy Delivery (EED), and Exelon Business Services Company (EBSC) functional areas, whose costs are borne ultimately by Pennsylvania ratepayers. Schumaker & Company's diagnostic review of functional areas and in-depth analyses of pre-identified issues (including both electric and gas operations) assessed the condition of each functional area or business unit against evaluative criteria or expected business practice to determine if appropriate management controls, processes, and systems were in place. These analyses were of sufficient depth to provide specific recommendations for changes together with projected costs and potential dollar savings or other quantifiable benefits, if any.
1935 Public Utility Holding Company *Lead Consultant* ♦ Affiliate relationships and transactions ♦ Cost allocation	Performed a review of charges associated with the services provided by a services company to its affiliates. The review was to determine whether the services were reasonable, necessary, and non-duplicative and to assess if charges were calculated in compliance with appropriate allocation formulae.
Central Maine Power Company *Lead Consultant and Expert Witness* ♦ Organizational structure/management and staffing ♦ Electric operations ♦ Customer service operations ♦ Management efficiency and cost control	Performed a focused management and operations review evaluating organizational structure/ management/staffing, executive compensation, customer service operations, and management efficiency and cost controls.
West Texas Utilities Company *Engagement/Project Manager and Lead Consultant* ♦ Executive management and organization ♦ Electric operations ♦ Power generation	Performed a management and operations review involving all operations functions and the company's relationship with its parent company, CSW. Investigated the areas of executive management and organization, electric operations, and power generation.

Ohio's Beaver Valley Unit No. 2 *Engagement/Project Manager* ♦ Engineering and construction	Reviewed and evaluated studies of construction costs according to the comprehensives of coverage, conformance to Generally Accepted Auditing Standards and Ohio prudence standards, the validity of the findings and conclusions, and the cogency of the supporting documentation. Recommended a course of action for the commission.
PSE&G's Hope Creek Nuclear Plant *Engagement/Project Manager* ♦ Analysis of construction costs ♦ Cost control systems ♦ Construction productivity ♦ Project management	Conducted an investigation and analyzed information for rate case preparation. Prepared cost reconciliation that identified reasons for cost overruns. Analyzed project cost and schedule control systems and tools. Recommended cost tracking systems for future construction projects. Reviewed construction productivity and analyzed the effectiveness of productivity programs.
Ohio Power Company ***Columbus Southern Power Company*** *Engagement/Project Manager* ♦ Fuel procurement ♦ Strategic planning ♦ Purchasing ♦ Marketing	Conducted a review of electric fuel procurement practices and procedures of two AEP subsidiary companies. Analyzed affiliated mines (surface and deep mines) and fuel procurement planning, long-term contracts, and spot procurement. Made recommendations on strategic planning, purchasing policies, and marketing programs.
Wisconsin Electric Power Company's Pleasant Prairie Unit 1 *Engagement/Project Manager and Expert Witness* ♦ Analysis of construction costs	Reviewed and evaluated cost overruns and testified in support of findings at rate proceeding. Testimony resulted in a WPSC order to remove $5 million from WEPCO's rate base request for the Pleasant Prairie project.
The Electricity Supply Board of Ireland *Lead Consultant* ♦ Fossil fuel procurement ♦ System dispatch and power purchase ♦ Power plant performance	Performed a focused management and operations that reviewed an examination of electric generation activities. It encompassed fossil (peat, oil, natural gas, and coal) generation and hydro generation in the three generating regions of ESB. Assessed fossil fuel procurement, system dispatch and purchase power, and power plant performance.
Georgia Power Company *Lead Consultant* ♦ Field station organization ♦ Operations and maintenance ♦ Power generation	Reviewed power generation and fuels management. Assessed Hatch nuclear generating station organization, operations and maintenance, hydro generation, and several fossil generating stations, including Bowen (3200 Mw).
Nebraska Public Power District *Lead Consultant* ♦ Engineering and construction ♦ Transmission and distribution	Performed a focused management and operations review encompassing all electric generation activities, including fossil engineering and construction, fossil generation, electric transmission and distribution, operations and maintenance, and customer service operations.
New Orleans Public Service Corporation *Lead Consultant* ♦ Fossil generation ♦ Transmission and distribution operations and maintenance	Performed a focused management and operations review that encompassed all electric generation activities, including fossil generation, electric transmission and distribution, operations and maintenance, and customer service operations.

Columbus Southern Power Company *Lead Consultant* ♦ Engineering and construction ♦ Transmission and distribution	Performed a focused management and operations review of electric transmission and distribution as well as engineering and construction.
Union Light, Heat and Power Company *Engagement/Project Manager and Lead Consultant* ♦ Organization and management ♦ Electric and gas operations ♦ Strategic and corporate planning ♦ Legal services	Conducted a management and operations review of the Kentucky division of Cincinnati Gas & Electric Company. Led the investigation of organization and management, strategic and corporate planning, electric and gas operations, and management and legal services.
Toledo Edison Company ***Cleveland Electric Illuminating Company*** ***National Gas and Oil Corporation*** ***Cincinnati Gas and Electric Company*** *Lead Consultant and Expert Witness* ♦ Fossil and nuclear fuel procurement ♦ System dispatch and power purchase ♦ Power plant performance	Conducted performance reviews of the fuel procurement policies and practices. These assessments included fossil and nuclear fuel procurement, system dispatch and purchase power, and power plant performance.

Gas Utility Assignments

Philadelphia Gas Works *Project Manager & Lead Consultant* ♦ Project planning and scheduling ♦ Executive management and human resources ♦ Corporate governance ♦ System reliability and related operations ♦ Gas operations/supply ♦ Leak detection ♦ Emergency preparedness ♦ Contractor oversight policies and procedures	Performed a stratified management and operations audit of Philadelphia Gas Works (PGW). The primary focus was the business components of PGW that are subject to regulation by the Pennsylvania Public Utility Commission, specifically any functions supporting PGW service production and delivery, whose costs are borne ultimately by Pennsylvania ratepayers. The objectives included the determination of what improvements, if any, can be accomplished in the management and operations of PGW pursuant to Section 522(b) of the Public Utility Code 66 Ps. C.S. §522(b). Specifically, Schumaker & Company looked for economies, efficiencies, or improvements which benefit PGW and its ratepayers. In doing so, Schumaker & Company identified which economically practical opportunities for cost saving measures could be instituted. This audit consisted of a three-step study process, including a diagnostic review that assessed the condition of each functional area or business unit against evaluative criteria or expected business practice and an in-depth analysis of pre-identified areas or issues.
National Fuel Gas Distribution Corporation *Project Manager, Lead, & Principal Consultant* ♦ Corporate mission, objectives, goals and planning ♦ Performance and results management ♦ System planning ♦ Energy supply and procurement ♦ Load forecasting	Assisted the New York State Department of Public Service (NYSDPS) in a comprehensive management audit of National Fuel Gas Distribution Corporation (NFGDC). The primary focus was the business components of NFGDC's New York gas business with an emphasis on NFGDC's effectiveness in meeting its performance goals and the extent to which there are opportunities for improvement. The objectives included determination of possible improvements for management and operations in areas such as corporate mission, objectives, goals and planning; affiliate relationships and transactions; load forecasting; supply procurement; system planning ; capital and O&M budgeting; program and project planning and management; work force management; and performance and results measurement. This audit consisted of a three-step study process, including a diagnostic review that assessed the condition of each functional area or business unit against evaluative criteria or expected business practice and an in-depth analysis of pre-identified areas or issues.
Equitable Gas Company *Project Manager & Executive Consultant I* ♦ Project planning and scheduling ♦ Gas supply and operations ♦ System reliability performance and related operations ♦ Customer service, billing, and collection functions	Performed a stratified management and operations audit of Equitable Gas Company (EGC), a subsidiary of EQT Corporation, and its relationship with its affiliates. The primary focus of this management and operations audit are the business components of EGC that are still subject to regulation by the Pennsylvania Public Utility Commission, specifically EGC service delivery and production, whose costs are borne ultimately by Pennsylvania ratepayers. The objectives include the determination of what improvements, if any, can be accomplished in the management and operations of EGC pursuant to Section 522(b) of the Public Utility Code 66 Pa. C.S. §522(b). Specifically, Schumaker & Company looked for economies, efficiencies, or improvements which benefit EGC and its ratepayers. In doing so, Schumaker & Company identifies which, if any, economically practical opportunities for cost saving measures and/or better service can be instituted.
Philadelphia Gas Works *Project Manager & Executive Consultant I* ♦ Project planning and scheduling ♦ Gas supply ♦ System reliability performance and related operations ♦ Customer service, billing, and collection functions	Performed a stratified management and operations audit of Philadelphia Gas Works (PGW). The primary focus of this management and operations audit is to review those PGW business components subject to regulation by the PaPUC, specifically PGW service delivery and production, whose costs are borne ultimately by Pennsylvania ratepayers. Schumaker & Company diagnostic review of functional areas and in-depth analyses of pre-identified issues assess the condition of, efficiencies, or improvements which benefit PGW and its ratepayers. In doing so, Schumaker & Company identified which, if any, economically practical opportunities for cost saving measures can be instituted.

PECO Energy Company *Project Manager and Lead Consultant* ♦ Project planning/scheduling ♦ Data and statistics research and benchmarking analysis ♦ Executive management ♦ Gas supply ♦ Electric/gas operations/reliability ♦ Emergency response ♦ GIS ♦ Corporate governance ♦ Customer service ♦ Shareholder proposals ♦ Merger agreement review	Performed a stratified management and operations audit of PECO Energy Company (PECO) for the Pennsylvania Public Utility Commission (PaPUC) in with the primary focus areas being PECO, Exelon Energy Delivery (EED), and Exelon Business Services Company (EBSC) functional areas, whose costs are borne ultimately by Pennsylvania ratepayers. Schumaker & Company's diagnostic review of functional areas and in-depth analyses of pre-identified issues (including both electric and gas operations) assessed the condition of each functional area or business unit against evaluative criteria or expected business practice to determine if appropriate management controls, processes, and systems were in place. These analyses were of sufficient depth to provide specific recommendations for changes together with projected costs and potential dollar savings or other quantifiable benefits, if any.
Elizabethtown Gas Company ***NUI Corporation*** ***New Jersey Natural Gas Company*** ***New Jersey Resources Corporation*** ***South Jersey Gas Company*** ***South Jersey Industries Corporation*** *Engagement Manager & Lead Consultant* ♦ Restructuring ♦ Affiliate relations ♦ Competitive services ♦ Code of conduct	Conducted compliance audits of the competitive services of New Jersey's gas utilities; specifically South Jersey Gas Company (South Jersey Industries Corporation), New Jersey Natural Gas Company (New Jersey Resources Corporation), and Elizabethtown Gas Company (NUI Corporation) as a part of the utility industry restructuring in New Jersey. The purpose of these audits was to ensure that the utilities or their related competitive business segments do not have an unfair competitive advantage over other, non-affiliated purveyors of competitive services, and to evaluate and review the allocation of costs between the utilities' competitive and non-competitive services.
Philadelphia Gas Works *Lead Consultant* ♦ Evaluation of implementation of earlier management audit	Performed a follow-up review approximately two years after the completion of a management and operations review, in which he completed the following: ♦ Reviewed results of the additional studies recommended during the management audit ♦ Developed a request for proposal for long-term strategic options
Western Kentucky Gas Company *Engagement/Project Manager and Lead Consultant* ♦ Executive management and organization ♦ Gas operations ♦ Affiliated relationships/transactions	Performed a management and operations review of all company operations, administrative functions, and relations between WKG and its parent company, ATMOS. Significant emphasis was placed on customer service, gas operations, and organization and management changes following the recent acquisition of WKG by ATMOS.
Philadelphia Gas Works *Project Manager and Lead Consultant* ♦ Executive management and organization ♦ Gas operations ♦ Customer services and relations	Performed a management and operations review of this city-owned entity. Investigated executive management and its relations with customers and various political entities. Study was conducted amidst a highly charged (political) environment surrounding all interaction between the Commission and the Gas Works.
Baltimore Gas & Electric Company ***Columbia of Maryland Inc.*** ***Washington Gas Light Company*** *Engagement/Project Manager and Lead Consultant* ♦ Gas purchasing practices	Reviewed and evaluated purchasing practices of three natural gas utilities for the Maryland Public Service Commission. In addition, he developed training materials and conducted a training program for commission staff personnel, thereby allowing them to continue the annual review and assessment of the natural gas plans submitted by each company.

Peoples Natural Gas Company *Project Manager* ♦ Organization and executive management ♦ Human resources ♦ Corporate planning ♦ Legal services ♦ Compensation and staffing ♦ Allocation of fees	Performed a management and operations review in which he investigated the areas of organization and executive management, human resources, corporate planning, legal services, compensation and staffing, and allocation of fees.
Southern California Gas Company *Lead Consultant* ♦ Meter shop operations	Conducted a management and operations review of one of the largest meter shop facilities in the country.

Water/Wastewater Utility Assignments

New Jersey American Water Company *Project Manager & Lead Consultant* ♦ System operations ♦ Cost recovery mechanisms ♦ Market conditions ♦ External relations ♦ Customer service ♦ Human resources ♦ Support services, including information technology services and security of infrastructure ♦ Recommendations and review of prior audit	Assisted the New Jersey Board of Public Utilities by performing an audit of the affiliated transactions between New Jersey American Water, American Water Works Company, Inc. and its Affiliates, including a review of operational and financial performance of New Jersey American Water Company pursuant to N.J.S.A. 48:3-49, 48:3-55, 48:3-56, 48:3-58 & N.J.A.C. 14:4-3.7(e) and (f), and comprehensive management audit of New Jersey American Water Company pursuant to N.J.S.A. 48:2-16.4 & N.J.A.C. 14:3-12.1 ET SEQ (Docket No. WA18080849).
City of Toledo, Department of Public Utilities *Engagement/Project Manager & Senior Consultant* ♦ Executive & performance management/measurement ♦ Water/wastewater operations ♦ Strategic planning ♦ Customer service, complaints and Inquiries ♦ External relations ♦ Information technology services	Provided an independent performance audit of the City of Toledo Department of Public Utilities (DPU) for the specific purpose of assessing current operations and proposing improvements in planning and processes to assure that future capital expenditures are made on a timely basis, scheduled maintenance and repairs are done when necessary, appropriate staffing levels are maintained, and best management practices of the industry are incorporated in the DPU's long term plans.
Philadelphia Water Department *Engagement/Project Manager &Lead Consultant* ♦ Water and wastewater field operations, workforce, and service levels ♦ Best practices comparison	Provided a management support study for the Philadelphia Water Department (PWD) customer service and field operations activities to optimize operations, including evaluation of its resource utilization, so as to ensure that it is cost effective, to improve customer service, and to meet its core services and regulatory requirements in a responsible way. In the evaluation of the field operations area, Mr. Schumaker reviewed PWD's existing practices in design functions and their ability to communicate with field construction personnel, planning, past and current construction projects for performance in planning, scheduling, cost minimization and efficiency, accuracy of documentation, response time, and performance of PWD's operations and maintenance, and engineering economics methodology and their ability to coordinate PWD's operations in an optimal manner.
Utilities, Inc./Twin Lakes *Engagement/Project Manager &Senior Consultant* ♦ Water and wastewater operations ♦ Customer service and key support units	Provided a management and operations audit of Twin Lakes utility organization and its affiliate, Water Service Corporation (WSC), on behalf of the Indiana Utility Regulatory Commission (IURC), including operations, customer service/support units, and financial management. The study was organized into three task areas. The first task area was a detailed analysis of the financial management of Twin Lakes Utilities. The second task area was examinations of the water and wastewater utility

operations, workforce, and service levels. The third task area comprised key Utilities, Inc. units that support Twin Lakes Utilities, including customer service operations, and included an examination of their operations, workforce, and contribution to the mission of the utilities.

Tennessee-American Water Company *Senior Consultant* ♦ Affiliate relationships ♦ Management effectiveness and cost competitiveness ♦ Communications and planning	Performed an affiliate audit of Tennessee-American Water Company (TAWC) at the request of the Tennessee Regulatory Authority (TRA). The audit included an investigation and assessment of the American Water Works Service Company management performance and decisions relating to internal processes and internal controls involving affiliate relationships and transactions, and the resulting recommendations of any management process changes needed for those controls and implementation. Further, the audit evaluated the charges allocated to TAWC, including the efficiency of processes and/or functions performed on behalf of TAWC, as well as the accuracy and reasonableness of the allocation factors utilized.
United Water New Jersey *Lead Consultant* ♦ Customer services ♦ Cost allocation	Performed a comprehensive management audit in which the area of customer services was analyzed, including telephone center operations, credit and collections, meter reading, meter investigators, and the meter shop.

Water Services Corporation of South Carolina *Engagement Manager & Lead Consultant* ♦ Project planning and scheduling ♦ Analytical discipline ♦ Planning concepts and practices ♦ Organization design ♦ Customer service ♦ Water operations ♦ Pricing strategies ♦ Technology tools and training	Performed a management and operations review and assessment of Water Services Corporation (WSC) of South Carolina for the State of South Carolina Office of Regulatory Staff (ORS) with specific focus on the operations of the five subsidiary water and wastewater companies that operate in South Carolina: ♦ Carolina Water Service, Inc. (CWS) ♦ Tega Cay Water Service, Inc. (TCWS) ♦ Utilities Services of South Carolina, Inc. (USSC) ♦ Southland Utilities, Inc. (SU) ♦ United Utility Companies, Inc. (UUC) The bottom line of this project was to determine whether the rates charged to the South Carolina ratepayers can be reduced through the implementation of greater efficiencies in organizations, operations, or both. Additionally, another relevant analysis was a determination of whether the ratepayers of South Carolina were being properly and economically served by the range of corporate services that are provided to the WSC operations in South Carolina by the managers located in both West Columbia and Northbrook. Significant consideration was given to investigation of the potential benefits that would result from the consolidation or merger of WSC's affiliated companies.
Pennsylvania-American Water Company *Executive Consultant I* ♦ Water operations ♦ Customer service, billing, and collection functions ♦ Operational performance	Performed a stratified management and operations audit of Pennsylvania-American Water Company (PAWC) for the Pennsylvania Public Utility Commission (PaPUC) with the primary focus areas being costs borne ultimately by Pennsylvania ratepayers. Schumaker & Company's diagnostic review of functional areas and in-depth analyses of pre-identified issues assess the condition of each functional area or business unit against evaluative criteria or expected business practice to determine if appropriate management controls, processes, and systems were in place. These analyses are of sufficient depth to provide specific recommendations for changes together with projected costs and potential dollar savings or other quantifiable benefits, if any.
Philadelphia Suburban Water Company *Engagement/Project Manager and Lead Consultant* ♦ Customer services ♦ Engineering and construction ♦ Operations and maintenance ♦ Cost allocation ♦ Capacity planning	Performed a management and operations review of all company functions, giving specific emphasis to staffing and compensation levels, management information systems, allocation of fees from affiliated companies, customer services, engineering and construction, operations and maintenance, water purchase agreements, and capacity planning.
General Waterworks Corporation of Pine Bluff *Engagement/Project Manager and Lead Consultant* ♦ Affiliated relationships and transaction ♦ Water operations ♦ Customer service	Performed a management and operations review focused on affiliate relationships, water operations, customer services, and financial management. His final report was submitted as testimony in a general rate hearing of General Waterworks Corporation of Pine Bluffs.
Kentucky-American Water Company *Engagement/Project Manager and Lead Consultant* ♦ Executive management ♦ Corporate planning	Performed a management and operations review of all functions within the company and the relationships with its parent company and affiliates. Investigated the areas of executive management and corporate planning.

Telecommunications Assignments

Frontier Commission West Virginia *Project Manager & Lead Consultant* ♦ Current status and condition of Frontier's copper network in WV ♦ Adequacy of Frontier's staffing levels dedicated to the copper network in West Virginia ♦ Adequacy of Frontier's capital investment in the copper network since July 2010 for West Virginia ♦ Evaluation of the adequacy of Frontier's policies and procedures impacting the quality of service in West Virginia ♦ Adequacy of the service quality metrics ♦ Impact of the declining West Virginia customer base on internal cash flow from Frontier Operations, relative to historic and current copper infrastructure maintenance and capital expenditures ♦ Impact of Frontier's current union bargaining agreements and the ongoing relations between management and labor on customer service quality and response timing	Performed a focused management audit of Frontier West Virginia Inc. & Citizens Telecommunications Company of West Virginia dba Frontier Communications of West Virginia
Verizon New York *Project Manager* ♦ Organization and management ♦ Capital and maintenance planning ♦ Customer services and field operations ♦ Performance analysis and statistics ♦ Best practice comparisons	Analyzed, documented, and verified, through findings based on identifiable and measurable information and data, to ensure that Verizon NY's existing service quality plans and practices of the five VIP service objectives (customer trouble report rate, percent out of service over 24 hours, percent installation completed in five days, PSC complaints, and outliers), NY telephone service standards, and company guidelines meet applicable service quality performance standards, including reasonably foreseeable events and contingencies. Developed and documented recommendations to improve or modify these service quality practices and/or plans where existing plans and practices were not sufficient to ensure that applicable standards were met. Reviewed Verizon NY's processes for service quality performance and its employees, technology, and work processes related to the planning, design, construction, installation, maintenance, repair, and delivery of product to retail customers within Verizon NY's service territory.
Verizon Pennsylvania *Lead Consultant* ♦ Network performance metrics ♦ Performance assurance plan	Performed a review and evaluation of the performance metrics and related remedies of Verizon Pennsylvania, Inc. (Verizon PA), as required by the Pennsylvania Public Utility Commission. Reviewed and evaluated performance metrics for eight different domains, specifically pre-ordering, ordering, provisioning, maintenance and repair, billing, network performance, operator services and general standards. This review and evaluation involved obtaining the source information from Verizon and replicating the information and calculations

	in a separate data warehouse using various technologies, such as Oracle 8i, SAS, and Microsoft SQL server tools. Developed computer code to represent the C2C performance metrics and worked with Verizon PA and the PaPUC to resolve differences identified.
ALLTEL Pennsylvania *Lead Consultant* ♦ Customer services ♦ Marketing ♦ Telephone operations ♦ Network planning, engineering, and construction	Performed a stratified management and operations review in which he focused on various functions and activities performed by ALLTEL Pennsylvania, its associated companies (ALLTEL Telephone Service Corporation, ALLTEL Corporate Services, ALLTEL Supply, ALLTEL Publishing), or its parent company (ALLTEL Corporation). Involved heavily in the areas of telephone operations (engineering, construction, and maintenance), regional operations (I&R, Network, etc.), business office and repair center operations, and marketing activities.
SBC Ameritech Indiana *Engagement Manager &Lead Consultant* ♦ Call center operations ♦ Field operations	Performed management and operations analyses of existing practices as part of a focused review of service quality performance and related plans and practices of SBC Ameritech Indiana, including its call center and field operations. Performed a historical review of operations to help identify those causal factors that led up to the service problems that were experienced in the year 2000. Performed computer-based analyses of a wide range of available performance statistics to determine how well specific geographical service areas were performing in relation to the norm for Ameritech Indiana. Further defined the quality of service provision by looking for trends in the underlying operational data of Ameritech Indiana that was linked, directly or indirectly, to the quality of service provided.
Commonwealth Telephone Company *Lead Consultant* ♦ Customer services ♦ Marketing ♦ Telephone operations ♦ Network planning, engineering, and construction	Performed a stratified management audit involving a diagnostic review of all company operations, followed by an in-depth review of nine pre-identified issues. Involved heavily in the areas of telephone operations (engineering, construction, and maintenance), regional operations (I&R, Network, etc.), business office and repair center operations, and marketing activities. Identified over $500,000 in annual savings plus other benefits.

Illinois Bell Telephone Company *Lead Consultant* ♦ Affiliated relationships and transactions	Performed a focused review of the relationship between IBT and its affiliates—Ameritech Corporate, Ameritech Services, Inc., Ameritech Information Systems, Inc., and Bell Communications Research, Inc. (Bellcore)—for the Illinois Commerce Commission. This assessment involved a comprehensive review that particularly focused on IBT's billings to various affiliates and the cost, value, and impact of these affiliate relationships on Illinois ratepayers.
U S WEST, Inc. *Lead Consultant* ♦ Affiliated relationships and transactions ***U S WEST Advanced Technologies, Inc.*** *Review Director and Lead Consultant* ♦ Affiliated relationships and transactions	Conducted regulatory impact reviews for a Three-State Steering Committee (TSSC) of Arizona, Iowa, and Oregon on behalf of the U S WEST Regional Oversight Committee, which is composed of the 14 states served by U S WEST Communications. Addressed various aspects of the affiliated relationships and transactions between two unregulated U S WEST affiliates—U S WEST, Inc. and Advanced Technologies, Inc.—and the impact these transactions had on U S WEST Communications ratepayers.
New England Telephone Company *Engagement Manager and Lead Consultant* ♦ Affiliated relationships and transactions ♦ Service company support of telephone operations	Performed a focused management and operations review involving affiliated transactions and associated allocation methodologies between New England Telephone Company and the major NYNEX affiliates, which include NYNEX Service Company, the NYNEX Corporate organization, and other smaller affiliates. The review also included a critical assessment of such items as cost allocation methodologies, benefits to ratepayers, and cost causal analysis.

Municipal Electric and Gas Assignments

City of Tacoma, Department of Public Utilities, Light Division *Engagement/Project Manager & Lead Consultant* ♦ Management and operations ♦ Performance management program ♦ Asset management for engineering, construction & maintenance, and electric service	Assisted the City of Tacoma, Department of Public Utilities, Light Division (dba Tacoma Power) with a comprehensive review and assessment of Tacoma Power Transmission and Distribution (T&D) Sections' management and operation practices. Schumaker & Company applied an Enterprise Performance Management approach that emphasized the relationship between service levels and costs. The mission of the enterprise was to provide good service at the lowest long-term total cost. Further, every enterprise management team has the responsibility to develop, implement and execute a performance management program that delivers measurable good service at the lowest long-term total cost. The Schumaker & Company approach evaluated the service and cost performances of Tacoma Power's T&D Section and recommended improvements in service levels as appropriate and cost reductions as practical.
City of Sturgis ***Sturgis, Michigan*** *Project Manager and Senior Consultant* ♦ Customer survey ♦ Competitive assessment/benchmarking ♦ Electric operations, transmission, and distribution	Performed a management and operations review, conducted a customer satisfaction and needs assessment, performed a competitive assessment and benchmarking study, and developed a strategic plan. Addressed the changes occurring within the electric utility industry and the competitive threats felt by the city.
Middleborough Gas & Electric Department ***Middleborough, Massachusetts*** *Project Manager and Senior Consultant* ♦ Competitive assessment/benchmarking ♦ Management and operations review ♦ Communication with utility board ♦ Electric operations and distribution	Performed a competitive assessment of this municipal gas and electric department, including a management review of all functional areas and benchmarking of major performance indicators in relation to other Massachusetts municipalities and to the best practices of other public and investor-owned utilities.
City of Coldwater Board of Public Utilities ***Coldwater, Michigan*** *Project Manager and Senior Consultant* ♦ Customer satisfaction survey	Developed, performed, and analyzed the results of a customer survey to assess satisfaction with the city utility services as well as some other city services. Customer survey was a follow-up survey to one that had been conducted two years earlier.
City of Hillsdale Board of Public Utilities *Engagement Manager and Lead Consultant* ♦ Strategic planning	Developed a strategic plan involving the creation of a mission statement; identification of the organization's strengths, weaknesses, opportunities, and threats; and formulation of long-term goals and objectives in support of the mission.
Michigan South Central Power Agency *Engagement/Project Manager and Senior Consultant* ♦ Customer survey ♦ Competitive assessment/benchmarking ♦ Relationship development – commercial and industrial customers ♦ Communication with boards and councils	Assisted in the development of a strategic plan for this agency owned by five Michigan municipalities, specifically Coldwater, Clinton, Hillsdale, Marshall and Union City. Addressed the changes occurring within the electric utility industry and the competitive threats being felt by the agency. The effort involved the performance of (1) a competitive assessment/benchmarking of the power agency and (2) a customer attitude survey (mail survey to residential and non-residential customers) to identify issues and concerns that needed incorporation in the strategic plan. The results of these efforts were

presented at the agency's annual meeting with customers/owners. Following the strategic plan development, Schumaker & Company was engaged to create, design, and implement a relationship development program involving the commercial and industrial customers of each municipality.

City of Niles (Michigan) Utilities Department *Engagement/Project Manager and Lead Consultant* ♦ Management and operations	Performed a management and operations review, which was used to develop a long-term plan for this 55-person utilities department. Identified potential benefits approaching $250,000 yearly for the electric, water, and wastewater operations, which totaled $9 million in revenues annually.

Other State Commission Assignments

Michigan Public Service Commission *Project Lead & Senior Consultant* ♦ Public Act 286 Section 11 verification involving rate cases ♦ Multiple electric company reviews	Assisted the Regulated Energy Division of the Michigan Public Service Commission by verifying that the requirements of Section 11, Public Act No. 286 of 2008 are being satisfied beginning with rate case orders issued after January 1, 2009 for each electric utility in the state, including Detroit Edison, Consumers Energy, Upper Peninsula Power Company, Wisconsin Electric Power Company, Alpena Power Company, Northern States Power Company, and Indiana Michigan Power. Regulated energy utilities file rate cases with the Commission for approval. The Commission issues an order after reviewing the testimony and exhibits of the utility, interveners and the Commission staff. Subsection (1) of Section 11 of PA 286 requires the Commission to phase in electric rates equal to the cost of providing service to each customer class over a period of five years from the effective date of this act unless an exception is met. Therefore, for each regulated electric utility with more than one million retail customers (Consumers Energy and Detroit Edison), the MPSC is phasing in electric rates equal to the cost of providing service to each customer class before October 2013. For each regulated electric utility with less than one million retail customers (all others in Michigan), as mentioned in Subsection (2) as an exception, the phase-in period for cost-of-service rates can exceed five years.
Illinois Commerce Commission *Engagement Manager and Senior Consultant* ♦ Customer satisfaction survey design ♦ Training manual in survey implementation ♦ Survey implementation training workshops	Designed survey to measure customer satisfaction with electric service reliability/quality, clarity of billing, rates, and services, and provided an Electric Service Customer Satisfaction Survey Manual to instruct electric service providers how to administer the survey and understand, interpret, and present its results.
Arkansas Public Service Commission *Lead Consultant* ♦ Project management training	Provided training to the APSC staff on how to proceed with the monitoring and control of a management and operations review. Prepared both written and oral reviews of the proposal and detailed work plan from the consultant team. Schumaker & Company also assisted the APSC in managing the review conducted by the outside consultant team.

State and Local Government Assignments

State of Michigan ***Department of Treasury*** *Senior Analyst* ♦ Business process review	Provided a business process review (BPR) of sales and use tax audits/processing for the Michigan Department of Treasury to provide a higher level of service to Treasury customers and Michigan citizens, while reducing costs and gaining efficiencies. Schumaker & Company reviewed internal Treasury's sales and use tax audit and processing processes in the Tax Compliance Bureau (TCB), and processes in other State departments, which impacted TCB's activities.
City of Ann Arbor ***Housing Commission, Michigan*** *Lead Consultant* ♦ Operational practices ♦ Technology ♦ Capital needs assessment	Assisted the Ann Arbor Housing Commission (AAHC) in an operational assessment with an emphasis on financial decisions involving the organization. Specifically, Schumaker & Company performed three key assessments: 1) a high-level analysis of the existing organization structure of services involving major areas of AAHC operations; 2) an evaluation of the present staffing structure for appropriateness, effectiveness, and efficiency of operations; and 3) an assessment of department processes for improved effectiveness and efficiencies with a goal to create an organizational climate of empowerment and accountability. Schumaker & Company identified potential organizational, staffing, and business process changes for consideration by AAHC management. A five-year strategic plan was addressed and a final report written.
City of Dearborn, Michigan *Lead Consultant* ♦ Camp Dearborn ♦ MIS Technology Committee	Assisted the City of Dearborn, who like many organizations, was faced with delivering essential services to its citizens with a reduced level of resources, by performing an assessment of selected units, specifically Camp Dearborn, as a means to streamline and consolidate its operations, eliminate non-essential services, and optimize overall level of resources involved in achieving its goals. Also provided consulting services to the City's Technology Committee regarding a definition of its role in relation to its five subcommittees, to MIS, and to City administration so that problems are efficiently resolved and progress is steady; definition of the role of the five subcommittees; and establishment of a one-year development plan to carry forward the recommendations of a previously-defined Technology Committee report.
Wayne County Airport Authority *Project Manager & Lead Consultant* ♦ Project planning and scheduling ♦ Analysis/development of project plan, planning concepts/practices ♦ Customer technology and services needs assessment ♦ Technology trends tracking, tools and training ♦ Security vision and strategy	Provided services to assist the Wayne County Airport Authority (WCAA) Information Technology Division in identifying technology business initiatives and updating its annual performance plan at the Detroit Metropolitan Wayne County Airport. Interviews with key management and staff were crucial to assess customer business needs and identify WCAA's technology initiatives for the next five (5) years, determine if changes are required of the Department of Technology services portfolio in order to continue to effectively and efficiently meet division business needs, determine the impact of current technology and/or airport business trends on the plan, and develop the plan to reflect project deliverables.
State of Michigan ***Office of Financial and Insurance Regulation*** *Senior Consultant* ♦ Organization and management ♦ Measurement tool development	Conducted an assessment of the State of Michigan, Office of Financial and Insurance Regulation (OFIR), Mortgage Examination and Investigation Section. Interviews and research were conducted to identify and describe characteristics of six state mortgage regulatory programs, including their organizational framework, employee training, and best practices/techniques. Also included was an assessment of the current complaint-based approach versus routine examination approach on a 36/48 month cycle. Quantitative data was identified and captured to develop a tool for OFIR to process the data in measuring the impact of additional staffing in reducing predatory lending practices. Recommended action

plans to implement given those findings.

City of Detroit, Michigan *Lead Consultant* ♦ Development and analysis of process maps (fire/public works) ♦ Development of findings, conclusions, and recommendations (fire/public works)	Recommended cost reduction planning and potential revenue enhancement initiatives based on process mapping and analysis of key processes for designated departments (fire and public works, plus potentially reviewing police, transportation, and health/wellness promotion in future months). These plans/initiatives address risks associated with implementation, not only within the designated departments, but especially its potential impact on the delivery of services to the residents and surrounding communities.
State of Michigan ***Department of State Police*** *Senior Consultant* ♦ Needs assessment ♦ Financial disbursement strategy	Assisted Michigan State Police (MSP) in developing an objective needs assessment and overall financial disbursement strategy for the specific monies collected under the authority of Public Act 78 of 1999, Section 409(E), specifically the *Wireless E911 $.03 Priority Fund*, whose monies were collected over a two-year timeframe. Assisted in developing a strategy for disbursement of these monies to provide appropriate funding for identified and needed services, initiatives, and products; developed criteria for selection and evaluated proposals from the public safety answer point (PSAP) community for disbursement of funds; and recommended proposals for consideration by the Michigan Legislature.
State of Michigan Department of Environmental Quality,<br***Air Quality Division*** *Project Manager* ♦ Joint applications design sessions ♦ Scope statement ♦ Estimate package ♦ Project planning and scheduling ♦ Cost/benefit analysis ♦ Risk management plan ♦ Process and systems improvements design	Performed a thorough and comprehensive assessment of existing systems and processes. Existing processes were inefficient and existing systems needed significant improvement. Delivered a comprehensive business process re-engineering strategy and a high-level project plan for systems redesign efforts. By working closely with Air Quality Division staff and understanding their needs, outlined process improvements, scoped system improvements, and delivered a strategy that exceeded expectations. Estimate package developed included the following; ♦ Outline existing business processes ♦ Recommended business process improvements ♦ Risk management plan ♦ Cost/benefit analysis ♦ Work breakdown structure ♦ High-level project plan, schedule, costs, and design for MAERS enhancement ♦ High-level project plan, schedule, costs, and design for EI Toolkit enhancement ♦ High-level system integration plan, schedule, and costs ♦ Recommendations for improvements and possible alternative solutions
State of Michigan ***Department of Environmental Quality*** *Project Manager & Lead Consultant* ♦ Records management reengineering ♦ File structure and indexing ♦ Imaging	Provided project management and QA services for the implementation of an electronic document management system (EDMS). The project began with a diagnostic review of the existing situation, identifying issues currently impeding complete implementation, and suggesting a program for moving the project forward. The project team, assisted by DEQ personnel, is in the process of reengineering its records management processes and implementing a pilot EDMS in the Storage Tank and Environmental Response divisions. The EDMS is using FileNET for document capture and retrieval and a custom Microsoft SQL database for managing the ongoing and backfile conversion efforts. Mr. Schumaker led the review and documentation of existing business processes for EDMS re-engineering and the creation of a file list, file structure, and indexing for a database of files; established processes and priorities for back file conversion; and established processes for electronic imaging of records. He is now involved in the hands-on implementation of the document management system and several other enhancements to support the Freedom of Information Act (FOIA) process for which the system is designed to streamline other business process enhancements.

State of Michigan
Department of Treasury
Department of Management & Budget
Family Independence Agency

Senior Consultant

- Warrant processing work flows
- Technology strategy and implementation
- Benchmarking organizations, both private and public sector, performing similar activities

Performed a study of the existing work processes and systems for printing and disbursing State of Michigan warrants, resulting in the following:

- Review and assessment of the current situation and existing policy, processes, and procedures
- Findings, conclusions, and recommendations, including identification of alternative technologies for enhancing quality, controls, and efficiency of operations
- Surveys of other organizations
- Alternatives/cost analysis
- Implementation strategy and plan

Information Technology Assignments

Ameri-serv Group *Project Manager* ♦ Project management ♦ Software design and development	Performed a customer relationship management (CRM) systems review for this small service firm. Developed a disaster recovery plan for the older existing systems and began to develop and implement a migration plan for rewriting the application in .NET and Microsoft SQL Server. Technologies used: Microsoft .NET and SQL Server
Baltimore Cass Auto Wash *Project Manager & Lead Consultant* ♦ Software design, development, and implementation	Designed, developed, implemented, and supported a billing and accounts receivable application. This application summarizes and tracks charges incurred by Auto Wash customers (such as Detroit Edison, the City of Detroit and other major companies) who have standing contracts for their services. The application supports the monthly billing and accounts receivable process. This application replaced an earlier application written in software that was no longer supported. This application permitted the company to continue their current operations.
M-CARE *Project Manager & Lead Consultant* ♦ Software design, development, and implementation	Designed, developed, implemented, and supported a participating provider database application for M-CARE, the health management organization designed by the University of Michigan. This application allows M-CARE staff and providers to maintain up-to-the-minute information about participating providers, including location and specialization, for M-CARE participants. The application provides management information that is printed and distributed to M-CARE providers as quarterly provider directories. This application has been in use for over three years, and the client saw a return on the investment on this application in less than one year. In addition, personnel resources that had been previously devoted to this effort were reduced by two full-time equivalents, and an even greater cost savings has been achieved by making this information available on the Internet and significantly reducing the publication of paper directories.
Middleborough Gas & Electric Department ***Middleborough, Massachusetts*** *Project Manager and Senior Consultant* ♦ Network design and installation	Developed and implemented an information technology (IT) plan that migrated Middleborough to a Windows NT network with a standard set of office automation software (Microsoft Office), electronic mail, and groupware applications. This migration included the installation of a new server and new workstations (a standardized workstation) and the implementation of a WAN using the municipality's electric distribution system facilities.
O'Neal Construction *Project Manager & Lead Consultant* ♦ Technology design and implementation ♦ Software design, development, and implementation	Originally engaged to correct technical problems associated with a Netware to Windows NT migration by another vendor, Schumaker & Company performed as the IT department for O'Neal Construction. Numerous security and configuration issues were addressed in the original migration. Assisted in IT improvements, including workstation hardware and software upgrades, reconfiguring of Windows NT server, implementation of Exchange mail system, and enhancing Internet access capabilities. Recommended to management and implemented the migration to a new server and all new workstations to meet performance needs of the users. Provided ongoing network support. Also designed and developed a construction cost projection model to develop cost projections on individual projects using ODBC connector to access historical construction costs for O'Neal's FOREFRONT accounting system (a Btrieve database) on a real time basis. The application used OLE to populate the information into an Access database for further analysis and presentation. It permits O'Neal Construction project managers to create real time costs

projections throughout the construction project.

Thorondor International *Senior Consultant* ♦ Technology design and implementation ♦ Software design, development, and implementation	Provided ongoing support of network support, as well as assistance with IT improvements, including workstation hardware and software upgrades, reconfiguring of Windows NT Server, Windows NT Workstation and Windows 98 workstations implementation of Exchange mail system, and enhancing Internet access capabilities.
Ann Arbor Plastics *Ann Arbor, Michigan* ♦ ERP system selection ♦ Business process reengineering	For this Michigan-based manufacturer of plastic display units, Schumaker & Company performed a business process reengineering project to identify potential opportunities for improvements in the flow of information and paperwork in the materials management and order entry/fulfillment processes. Detailed flowcharts of the two existing business process flows were developed. Analysis of these flowcharts, in conjunction with company management, revealed numerous potential areas for improvement. Formulated a listing of recommendations to take advantage of opportunities for improvement. Implementation of these recommendations by management resulted in significant gains in the efficiency and cost effectiveness of the overall business process. As a result of this, Schumaker & Company was contracted to assist the company in the identification of an ERP system that would better meet the needs of Ann Arbor Plastics, especially in regard to the ability to support projected future growth. This ERP requirements definition and selection/implementation project is currently in process.
Bosquette & Company *Network Consultant* ♦ Technology design and implementation ♦ Network support	Upgraded the Novell 3.2 OS to Novell 4.2, overseeing and maintaining the Novell 4.11 50-user network with two remote locations connected via point-to-point fractional T1 to a Citrix Winframe 1.7 server (NT 3.51 platform). Recommended network upgrades, ordering equipment, configuring, and installing workstations (Win95 & Win98) to operate properly for TCP/IP sDSL connection to Internet, and WinTam software. Additionally, acted as the primary point of contact for utilities, performed troubleshooting and training on our Applied Systems-WinTam & DosTam v.6.03 software; general MS Office training; general Internet Browsing and Email training; and general maintenance and management of the Comdial telephone, Konica & Pitney Bowes fax, HP IIIsi, 5si, 4P, and various InkJet & Office Jet printers, in addition to Konica printer/copier troubleshooting and training.
Consumers Power Company *Project Manager and Lead Consultant* ♦ Service bureau analysis ♦ Information technology	Investigated new business opportunities for the Information Systems Department. Identified several opportunities, but advised client not to pursue due to resource requirements and lack of competitive advantage.
Consumers Power Company *Project Manager and Lead Consultant* ♦ IT systems planning ♦ Information technology	Coordinated the implementation of a formalized information systems planning process, which became the fundamental planning process governing the company's hardware, software, telecommunications, and office automation expenditures. Assignment involved holding briefings with upper management, establishing a systems planning organization, developing specific systems planning activities and schedules, and defining the content of the systems plan document.
Consumers Power Company *Project Manager and Lead Consultant* ♦ Information technology planning	Assisted in developing of a long-range plan for meeting information and computer system needs of the energy supply. The plan identified two major system needs: 1) a new power plant maintenance management system and 2) a nuclear plant admittance system. The utility subsequently developed and is marketing to other utilities in addition to in-house use. The study also resulted in several smaller system and procedural improvements.

Consumers Power Company

Project Manager and Lead Consultant

- Information technology planning

Developed long-range information technology plan for the nuclear department. In addition, conducted a separate investigation of the use of outside computer resources for nuclear processing. The decision was made to continue using the outside services for processing; however, the same methodology was applied three years later to warrant moving the processing in-house, which resulted in more than $250,000 in annual savings.

Internal Schumaker & Company Projects

Project Manager & Lead Consultant

- Systems design, development, and implementation

Provided project management services for Schumaker & Company's internal Visual Basic/SQL Server applications tailored to consulting business needs, including:

- *TEIRS* – A time and expense tracking system that can organize information by client, project, deliverable and staff person for project management and invoicing purposes.
- *Information Media & Records Management System Database* – A records management system that catalogs all information stored in office bookcases and file cabinets in a readily retrievable form.
- *PMIA* – A project management documentation system that implements the project management principles contained in the Project Management Institute's Project Management Body of Knowledge.
- *QMS* – An application that facilitates quality management by tracking issues, actions, change orders, defects, etc., for large projects.
- *IT Database* – An application that facilitates the tracking of available hardware and software within an organization.
- *Contact Manager Mailing DB and Lead Management DB* – Mailing databases for managing prospective clients and generating mailing lists.
- *KeyInfo* – A database for managing and storing important personal information, including online account information, credit card information, membership information such as frequent flyer and diner accounts, etc., and other pertinent data.
- *Media Collection DB* – A database for organizing and maintaining information on various media (CDs, DVDs, and Video)

1

Schumaker & Company

Report

Of the
Prudency Review of Spire STL Pipeline
for the
Missouri Public Service Commission

Case No. GR-2021-0127

3101 Walnut Ridge Drive, Ann Arbor, MI 48103, 734-998-5550 (telephone), 734-998-5590 (fax)

May 27, 2022

** Denotes Confidential Information **

Table of Contents

Table of Exhibits

Table of Findings

I. Executive Summary

Schumaker & Company consultants were engaged by the Missouri Public Service Commission ("Commission") to conduct a prudency review of the actions undertaken by Spire Inc. in deciding to build and operate an interstate pipeline under its subsidiary Spire STL Pipeline LLC ("Spire STL").

The Commission is charged with ensuring that Missourians receive safe and reliable utility service at just, reasonable and affordable rates. The Commission's mission statement states:[1]

We will:

1. Ensure that Missourians receive safe and reliable utility services at just, reasonable and affordable rates;
2. Support economic development through either traditional rate of return regulation or competition, as required by law;
3. Establish standards so that competition will maintain or improve the quality of services provided to Missourians.
4. Provide the public the information they need to make educated utility choices;
5. Provide an efficient regulatory process that is responsive to all parties, and
6. Perform our duties ethically and professionally.

The Spire STL pipeline is an interstate pipeline regulated by the Federal Energy Regulatory Commission (FERC). The Spire STL pipeline was built to primarily serve the customers of Spire Missouri East. The costs of this pipeline is being paid for by Spire Missouri East customers in current rates. In a manner similar to past incorporation of nuclear plant engineering and construction costs into utility rate base, the Commission's prudency standard can be applied to the costs of the Spire STL pipeline.

The prudency standard adopted by the Commission recognizes that a utility's costs are presumed to be prudently incurred, and that a utility need not demonstrate in its case-in-chief that all expenditures are prudent. "However, where some other participant in the proceeding creates a serious doubt as to the prudence of an expenditure, then the applicant has the burden of dispelling those doubts and proving the questioned expenditures to have been prudent."[2] In the case of Spire STL pipeline costs charged to customers, several parties have raised concerns including Consumers Council of Missouri, Environmental Defense Fund, Midwest Energy Consumers Group and the Office of the Public Counsel.

Schumaker & Company consultants applied the Commission's prudency standard in reviewing the decision making undertaken prior to the construction and operation of the Spire STL pipeline.

Summary of Findings and Conclusions

In summary, Schumaker & Company consultants found Spire Inc.'s ("Spire") (formerly Laclede Group Inc.) decision making surrounding the Spire STL pipeline was reasonable and consequently prudent based on our review of company documentation of that time. We found:

- The decision made by Spire to build the Spire STL Pipeline was reasonable and prudent.
  - The decision by Spire to construct the Spire STL pipeline was rendered after a long review process undertaken by Spire Missouri (at that time called Laclede Gas Company) which began in 2011 and culminated in January 26th 2017 with Spire STL pipeline filing its application for a 7(c) Certificate at FERC.
  - The operation of the Spire STL pipeline helped improve some operational issues within the distribution system.
  - Reconfiguring Spire Missouri East's supply portfolio has yielded financial and non-financial benefits for the customers of Spire Missouri East.
  - Spire developed a dashboard analysis showing potential financial benefits of STL pipeline.
  - Spire hired Concentric Consulting LTD ("Concentric") to develop an economic analysis of the Spire STL pipeline.
  - The Spire Project Gas team's evaluation of Spire Missouri East's gas supply portfolio was thorough and complete.
- The Spire Inc. Board of Directors were involved in the decision making process throughout this timeframe.
  - Communications between the Project Gas team, the Board of Directors and Strategy Committee was frequent and complete.
  - Several key benefits were presented during a Board Strategy Meeting.
- Missouri ratepayers have been shielded from the cost overruns by a precedent (founders) agreement that was negotiated at the start of the project.
  - A favorable transportation rate was negotiated between Spire Missouri East and Spire STL pipeline.
  - The Spire STL pipeline provides gas transportation services to Spire Missouri East at an allowed FERC rate that was established in the precedent agreement whereas services provided to Spire STL pipeline by Spire Missouri are provided at fully distributed cost to Spire STL Pipeline.
- A qualified Project Management team was put in place to manage the Spire STL pipeline Project.
  - Key individuals were hired with specific pipeline construction experience to run the project.
  - Competitive bidding was used to select Principal General Contractor.
  - Approvals at all levels of government were sought and granted.

- Spire Inc. has created an organization similar to what we have observed at other electric and gas utilities.
  - The Spire STL pipeline affiliate was created due to anticipated supply need and the absence of an available unaffiliated company that met Spire standards to partner with Spire on this effort.
  - Spire is in general compliance with the Missouri Affiliate Rules with respect to STL Pipeline.

Discussion of the last two points can be found in the Staff Memo filed with this Report.

- However, as further discussed in the recommendation memo, Staff has concerns regarding the availability and access to certain supporting documentation.
- Also, as discussed in the Staff memo, key risks for Spire remain with regard to the ongoing FERC certification process of the Spire STL Pipeline and the court review of that process. Those risks should be borne by Spire in future Commission proceedings.

INTENTIONAL

BLANK

PAGE

II. Spire STL Pipeline Background

This chapter provides a brief background on the Spire STL pipeline. Later chapters of this report address the justification to construct the pipeline and did that decision and the construction itself meet the Commission's prudency standard, and whether affiliate transaction rules are complied with regarding STL pipeline and Spire Missouri East.

A. Background

Spire Missouri East based its decision to build the Spire STL pipeline on information and data available on or before January 2017[3] which showed benefits to its customers by improving its gas supply portfolio. Benefits were expected to be realized in the areas of gas supply diversity, reliability, flexibility, improved system operations and lower gas portfolio costs. Several alternatives to the Spire STL Pipeline were evaluated and none were able to provide all of the benefits or provide a significant economic improvement over the supply portfolio that included the pipeline.[4] All of the subsequent improvements to the supply portfolio directly benefited Spire Missouri East customers.

On August 3, 2018, the Federal Energy Regulatory Commission (FERC) approved an order issuing a Certificate of Public Convenience and Necessity for the Spire STL pipeline, enabling the St Louis region to receive new sources of natural gas supply (specifically gas transportation). With this approval, the pipeline moved forward with land acquisition and other pre-construction activities.[5] Pipeline construction started in late 2018 and the pipeline was placed into service in late 2019.

FERC's approval of the Spire STL pipeline was challenged by the Environmental Defense Fund (EDF) on June 26, 2020, and EDF filed a brief asking the U.S. Court of Appeals for the D.C. Circuit to overturn FERC's approval of the project. According to EDF attorney Erin Murphy, "FERC unlawfully approved the Spire STL Pipeline without a sound determination that the project was needed. When FERC relies exclusively on an affiliate contract to justify the need for a pipeline, as it did with the Spire STL project, it threatens market integrity and harms ratepayers, who ultimately end up footing the bill for unnecessary gas infrastructure".[6] In June of 2021, a three judge panel of the U.S. Court of Appeals for the D.C. Circuit ruled that FERC "failed to adequately balance public benefits and adverse impacts"[7] in approving the pipeline and "ignored record evidence of self-dealing."[8] The panel also wrote that evidence showed the pipeline "is not being built to serve increasing load demand and that there is no indication the new pipeline will lead to a cost savings."[9] Spire Inc. appealed to the U.S. Supreme Court which rejected to hear the appeal.[10]

Currently the pipeline is operating under a temporary license, and FERC will revisit its decision to approve or not approve the Spire STL pipeline.

B. Missouri Public Service Commission's Prudency Rules

The Commission established its prudence standard in a 1985 case involving the costs incurred by Union Electric Company in constructing its Callaway nuclear plant. In determining how much of those costs were to be included in Union Electric's rate base, the Commission adopted a standard for determining the prudence of costs that had been established by the United States Court of Appeals, District of Columbia, in a 1981 case. The prudency standard adopted by the Commission recognizes that a utility's costs are presumed to be prudently incurred, and that a utility need not demonstrate in its case-in-chief that all expenditures are prudent. "However, where some other participant in the proceeding creates a serious doubt as to the prudence of an expenditure, then the applicant has the burden of dispelling those doubts and proving the questioned expenditures to have been prudent."[11] In the case of Spire STL pipeline costs charged to customers, several parties have raised concerns including Consumers Council of Missouri, Environmental Defense Fund, Midwest Energy Consumers Group and the Office of the Public Counsel.

The Commission, in the Union Electric case, further recognized that the prudence standard is not based on hindsight, but upon a reasonableness standard. The Commission cited with approval a statement of the New York Public Service Commission that:

> the company's conduct should be judged by asking whether the conduct was reasonable at the time, under all the circumstances, considering that the company had to solve its problem prospectively rather than in reliance on hindsight. In effect, our responsibility is to determine how reasonable people would have performed the tasks that confronted the company.[12]

Since its adoption, the Commission's prudence standard has been recognized by reviewing courts.[13]

More recently the Missouri Supreme Court, with regard to application of the prudence standard to affiliate transactions, has stated in Docket No. SC92964:

"A presumption of prudence is inconsistent with the rationale for the affiliate transaction rules and with the PSC's obligation to prevent regulated utilities from subsidizing their non-regulated operations."

"The affiliate transaction rules were enacted in an effort to prevent regulated utilities from subsidizing their non-regulated activities. To presume that a regulated utility's costs in a transaction with an affiliate were incurred prudently is inconsistent with these rules."

III. Pipeline Decision Making

This section discusses the process used by Spire Inc. to determine the need for the Spire STL Pipeline.

Finding III-1 **The decision by Spire Inc. to construct the Spire STL Pipeline was rendered after a long review process was undertaken by Spire Missouri which began in 2011 and culminated in January 26th 2017 with Spire STL Pipeline filing its application for a 7(c) Certificate at FERC.**

A. Project Gas/Project Timeline Key Dates Thru decision to proceed with Spire STL pipeline

The creation of Spire STL pipeline was the culmination of a process starting in early 2011. In 2011, a 3rd party developer proposed a REX lateral to St Louis and Spire Missouri filed a settlement stipulation with the PSC to interconnect with this pipeline, if constructed. It was never constructed. Sometime in the next couple of years, Spire began looking at other lateral options and spoke with a few potential partners for this project. In late 2013, Spire Missouri East (then known as Laclede Gas Company) formed a committee staffed with a cross section of key employees to review its gas supply portfolio[14]. The committee was named "Project Gas". Its objective is shown below in *Exhibit III-1*.

Exhibit III-1
Project Gas Objective
Late 2013

Objectives of this project

- In light of the rapidly changing North American natural gas marketplace, determine the optimal future gas supply portfolio that :
  - Fully maintains (consistent with past practice) reliable and favorable cost gas supplies for LGC and MGE regulated customers
  - Maximizes total value generated from underutilized regulated gas supply assets and commodity spend
  - Standardizes planning and forecasting methodologies between utilities
  - Capitalizes on any market opportunities to provide new service offerings using T&S and supply portfolios
  - Enables equitable sharing of risk and total value generated between customers and shareholders

Source: Information Request 42

Project Gas from its inception in 2013 to January 2017 studied the current state (2013) of Spire Missouri supply portfolio, examined and studied many factors that impact the supply portfolio, and recommended what the future supply portfolio should be. It completed its objective with the result being that a REX supply lateral was recommended as a gas supply project.[15]

The team studied U.S. and international gas market trends, environmental drivers, Midwest and Mid-continent area trends and implications, background and analysis on 13 key pipeline systems, Spire Missouri's system demand forecast, and many other factors that affect the supply portfolio.[16]

Highlights of Project Gas/Spire Decision Timeline are as follows:[17]

- June 16, 2014: initial Project Gas report distributed to Spire leadership council. Identified retention of IHS and PACE as consultants. Discussion of IHS reference case and North American gas market fundamentals driven by shale, exports, etc.[18]
- September 26, 2014: Siemens/PACE presentation finalized to provide update on Project Gas activities and analysis to date.
- Mid October 2014 Board Strategy Committee formed. Project Gas update provided overview, notes nearing completion of current state assessment and gas market forecasting. Noted evolving gas flows and basin outputs. Noted joint venture (JV) investment with pipeline operator as an opportunity.[19]
- November 4, 2014: Spire entered into a Non-Disclosure Agreement with ** [redacted] ** pipeline for discussion of potential gas supply projects.[20]
- November 10, 2014: Spire entered into a Non-Disclosure Agreement with ** [redacted] ** pipeline for discussion of potential gas supply projects.[21]
- March 5, 2015: Project Gas provided comprehensive update to full board during strategy session. Included review of Spire Missouri East gas supply portfolio. Noted lack of pipeline diversity impacts for Spire Missouri East: Limited capacity into citygate relative to peak demand, dependence on MRT and no-notice storage, traversing New Madrid fault, and limited pipeline competition absent new build. Included IHS presentation, with recommendation to obtain firm pipeline capacity from the Marcellus and enhance Rockies supply.[22]
- July 23, 2015: Requests for Proposals (St. Louis Lateral Process Description) are finalized and ready for release to potential project partners. (RFPs were sent to ** [redacted] **.) Included were tentative project criteria and tentative project terms.[23]
- October 28, 2015: Project Gas reported to the Board Strategy Committee that a REX lateral has been identified as a recommended gas supply project, and that ** [redacted] ** have been identified as the final two potential partners in the process. The project was being considered as a joint venture with these parties.[24]
- January 13, 2016: Spire Missouri presented REX lateral concept to the Commission, Advisors and Staff[25] in an agenda meeting.
- January 21, 2016: Project Gas reported to full board of directors that informal RFPs were sent to three pipelines with a qualitative assessment of the response terms. It was highlighted that there are significant benefits to utility customers. The presentation indicated that ** [redacted] ** was the leading contender in the bidding process. The assumed project price was ** [redacted] **. It contained a discussion of customer and shareholder impacts of

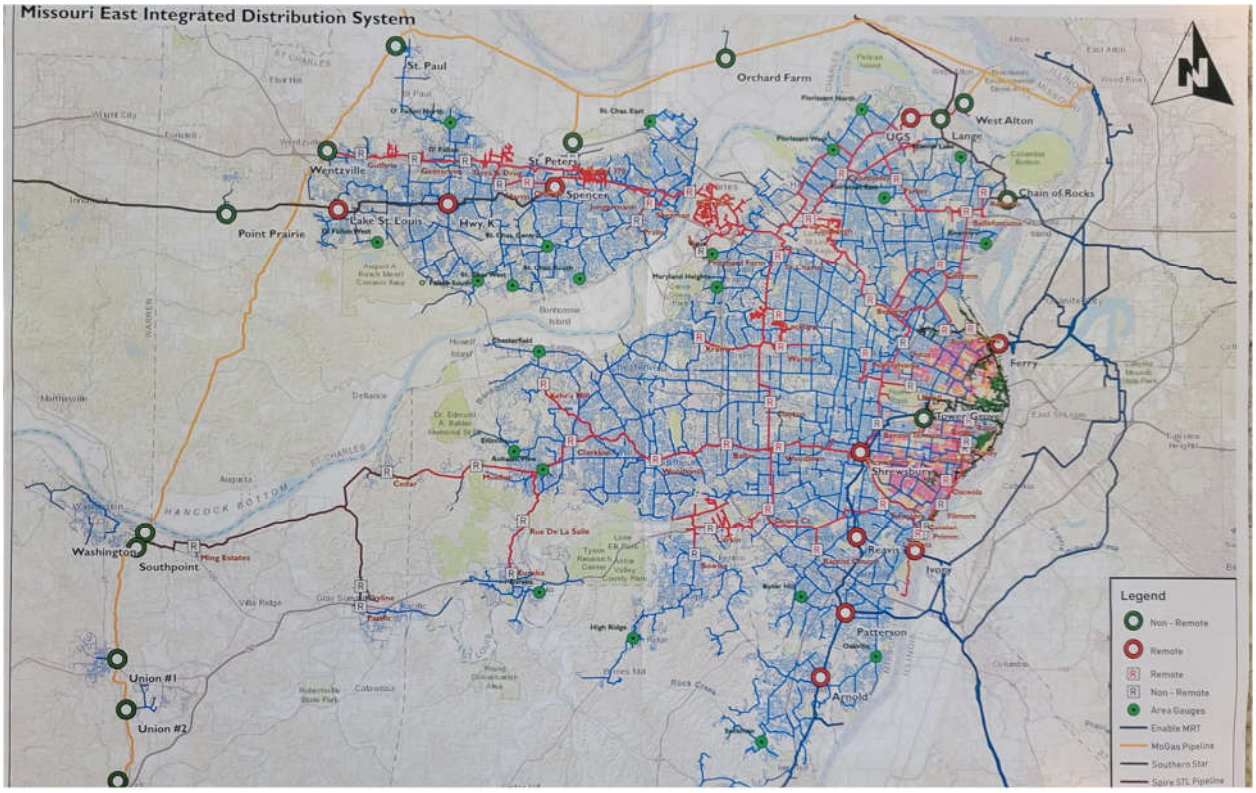
proceeding with ** [redacted] ** partnership to build lateral vs. re-negotiating existing agreements with ** [redacted] ** without a lateral. Highlighted risks with ** [redacted] ** as a partner, including credit quality. Supply diversity discussion highlighted freeze offs and earthquake risk as potential concerns to be mitigated.[26]

- April 27, 2016: Spire STL pipeline provided update to board strategy committee. Internal team members and team structure is identified. Team reported that they have evaluated and considered multiple approaches for Spire to develop construct and own 100% of Spire STL pipeline. Discussion of outside expertise needed to facilitate the process (engineering, design, regulatory, etc.). Reported that ** [redacted] ** had conducted extensive route review and preliminary environmental and cultural work (presumably as part of their RFP). The presentation included section titled, "Request for Approval to Build and Own and Operate an Interstate Pipeline." Included analysis of portfolio cost impact of various foundation shipper rates. Contained discussion of Spire resolutions to create Spire STL Pipeline, Spire Midstream Resources subsidiaries and approval to construct, own and operate pipeline. It also contained authorization for both Spire Missouri and Spire STL pipeline to enter into precedent agreement.[27]
- July 6, 2016: Pipeline Team conduct pre-filing meeting with FERC in Washington DC.
- July 2016: FERC accepted Spire STL Pipeline into pre-filing process.[28]
- October 19, 2016: Pipeline team made report to strategy committee. Costs and investment generally going up. Discussion of Precedent Agreement terms including quantity and price; "we determined the $.22 negotiated rate meets the needs of both parties." Noted "continuing to negotiate and finalize the precedent agreement for foundation shipper Laclede Gas (LGC) [Spire Missouri East]." Sought to increase the total project budget from $200M to $220M.[29]
- Late 2016/Early 2017: Final Discussions were held with ** [redacted] ** about a potential partnership to build the pipeline. There were serious concerns about ** [redacted] ** ability to raise the capital to build the pipeline. ** [redacted] ** was unable to get the capital to finance the project.[30]
- January 2017: Spire Missouri executed precedent agreement to become foundation shipper on Spire STL pipeline, and Spire STL files application for 7(c) Certificate at FERC.[31]

Spire Missouri East Distribution System

In 2017, Spire Missouri East served approximately 650,000 customers in the St. Louis and ten other counties in eastern Missouri.[32] The St. Louis-area distribution system is shown on the color coded map below in *Exhibit III-2*.

Exhibit III-2
Spire Missouri East Distribution System
as of February 2022



Source: Interview 2 & 3

Gas flows from the various transmission pipelines into the 300-psi system shown in solid red. The 300-psi system is the backbone of the distribution system. This system ultimately distributes the gas to the lower pressure systems, 60 psi, 25 psi and low pressure shown in dark blue, light blue and pink, respectively. The gas flows primarily from east to west within the 300-psi system.[33] Spire Missouri East does not expect any significant growth in gas demand over time but it does expect that there would be load shifts within its service area.[34] Load is shifting from the eastern part of the service territory to the west.[35]

Finding III-2 **The operation of the Spire STL pipeline helped improve some operational issues within the distribution system.**

One of the operational issues facing Spire Missouri East during the review process is that MRT East pipeline was proving unreliable and could not guarantee pipeline pressure levels in the winter. This was proving problematic in the distribution system. This is further highlighted by the comparison of pressures in *Exhibit III-3*.[36]

Exhibit III-3
System Pressure Distribution
2019 to 2021

	Pressure at Low Point		
Location	1/30/2019-08:17	2/15/2021-8:00	Increase
	PSI	PSI	PSI
Clarkson	63	162	99
South Point	82	222	141
Woodsmill	89	159	71
Jungerman	92	182	90
Spencer	95	164	69
St. Charles Bridge	158	200	42
St. Peters	110	196	86
Terra & Drug	68	130	62
Wentzville	87	136	49
			79

Source: Information Request 51

For example, on 1/30/19 the gas day average temperature was 4 degrees and the pressure in parts of the 300-psi system dropped to 68 psi.[37] The following winter, on 2/15/21 the gas day average temperature was 2 degrees. The STL pipeline was in service at this time and the lowest pressure recorded on the 300-lb. system on that day was 130 psi. The pressure point that recorded 68 psi on 1/30/19 was at 130 psi on 2/15/21.

B. Spire Missouri East Supply Portfolio Pre Spire STL

Gas utility supply planning principles[38]

One of the responsibilities of a local distribution company (LDC) is to develop a portfolio of natural gas supplies that can be delivered to its service territory to serve customer demand. Typical LDC gas supply portfolios consist of some combination of gas supplies purchased at a liquid trading point, long-haul and/or short-haul pipeline capacity, underground storage, peaking supplies (e.g., LNG, liquid propane, propane air), and citygate delivered supplies. Not all utilities hold all types of gas supply assets; specific circumstances dictate the types of assets held by a particular utility (e.g., location, access to specific assets, cost, and market conditions).[39]

There are also several different approaches to acquiring assets for a gas supply portfolio. Utilities execute contracts to purchase natural gas supplies and to obtain access to pipeline capacity, storage, or peaking supplies. These contracts typically vary in duration, with contracts for existing infrastructure typically shorter term (e.g., one season to a few years), while contracts for new infrastructure typically

longer term (e.g., 10-20 years), although there are exceptions to both. Alternatively, utilities can build or acquire assets – both natural gas supplies and infrastructure – for their gas supply portfolios.[40]

In addition to type of asset and method of acquisition, there are several other factors to consider when choosing assets to include in a gas supply portfolio. Important considerations include: ability to meet forecasted demand, cost level and stability, flexibility, diversity, reliability, and operational considerations.[41]

Ability to Meet Forecasted Demand: Because LDCs are required to meet firm customer needs under a variety of weather and economic conditions, and because factors such as future weather are difficult to predict, utilities typically build gas supply portfolios that can meet customers' forecasted needs under a wide range of demand scenarios. For example, it is important to ensure that an LDCs' gas supply portfolio is sufficient to meet customer demands under assumed extreme cold conditions, known as "design day," "design winter," and "design year." It is also critical that an LDC's gas supply portfolio be designed to serve daily fluctuations in demand that occur as a result of changing weather. It is not appropriate to plan solely for an average demand day, as many days will have demand that exceeds an average day and LDCs have an obligation to serve and are responsible for delivering under extreme weather conditions.[42]

Cost: The total cost to acquire and deliver gas supply to customers is clearly an important factor for utilities to consider when developing a gas supply portfolio to ensure that customers are being served in cost effective and reliable manner. "Cost" encompasses both the cost level as well as cost stability. Especially for assets that have long lives or long-term contracts, it is important to not only consider cost today, but the potential for significant changes in costs over time. Cost stability is one reason that many LDCs utilize hedging as part of their overall gas supply portfolio strategy.[43]

Flexibility: Flexibility refers to the ability of a gas supply portfolio to serve potentially changing needs over time. For example, demand growth may not be uniform across the service territory. To the extent that assets provide the flexibility to change delivery points to suit the needs of shifting load centers, those assets would provide greater value to the portfolio than assets that have one fixed delivery point. The flexibility to access multiple supply sources or to allow for intra-day load swings are other examples of flexibility that add value to a gas supply portfolio.[44]

Diversity: Having access to a diverse range of gas supplies, transportation paths, and types of assets in the portfolio provides value in the sense that it provides the opportunity to mitigate the effects of a price spike and to take advantage of lower prices in different locations. If a utility purchases all its gas from one supply location, and has not hedged, its customers will be subject to price swings experienced in that supply location. Adding diversity to an LDC's portfolio through access to multiple supply locations or through adding storage can provide value by mitigating the effects of price swings.[45]

Reliability: Because utilities have an obligation to serve firm customers, it is critical that the supply portfolio provide utilities with reliable delivered gas supplies. Generally, utilities back-up their obligations to firm customers with firm supply contracts and corresponding pipeline transportation capacity. While supply and delivery disruptions, and restrictions due to weather, operational issues,

or other factors are generally rare, they do occasionally occur, and these upstream reliability concerns are often considered when making portfolio decisions.[46]

Operational Considerations: Operational considerations must be factored into the decision-making process due to the specific configurations of a distribution system, the size, location, and needs of customers, and the ability of gas to be transported across the distribution system. Due to the unique characteristics of distribution systems, utilities may have requirements to receive certain amounts of natural gas at specific locations on their system to maintain delivery pressures, serve growing loads and/or allow for greater flexibility or security of supply. These operational considerations also play a role in determining an appropriate gas supply portfolio.[47]

Overview of Spire Missouri East Supply Portfolio

Spire Missouri East serves approximately 650,000 customers in St. Louis and other areas of eastern Missouri. Spire Missouri East's planning standard is for a design winter based on the weather pattern experienced during the winter of 1935-1936 because it is the most difficult winter to meet from a supply adequacy perspective due to a 5-week cold period that occurred from January to mid-February of 1936. Total send out during the design winter for Spire Missouri East is expected to be approximately 76 Bcf, and approximately 110 Bcf for the year that includes a design winter (assuming a 365 day year). Spire Missouri plans for peak design day send out ranging from 990 MMcf to 1,183 MMcf, depending on the scenario. In addition, while Spire Missouri East expects that it will experience load shifts within its service territory over time, Spire Missouri East does not expect any significant growth or decline in the total forecasted demand over time.[48] Spire Missouri East's gas supply contracts other than with the Spire STL pipeline were not evaluated in this report but are addressed by the Commission Staff in actual cost adjustment (ACA) reviews.

In July 2017, Spire Missouri East held pipeline transportation contracts on eight interstate pipelines, each of which is described below:

Mississippi River Transmission ("MRT"): MRT consists of approximately 1,650 miles of pipe, that includes: (i) the mainline ("MRT-ML") segment spanning from Louisiana to Missouri (including deliveries to Spire Missouri East's citygates); (ii) a west line ("MRT-W") that runs from eastern Texas and connects to the mainline in northern Louisiana, and (iii) an east line ("MRT-E") that runs from central Illinois, with interconnects with multiple pipelines, to Spire Missouri East citygates in St. Louis. Approximately 21% of the system miles were installed prior to 1950, and more than 62% of the system miles were installed prior to 1970. Spire Missouri East can use its capacity on MRT in multiple ways. First, it can purchase gas on the MRT-W or the MRT-ML segments in northern Louisiana or Arkansas, and deliver it directly to Spire Missouri East's citygates using the MRT-ML. Spire Missouri East e can also use its capacity on the MRT-ML to deliver gas from Enable Gas Transmission ("EGT") to Spire Missouri's East citygate. In addition, Spire Missouri East can use its capacity on the MRT-E leg to deliver gas from Trunkline Gas Company ("Trunkline") or Natural Gas Pipeline Company of America ("NGPL") to Laclede's citygate. Lastly, Spire Missouri East holds a contract for underground storage service on MRT as well as a southbound contract to fill its storage on MRT.

EGT: The EGT system consists of approximately 5,950 miles of pipe, with the majority of the facilities in Arkansas and Oklahoma, with lesser amounts in Louisiana and northeastern Texas, and very small amounts in Kansas, Mississippi, Missouri, and Tennessee. Over 11% of the system miles were installed prior to 1950, and more than half of the system miles were installed prior to 1970. EGT does not deliver directly to Spire Missouri's citygates, but rather Spire Missouri East requires one or more downstream pipelines in conjunction with EGT in order to deliver gas to its citygates. Specifically, Spire Missouri East can purchase gas in Oklahoma on EGT, and then transport that gas to either the MRT-ML for delivery to its distribution system or to Trunkline for subsequent redelivery to the MRT-E, for ultimate delivery to its distribution system.

NGPL: NGPL consists of over 9,000 miles of pipe, with two legs – one from New Mexico, the Texas panhandle and Oklahoma, and the other from eastern and southern Texas and Louisiana, connected by a crossover – that deliver gas to the Chicago metropolitan area. More than 11% of the system miles were installed prior to 1950, and more than 75% of the system miles were installed prior to 1970. NGPL does not deliver directly to Spire Missouri East's citygates, but rather Spire Missouri East can purchase gas in either Oklahoma or Texas and transport that gas on NGPL to the MRT-E for redelivery to Spire Missouri East citygates.

Trunkline: Trunkline consists of over 2,200 miles of pipe, spanning from southern Texas to the Indiana/Michigan border. None of Trunkline was installed prior to 1950, but over 90% of the Trunkline system miles were installed between 1950 and 1970. Trunkline does not deliver directly to Spire Missouri East's citygates, but rather Spire Missouri East can purchase gas in either south Texas or east Louisiana and transport that gas on Trunkline to the MRT-E for redelivery to Spire Missouri East citygates. In addition, Spire Missouri East can use its capacity on Trunkline to bring gas from EGT to the MRT-E for ultimate delivery to Spire Missouri East. Spire Missouri East can also use its capacity on Trunkline to bring gas from Panhandle Eastern Pipeline ("PEPL") to the MRT-E through a backhaul on Trunkline.

PEPL: PEPL consists of approximately 6,000 miles of pipe, spanning from the Oklahoma panhandle to Michigan. More than 42% of the system miles were installed prior to 1950, and close to 90% of the system miles were installed prior to 1970. PEPL does not deliver directly to Spire Missouri's citygates, but rather Spire Missouri East can purchase gas in western Kansas or western Oklahoma, and transport that gas on PEPL either to MoGas for ultimate redelivery to Spire Missouri, or to Trunkline (backhaul) and then to the MRT-E for delivery to Spire Missouri.

Rocky Mountain Express (REX) consists of over 1,700 miles of pipeline from Wyoming to Ohio, directly accessing both Rockies production and Marcellus/Utica production. The REX system currently provides bi-directional capability to flow gas both west-to-east out of the Rockies and east to-west out of the Marcellus/Utica. REX is a relatively new pipeline, with all of its system installed since 2000. Spire Missouri can purchase Marcellus/Utica shale gas in eastern Ohio on REX and transport that gas to MoGas for ultimate delivery to Spire Missouri East's citygates.

MoGas Pipeline ("MoGas"): MoGas is a regional pipeline that consists of approximately 263 miles of pipe, almost all located in Missouri, with a very small amount of pipe located in Illinois. More than 26% of the system miles were installed prior to 1950, with the rest of the system miles were

installed since 1980. MoGas is directly connected to the Spire Missouri distribution system, but is not directly connected to upstream production. Therefore, Spire Missouri can use its capacity on MoGas to bring gas from either PEPL or REX for delivery to its citygates.

Southern Star Central ("SSC"): SSC is a reticulated system that consists of approximately 5,850 miles of pipe, primarily in Kansas, Oklahoma, and Missouri, with lesser amounts in Wyoming and Colorado, and very small amounts in Texas and Nebraska. Almost 25% of the system miles were installed prior to 1950, and over 58% of the system miles were installed prior to 1970. Spire Missouri East's existing SSC contracts provide the capability to purchase gas in western Oklahoma and the Texas panhandle transport gas on SSC directly to Spire Missouri East's citygates.

As summarized in the figure below, Spire Missouri East currently holds upstream and downstream firm pipeline transportation and storage contracts that provide a total of 1,265,829 dth/d of deliverability to Spire Missouri East's citygate. This capacity is comprised of 743,622 dth/d of long-haul pipeline transportation capacity, 357,000 dth/d of on-system storage deliverability, and 163,200 dth/d of propane deliverability. Spire Missouri East's existing gas supply portfolio as of July 2017 is presented in *Exhibit III-4*.

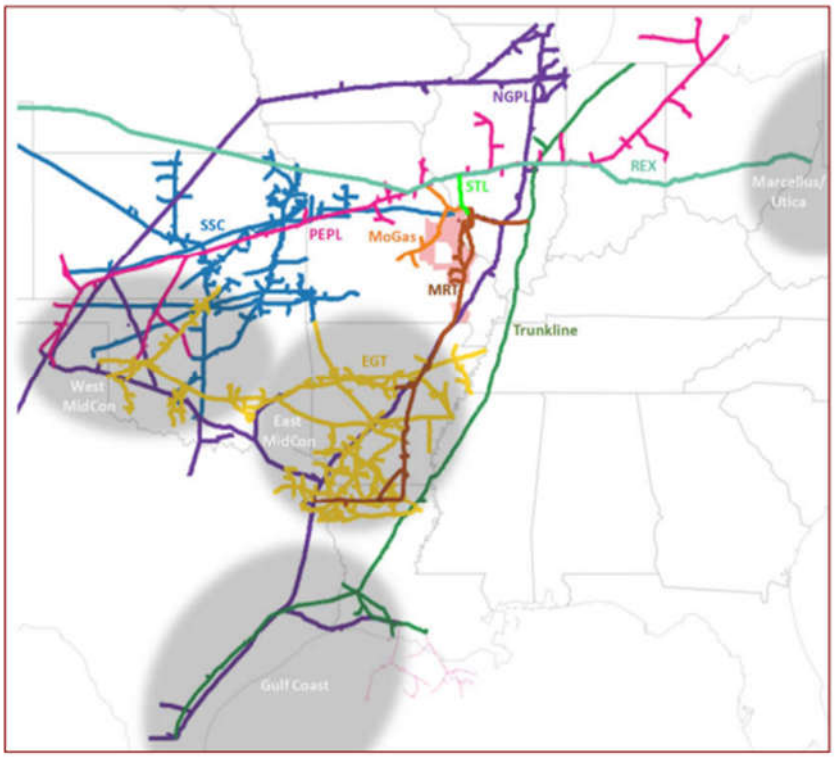
Exhibit III-4
Spire Missouri East's existing gas Transportation and Storage Portfolio
as of July 2017

Citygate Supplies	Current Portfolio
MRT	660,329
MoGas	55,000
SSC	30,300
On System Storage	357,000
Propane	163,200
STL	-
Total	**1,265,829**
Upstream Pipelines	**Current Portfolio**
EGT	135,000
NGPL	80,000
Trunkline	90,000
PEPL	45,462
REX	20,000
Total	**370,462**
Storage	**Current Portfolio**
MRT Max Withdrawals	383,226
MRT Capacity	22,000,000

Source: Concentric Report 7/2017

Prior to the STL Pipeline, Spire Missouri East purchased the vast majority of its gas supplies in three regions: (1) western-central Oklahoma (i.e., west MidCon); (2) northern Louisiana, Arkansas, and eastern Oklahoma/east Texas (i.e., east MidCon); and (3) southern Texas and southern Louisiana (i.e., Gulf Coast). In December 2016, Spire Missouri added the REX contract to its portfolio, which allows it to purchase a small amount of supply (i.e., 20,000 dth/d) from the Marcellus/Utica supply area in eastern Ohio utilizing its existing transportation portfolio as shown in *Exhibit III-4* and *Exhibit III-5*.[49]

Exhibit III-5
Map of pipelines in Spire Missouri East's existing portfolio, plus STL



Source: Concentric Report 7/2017

Issues with pre-STL Pipeline Supply Portfolio

On March 5, 2015, Project Gas provided a comprehensive update to the full board regarding existing issues with the Spire Missouri East gas supply portfolio during a strategy session. The issues noted include lack of pipeline diversity impacts for Spire Missouri, limited capacity into citygate relative to peak demand, dependence on MRT (supplied 70% to 80 % of Spire Missouri East's gas)[50] and no-notice storage, traversing New Madrid fault, and limited pipeline competition absent new build. The presentation included an IHS Consulting Services (IHS) presentation, with recommendation to obtain firm pipeline capacity from the Marcellus region in the East and enhance Rockies supply in the West.[51] A number of alternate solutions were explored including the construction of a pipeline to address these deficiencies as well as cost impact to the supply portfolio for each of the alternatives.[52]

Propane Injection

Spire Missouri East's propane injection peaking system is old, nearing obsolescence, and a challenge to operate and maintain. The direct injection of propane into the system causes operational issues due to its much higher BTU content (2516 BTU/CuFT) vs. (1030 BTU/CuFT) for natural gas.[53]

Underground Storage

In addition, the on system storage facility requires the use of compressors to fill the system since the existing feeds does not have adequate pressure to fill the system without compression.[54]

C. Spire Missouri East Portfolio with Spire STL pipeline

Spire Missouri East had decided to retire its propane facility. Since Spire Missouri East has contracted for 350,000 dth/d on Spire STL Pipeline, and the propane facility has a maximum daily withdrawal quantity of 163,200 dth/d, Spire Missouri East would need to reduce the citygate deliverability of its existing portfolio by 186,800 dth/d to maintain the same amount of citygate deliverability. Based on discussions with Spire Missouri East, its gas supply consultant Concentric understood that MoGas and SSC provide deliveries that are critical for maintaining pressure and serving customer demand on the west side of Spire Missouri East's distribution system that cannot be met by deliveries from other existing pipeline supply alternatives in Spire Missouri East's portfolio. In addition, Spire Missouri East had a long-term contract on MoGas and thus could not terminate its contractual commitment in the near-term. Therefore, Spire Missouri East's existing contractual commitments on MoGas and SSC were not candidates for meeting the reduction in contract demand required to maintain Spire Missouri East's existing deliverability. As a result, the 186,800 dth/d must have been reduced from MRT because it is the only other pipeline that provides deliveries directly to Spire Missouri East's citygates. Because Spire Missouri East utilized transportation on MRT in conjunction with other upstream pipelines to facilitate deliveries of gas to its system, a reduction in contract demand on MRT also provides the opportunity to reduce capacity on other upstream pipelines. Based on a review of the costs of the various pipeline transportation paths to serve Spire Missouri East's customers using MRT, one reasonable portfolio that included STL Pipeline and excluded propane would eliminate 95,000 dth/d on the MRT-ML and 91,800 dth/d on the MRT-E, and also eliminate 135,000 dth/d of upstream capacity on EGT, 11,800 dth/d of upstream capacity on NGPL, and 80,000 dth/d of upstream capacity on TGC ("Portfolio STL"), as summarized below in *Exhibit III-6*.[55]

Exhibit III-6
Spire Missouri East Portfolio with STL
as of July, 2017

Citygate Supplies	Current Portfolio	Portfolio STL	Difference
MRT	660,329	473,529	(186,800)
Mogas	55,000	55,000	-
SSC	30,300	30,300	-
On System Storage	357,000	357,000	-
Propane	163,200	-	(163,200)
STL	-	350,000	350,000
Total	**1,265,829**	**1,265,829**	**-**
Upstream Pipelines	**Current Portfolio**	**Portfolio STL**	**Difference**
EGT	135,000	-	(135,000)
NGPL	80,000	68,200	(11,800)
TGC	90,000	10,000	(80,000)
PEPL	45,462	45,462	-
REX	20,000	20,000	-
Total	**370,462**	**143,662**	**(226,800)**

Source: Concentric Report

Finding III-3 **There are several benefits form the Spire STL Pipeline.**

D. Benefits from Portfolio STL

Non-Financial Benefits[56]

Increased Supply Diversity—Spire STL pipeline provides the opportunity for Spire Missouri East to enhance the diversity of its natural gas supply portfolio through increased access to supplies that it has not traditionally accessed. Ninety eight percent of Spire Missouri East's current portfolio accesses supplies from south and west of Missouri (i.e., west MidCon, east MidCon, and the Gulf Coast) and the remaining 2% accesses supplies from the east (i.e., Marcellus/Utica). Specifically, Spire STL pipeline's interconnection with REX provides direct access to natural gas produced in the Marcellus/Utica supply areas, which is the largest and is projected to continue to be the most prolific supply basin in North America. The development of abundant natural gas supplies in the Marcellus/Utica region has completely changed the United States' gas flows and created unprecedented cost savings and reliability advantages. As a result, many utilities and other natural gas users have been attempting to shift their gas supply portfolios to provide access to this substantial and growing source of supply. Spire STL pipeline provides Spire Missouri's customers greater access to these prolific Marcellus/Utica natural gas supplies through REX, mitigating Spire Missouri East's existing heavy reliance on the MidCon and Gulf Coast supplies, thus diversifying gas supply options for the benefit of Spire Missouri East's customers.[57]

Enhanced Flexibility- Spire STL pipeline provides the flexibility to access multiple sources of supply at a liquid supply point in very close proximity to Spire Missouri East's distribution system. Specifically, Spire STL pipeline's interconnect with REX does not only provide direct access to Marcellus/Utica supplies, but it also provides direct access to Rockies supplies, as well as indirect access to Gulf Coast, MidCon, and potentially western Canadian supplies through its various interconnects with a number of interstate pipelines. The flexibility to access a number of supply sources increases the gas-on-gas competition and thus increases the benefits of buying gas at points on REX. LDCs typically contract for pipeline capacity back to the nearest liquid trading point to minimize transportation costs, provide supply security, allow price transparency, and enable the flexibility of transactions with multiple potential counterparties. Spire STL pipeline allows Spire Missouri East the flexibility to transact at a liquid point very near its citygate served by multiple supply sources for the benefit of its customers.[58]

Operational Considerations—Spire STL pipeline will provide deliveries into the distribution system at a pressure high enough to allow for direct injection into Spire Missouri East's on-system storage facility under most operating conditions, therefore minimizing compressor usage.[59] Spire Missouri East also has the opportunity to reconfigure its existing portfolio for the benefit of customers by not renewing certain existing pipeline capacity while maintaining the same citygate delivery capability.[60] By reconfiguring its existing portfolio to take advantage of Spire STL pipeline's high operating pressure (750psi on a peak day) pressure and better distribute gas into Spire Missouri East's distribution system. This will mitigate pressure problems in Spire Missouri East's 300 psi distribution system.[61]

Ability to Meet Customer Demand without On-System Propane-- Spire Missouri East is contracting for 350,000 dth/d of capacity on the Spire STL pipeline (i.e., 186,800 dth/d more than necessary to fill the gap created by retiring its propane facility),

---

Financial Benefits

There are two parts to this question; first, "Were there any alternatives to the pipeline that yielded a financial benefit to Spire Missouri East?" Based on the information available to Concentric, Concentric determined that none of the alternative portfolios evaluated represent a significant economic improvement for Spire Missouri's customers over the portfolio with Spire STL pipeline. In addition, many of the alternative portfolios evaluated have operational challenges making them not suitable alternatives for the portfolio with Spire STL Pipeline.[62] Second, was the cost of Spire Missouri's gas supply portfolio that showed the annual cost of the gas with Spire STL Pipeline less expensive than the gas portfolio in place without the pipeline? *Exhibit III-7* shows a benefit of $1,906,000 in annual savings with the Spire STL Pipeline compared to the then- current gas supply portfolio. This dashboard is an updated version of the one presented to the Strategy committee on 4/ 27/16. *Exhibit III-9*. Lastly, this supply portfolio was updated once more when the Precedent Agreement with Spire STL pipeline was finalized and showed an annual savings of $8,459,000 annually on *Exhibit III-8*.

Exhibit III-7
Dashboard Gas Portfolio $0.21 reservation charge STL pipeline
as of Late 2016 (dollars are in thousands)

MRT Rate Increase	Inc./(Decr.)	
T&S Impact	$5,668	6.0%
Total Portfolio Impact	($2,067)	(0.6%)
No MRT Rate Increase		
T&S Impact	$9,220	10.1%
Total Portfolio Impact	$1,486	0.5%
Removing Propane	($1,000)	
Turnback Sharing	$1,161	*30%*
Total Impact incl. Propane		
MRT Rate Increase		
T&S Impact	$5,829	6.4%
Total Portfolio Impact	($1,906)	(0.6%)
No MRT Rate Increase		
T&S Impact	$9,381	10.3%
Total Portfolio Impact	$1,647	0.5%

Source: Spire Gas portfolio dashboard late 2016

Exhibit III-8
Dashboard Gas Portfolio with Precedent Agreement update
as of January 2017

	LGC Portfolio Cost Impact - $000		
	MRT Rate Increase	Inc./(Decr.)	
	T&S Impact	$3,526	3.6%
	Total Portfolio Impact	($7,414)	(16%)
	No MRT Rate Increase		
	T&S Impact	$8,855	9.7%
	Total Portfolio Impact	($2,085)	(0.5%)
	Removing Propane	($2,000)	
	Turnback Sharing (MRT)	$955	.8%
1			
2			
3	**Total Impact incl. Propane** (No Turnback Sharing)		
4	MRT Rate Increase		
5	T&S Impact	$1,526	1.7%
6	Total Portfolio Impact	($9,414)	(2.1%)
7			
8	No MRT Rate Increase		
9	T&S Impact	$6,855	7.5%
10	Total Portfolio Impact	($4,085)	(0.9%)
11			
12	**Total Impact incl. Propane** (w/Turnback Sharing)		
	MRT Rate Increase		
	T&S Impact	$2,481	2.7%
	Total Portfolio Impact	($8,459)	(1.9%)
	No MRT Rate Increase		
	T&S Impact	$7,810	8.5%
	Total Portfolio Impact	($3,130)	(0.7%)

Source: Spire Gas Portfolio Dashboard January 2017

Finding III-4 **Spire hired Concentric Consulting to develop an economic analysis of the Spire STL pipeline.**

Concentric Consulting Analysis

In July 2017, after the precedent agreement was signed, Concentric developed a hypothetical daily dispatch analysis ("Dispatch Analysis") to compare the potential economic benefits to Spire Missouri East's customers using a gas supply portfolio that includes Spire STL pipeline versus a portfolio comprised of alternatives to Spire STL pipeline.[63]

Using the Dispatch Analysis, Concentric first developed a baseline portfolio cost over the Forecast Period assuming that Spire STL pipeline will replace the existing capacity associated with the propane facility plus current contractual commitments on other pipelines so the that the total contracted citygate deliverability remains the same. In addition, Concentric estimated the cost that would be required for incremental capacity on other pipelines in order to produce a cost to Spire Missouri's customers that was equivalent to or less than the cost of the portfolio with a new pipeline. (referred to as the "Portfolio STL"). In other words, using the Dispatch Analysis, Concentric determined the "price to beat" for incremental capacity on other pipelines to have a portfolio that was less expensive than the portfolio with a new pipeline. The analysis assessed whether it was likely that the other pipeline alternatives would have been a reasonable economic substitute for contracting on a new pipeline. The methodology and assumptions used in Concentric's Dispatch Analysis are discussed in detail in Appendix A of the Concentric report. The cost evaluations were comprehensive and conservative. The following alternatives were evaluated:[64]

Alternative portfolio A: Additional capacity on SSC

In July 2017, Spire Missouri East had multiple contracts with SSC to deliver a total of 30,300 dth/d from SSC's production area to Spire Missouri East's citygate via an 8-inch, approximately 200-mile lateral ("Little Mo") that extends across Missouri to Spire Missouri East's citygate. It is Concentric's understanding that the lateral is currently fully subscribed. Thus, if Spire Missouri East required significant incremental capacity on SSC, the entire 200 miles of the Little Mo lateral would likely need to be looped. Looping 200 miles of pipeline to deliver additional capacity to Spire Missouri, it is not likely that SSC could provide Spire Missouri East the necessary incremental capacity at a cost comparable to Portfolio STL. [65]

The conclusion drawn in the Concentric report for this alternative is, "For both economic and operational reasons, Alternative Portfolio A does not represent a significant improvement compared to Portfolio STL".

Alternative B: Additional capacity on PEPL/MoGas

The Dispatch analysis in the Concentric report showed it was highly unlikely that PEPL and MoGas could provide Spire Missouri East the necessary incremental capacity at rates lower than offered by Spire STL pipeline. In addition, substantial additional distribution infrastructure would be necessary to effectively move the greater supplies delivered to the west side of Spire Missouri East's system to the east side of its distribution system.

The conclusion drawn in the Concentric Report for this alternative is, "For both economic and operational reasons, Alternative Portfolio B does not represent a significant improvement compared to Portfolio STL".

Alternative Portfolio: C Additional Capacity on MoGas

The Dispatch Analysis showed that MoGas would most likely not be able to supply incremental capacity at competitive rates. In addition, it would be difficult for Spire Missouri East to receive significant incremental supplies from MoGas for operational reasons. Substantial additional distribution or pipeline infrastructure would be necessary to effectively deliver to customers significantly greater supplies to the west side of the system.

Therefore, for both economic and operational reasons, Alternative Portfolio C does not represent a significant improvement compared to the Portfolio STL

Alternative D: Additional Capacity on NGPL

The Dispatch analysis showed for economic reasons, this Alternative Portfolio does not represent a significant improvement compared to the Portfolio STL.

Alternative E: Additional Capacity on MRT Main line

The following variations of the supply portfolio using MRT were explored in detail in the Concentric Report:

- Alternative Portfolio E1: Additional Capacity on MRT Mainline alone
- Alternative Portfolio E2: Additional Capacity on MRT Mainline and EGT
- Alternative Portfolio F: Additional Capacity on MRT East
- Alternative Portfolio F1: Additional Capacity on MRT-E and TGC from the south
- Alternative Portfolio F2: Additional Capacity MRT-E and NGPL from the south
- Alternative Portfolio F3: Additional Capacity on MRT-E and TGC from the north
- Alternative Portfolio F4: Additional Capacity on MRT-E and NGPL from the north

The Dispatch analysis showed for economic reasons Alternative Portfolios involving MRT do not represent a significant improvement compared to the Portfolio STL.

In summary, Concentric determined that none of the alternative portfolios evaluated represent a significant economic improvement for Spire Missouri East's customers over the portfolio with Spire STL pipeline. In addition, many of the alternative portfolios evaluated have operational challenges making them not suitable alternatives for the portfolio with Spire STL pipeline.[66]

E. Key Data Presented to the Board Strategy Committee for Approval of the Spire STL Pipeline.

Finding III-5 **Spire Board of Directors were involved in the decision making process throughout this timeframe.**

In October of 2015, Project Gas reported to the Board Strategy committee that the "REX" lateral (to eventually become the Spire STL pipeline) has been identified as a recommended gas supply project, and that ** [redacted] ** have been identified as the final two potential partners in the process. The project was being considered as a JV with these sources.[67] During January of 2016 it was reported to the full Board of Directors that bids have been sent out to three pipeline companies for the construction of the pipeline and that ** [redacted] ** was the leading contender. Discussion highlighted the risks with ** [redacted] ** as a partner, including credit quality. Supply diversity discussions highlighted freeze-offs and earthquake risk as a potential concerns to be mitigated. Later in January it was reported to the Board that negotiations were proceeding with ** [redacted] ** but other alternatives were being considered.

On April 27, 2016, a presentation was made to the Board Strategy Committee requesting approval to build, own and operate 100% of the Spire STL pipeline into the St Louis Market.[68]

Key areas addressed in the presentation were:[69]

- STL Pipeline Team Structure—Organization Chart
- Evaluated multiple approaches to develop, construct and own 100% of STL pipeline.
- Conducted meetings and rated nine Engineering, Procurement, and Construction Management Firms. Request for Proposals to be extended to 4 of 9 firms.
- Conducted meetings with and rated five environmental firms. Requests for proposals will be sent to 3 of the 5 firms
- Identified a FERC expert with over 15 years' experience at FERC as a Project Manager and Outreach Manager to assist with Public and Regulatory Affairs
- ** [redacted] **
- Validation of ** [redacted] ** route with an advanced routing tool (PPRO) which incorporates the latest technology and data sets
- Tallgrass update-proceeding with firm contract on Rockies Express to facilitate deliveries to STL pipeline.
- High level description of pipeline and project parameters
- Business case and sensitivity analysis of capex and shipper rate.
- Future gas portfolio analysis and sensitivity analysis
- Qualitative Rationale for STL pipeline
- Project Timeline
- Resolutions regarding the approval of the construction, 100% ownership and operation of a pipeline to serve eastern Missouri

Finding III-6 Several key benefits were presented during a Board Strategy Meeting.

Key Benefits of the Spire STL Pipeline Presented to the Board Strategy Committee 4/27/16

Non-Financial Benefits for Customers

- Offers more reliable and diverse gate capacity at similar cost
- Modernizes gas supply portfolio
- Removes problematic reliance on propane for peaking
- Provides capacity to support long term load growth in the market
- Creates incremental supply basin diversity, especially access to prolific low cost Marcellus/Utica gas

Future Gas Portfolio savings with Spire STL Pipeline as shown in *Exhibit III-9*

It shows a savings associated with Spire STL Pipeline of $4.494 million per year with no MRT rate increase and $8.046 million assuming an MRT rate increase.

Exhibit III-9
Spire Missouri East Future Portfolio Analysis
as of 4/27/16

LGC Portfolio Cost Impact (@ $0.1850) - $000		
MRT Rate Increase	Inc./(Decr.)	
T&S Impact	$3,035	3.2%
Total Portfolio Impact	($8,404)	(2.6%)
No MRT Rate Increase		
T&S Impact	$6,588	7.2%
Total Portfolio Impact	($4,852)	(1.5%)
Removing Propane	($1,000)	
Turnback Sharing	$1,358	*30%*
Total Impact incl. Propane		
MRT Rate Increase		
T&S Impact	$3,393	3.7%
Total Portfolio Impact	($8,046)	(2.5%)
No MRT Rate Increase		
T&S Impact	$6,946	7.6%
Total Portfolio Impact	($4,494)	(1.4%)

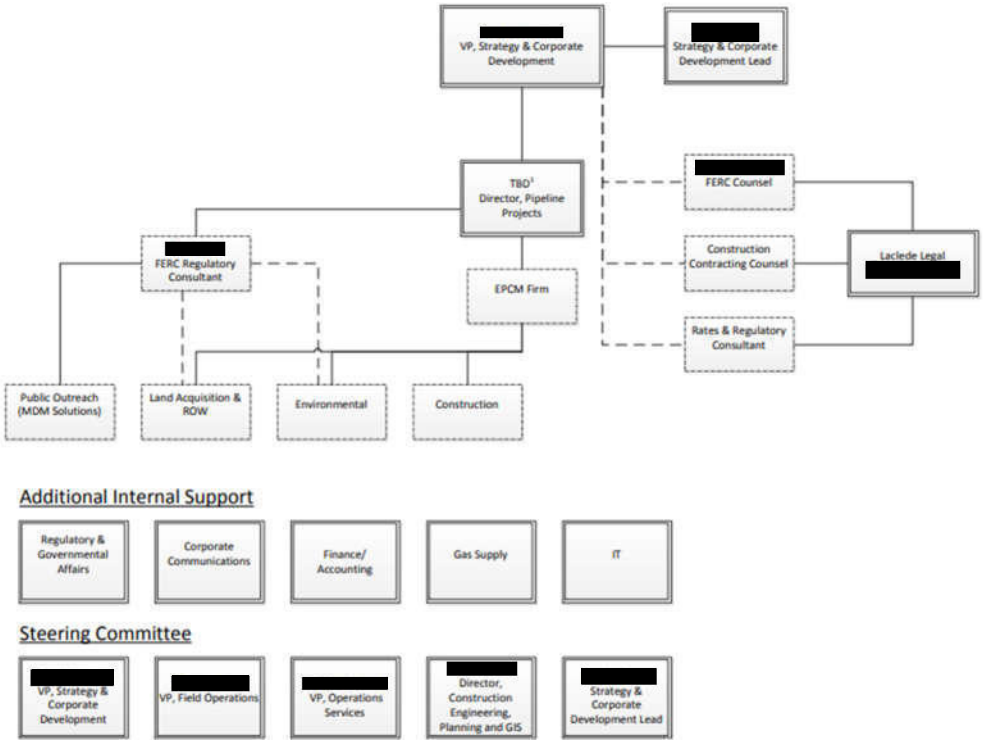
Source: Strategy Committee Deck 4/27/16

Spire STL Organization

The Spire STL Organization was formed early in 2016. The Organization Chart is shown below in *Exhibit III-10*.

Exhibit III-10 (Confidential)
Proposed Spire STL Organization Chart
as of 4/27/16

**



**

Source: Strategy committee presentation deck 4/27/16

Finding III-7 **Key individuals were hired with specific pipeline construction experience to run the project.**

Spire recognized that there is a difference between construction and operations personnel and went to the outside to hire the required skills. Spire STL hired two individuals to fill two key positions in the new organization in July 2016[70]:

- ** [redacted] ** —Director of Pipeline Projects. Mr. ** [redacted] ** provided overall direction and have ultimate responsibility for managing the Spire STL pipeline project. He brought 20 years' experience designing, constructing and managing all phases of pipelines and facilities projects, and had expertise in project management, pipeline and facilities design, project construction estimates and support, field survey solutions, environmental solutions, material and contractor logistics services , and field inspection and commissioning services[71].

- ** [redacted] ** ---Project Consultant Mr ** [redacted] ** served as "Advisor"/engineer for the project. Mr. ** [redacted] ** brought 30 years of experience in the pipeline industry and was well respected for his achievements and expertise relating to all aspects of gas pipeline development projects including specific field expertise for construction in Illinois and Missouri. ** [redacted] ** is not shown on the Organization Chart since he was a consultant

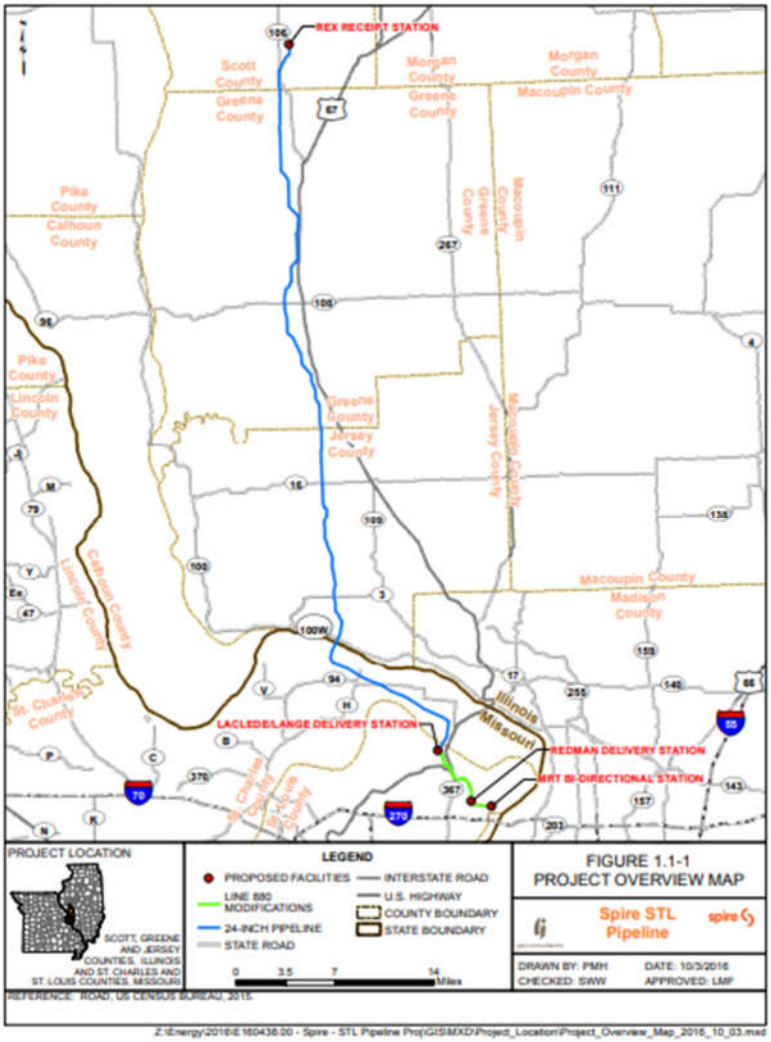
Description of Pipeline Project

The project was described in the *Draft Resource Report 1, October 2016*:

> The proposed Spire STL Pipeline Project ("Project") located in Scott, Greene, and Jersey Counties, Illinois, and St. Charles and St. Louis Counties, Missouri. The Project as proposed will consist of approximately 58 miles of new, greenfield, 24-inch diameter steel pipeline (referred to as the "24-inch pipeline" portion of the Project) originating at an interconnection with the Rockies Express Pipeline LLC ("REX") pipeline in Scott County, Illinois; extending down through Greene and Jersey Counties in Illinois before crossing the Mississippi River and extending east in St. Charles County, Missouri. The 24-inch pipeline then crosses the Missouri River and ties into an existing pipeline in St. Louis County, Missouri that is currently owned and operated by Laclede Gas Company ("LGC") [now Spire Missouri] (referred to as "Line 880"). As part of the proposed Project and subject to LGC's receipt of approval from the Missouri Public Service Commission ("MPSC"), Spire is proposing to purchase Line 880 from LGC and modify the pipeline before placing it into interstate service. Line 880 consists of approximately seven miles of existing 20-inch diameter steel natural gas pipeline located in St. Louis County, Missouri that will connect the 24-inch pipeline part of the Project to the Enable Mississippi River Transmission, LLC ("Enable MRT") pipeline along the western bank of the Mississippi River in St. Louis County, Missouri at the terminus of the Project. The total length of the Project pipelines will be approximately 65.0 miles. The overall design capacity of the Project pipeline is expected to be 400,000 dekatherms per day ("Dth/d"). No compression will be required. The Project will also include the construction of three new metering and regulating ("M&R") station interconnects with REX in Illinois and LGC and Enable MRT in Missouri and the construction of a new facility at an existing LGC site along Line 880.[72]

The original route map is shown below in *Exhibit III-11*.

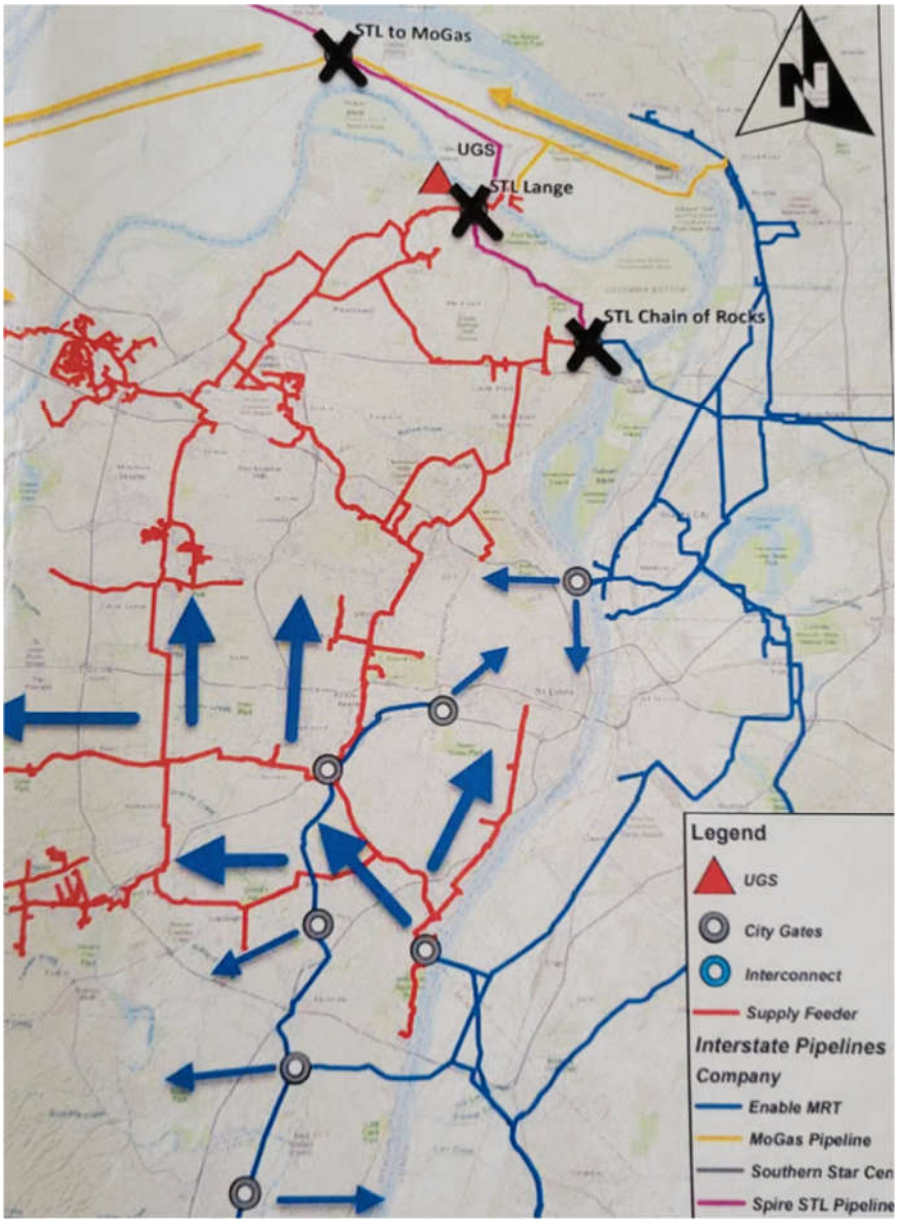
Exhibit III-11
Original STL Pipeline Route
as of October 3,2016



Source: Draft Resource Report 1, October 2016

There was a change to the terminus of the pipeline since this route map was prepared. The current installed terminus is shown on the map *Exhibit III-12*. Presently there are three interconnections at the southern end of the pipeline, STL to MoGas, STL Lange where it interconnects with Spire Missouri East supply feeder system and to the Underground Storage Facility (UGS), and STL Chain of Rocks where it interconnects with Enable MRT pipeline and Spire Missouri East's supply feeder systems.

Exhibit III-12
Current Terminus of STL Pipeline
as of March 1, 2022



Source: Interview #2&3

Pipeline Construction, Regulatory Approvals and Budget

Third-party pipeline developers that participated in the RFP process proposed to construct the pipeline using outside resources. They would have had to contract out 100% of the work related to this project, most likely to the same contractors listed below which would not have resulted in benefit accruing to Spire STL.[73]

Construction

There were three rounds of bidding for the construction of the pipeline in the fall of 2017. In the first round requests for bids were sent out by Spire to seven companies: Michels Corporation, Associated Pipe Line Contractors, Price Gregory International Inc., Rockford Corporation, Welded Construction, Precision Pipeline LLC and US Pipeline. Round 2 eliminated Welded Construction, Precision Pipeline LLC and US Pipeline. Round 3 consisted of negotiations on prices submitted in round 2. Michels Corporation was selected as the prime contractor.[74] The contract was for approximately $200 million.

Other contractors used in the project were:[75]

- Foltz Welding LTD: General Contractor
- Burns and McDonald: Environmental Engineering
- GAI: Environmental Engineering
- MDM: Land Acquisition, Public Affairs, and Regulatory Consultant
- Mott McDonald: Engineering
- Sagebrush Pipeline Equipment: Engineering and Equipment Fabrication
- Lake Superior Consulting: Operating and Maintenance procedures, Transmission Integrity Management Plan and Emergency Plans and Procedures.
- LRS: Farm Drainage; Drain tile Installation
- Farnsworth Group: Engineering
- Cleveland Integrity Services: Inspection
- Shaw Pipeline Services: Non-Destructive Examination, x-ray
- TG Mercer: Logistics
- Big River Pipeline Services: Drain Tile repair
- JD Hair and Associates: Engineering and Construction Monitoring
- Stutz Excavating: Post Construction Clean-up
- Springwater Pipeline Services: Post Construction Clean-up
- Terricon Consultants: Engineering

Construction started in late 2017. In November 2019 Spire requested and FERC authorized Spire to place most of the project facilities into service including the Mainline, North county extension, REX Receipt Station and the Spire

Missouri Lange and Chain of Rocks Delivery Station.[76] This section of the Pipeline was placed into service in November of 2019. Spire requested an extension of time to August 2021 to complete the remaining section to the MRT interconnect. That section was placed into service in the spring of 2020.

Approvals/Permits Required/Received for the Project:

- FERC Federal Energy Regulatory Committee
- U.S.FWS U.S. Fish and Wildlife Service
- USACE U.S. Army Corps of Engineers
- USDA U.S. .Dept. of Agriculture
- IDNR Illinois Dept. of Natural Resources
- ILEPA Illinois Environmental Protection Agency
- ILSHISPO Illinois State Historic Preservation Office
- ILDOA Illinois Dept. of Agriculture
- MDNR Missouri Department of Natural Resourses
- MDOC Missouri Dept. of Conservation
- MSHPO Missouri State Historic Preservation Office

Budget

The budget for the Spire pipeline project was $220 million and was presented to the Strategy Committee on 10/19/16[77] . The final cost came in at $294 million.[78] Most of the overage was due to an increase in construction and labor costs of $63 million primarily due to flooding of the pipeline right of way that caused significant delays and issues with construction. Other services and costs increased by about $10 million primarily driven by legal fees and condemnation.[79]

Finding III-8 **Missouri Ratepayers have been shielded from the cost overruns by a precedent (founders) agreement that was negotiated at the start of the project.**

The overrun of the project cost is not a significant issue for Spire Missouri East or its customers. Spire Missouri East's customers are largely insulated from cost overruns since it had negotiated a reservation rate of $0.23 dth/d with a $0.02 dth/d cap in January 2017[80] which used the $220 budget as guidance. This rate is in effect for 20 years[81] . The maximum rate Spire STL can charge was calculated by FERC at $0.375 dth/d. Spire Missouri's customers are benefiting from a gas transportation rate that is under FERC approved rates.[82]

INTENTIONAL

BLANK

PAGE

IV. Affiliate Relationships and Transactions

A. Affiliate Relationships

Organization of Spire Affiliates

The organization of the Spire and affiliates is shown in *Exhibit IV-1*.[83] Spire Inc. is the holding company with 7 affiliates presented directly below. Three are gas utilities, Spire Alabama Inc., Spire Energy South Inc. and Spire Missouri Inc. Two gas utilities are organized to roll up organizationally to Spire Energy South, those being Spire Gulf Inc. and Spire Mississippi Inc. There is one gas marketing affiliate, Spire Marketing Inc., that markets gas throughout the US. There are several other companies labeled Other Segments in the Affiliate Organization chart, one of which is Spire STL Pipeline LLC, which rolls up organizationally to Spire Midstream LLC, then to Spire Resources LLC, which then rolls up to the Spire Inc. organization. These three companies (Spire STL Pipeline LLC, Spire Midstream LLC, and Spire Resources LLC) roll up to the Spire Inc. organization. These three companies (Spire STL Pipeline LLC, Spire Midstream LLC, and Spire Resources LLC) were created at the same time, when it was determined that Pipeline project would be constructed and operated inside of the Spire organization.[84] (For details on that decision, see *Chapter III* of this report).

Exhibit IV-1
Spire Inc. Corporate Organization
March 1, 2020

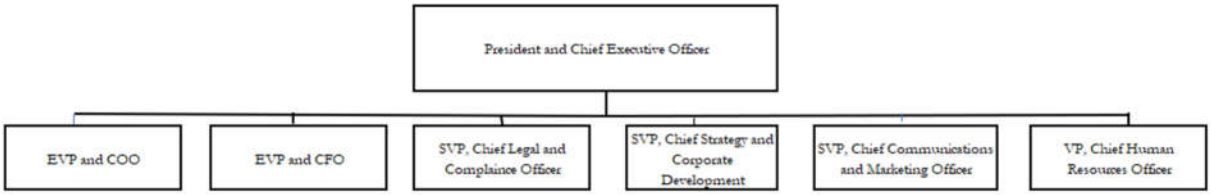
**

**
Source: DR 0036 Current org chart_03.01.2020.pdf

Management Organization at Spire Inc and Spire STL

The Spire organization upper management structure is shown in *Exhibit IV-2*. The president and CEO has 6 direct reports that encompass the management of the Spire companies.[85]

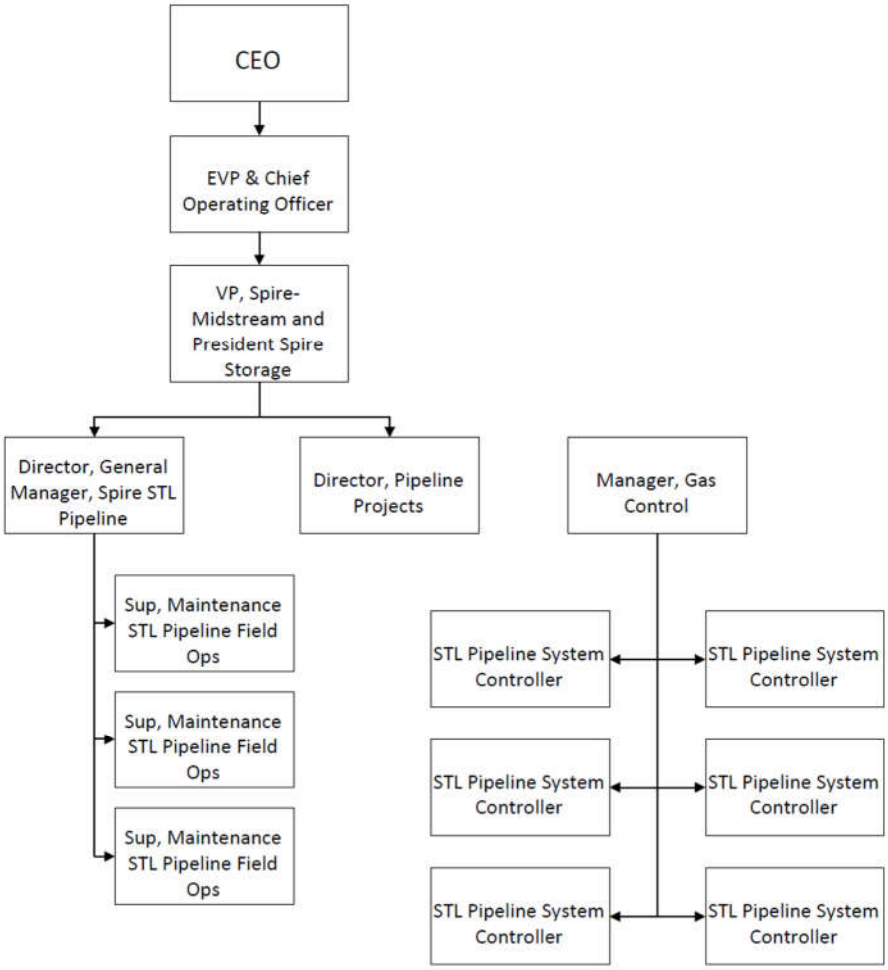
Exhibit IV-2
Spire Upper Management Organization
as of November 30, 2021



Source: Information Response #8, 2021 Report

Spire STL pipeline has its own management structure shown in *Exhibit IV-3*. The Spire STL pipeline organizational structure is focused on operations and maintenance. Supporting services are conducted outside of STL Pipeline, in the shared services area and billed to Spire STL Pipeline according to an affiliate agreement with the services and costs summarized in the Cost Allocation Manual (CAM).[86]

Exhibit IV-3
STL Pipeline Management Organization Chart
as of 2017



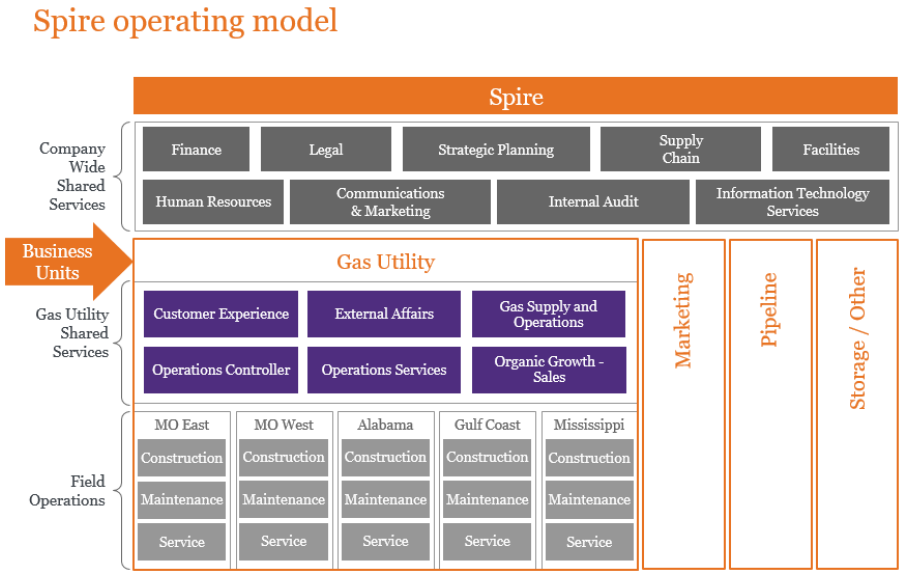
Source: Information Response #41

Spire Operating Model

While the Spire STL pipeline focuses on the operations and maintenance of the pipeline, the supporting business functions for Spire STL are provided by the shared services division. The agreement and guidelines for the shared services are documented in an Affiliate Shared Services

Agreement (see Section A) and with the Cost Allocation Manual (see Section B). A visual depiction of the Spire organization services, and business units is shown *Exhibit IV-4*. Services are provided to Spire affiliates, tracked and billed monthly, per the CAM.[87]

Exhibit IV-4
Spire Inc. Operating Model
March 1, 2020



Source: PMIA Information Response #31

The shared services division is currently embedded in the Spire Missouri regulated entity. However, currently under consideration is the creation of a separate affiliate, specifically for provision of these companywide shared services.[88]

Governing Regulations

The governing regulations for affiliate transactions in Missouri is 20 CSR 4240-40.015, from Chapter 40 Gas Utilities and Gas Safety Standards. The purpose of the rule is stated:[89]

> This rule is intended to prevent regulated utilities from subsidizing their non-regulated operations. In order to accomplish this objective, the rule sets forth financial standards, evidentiary standards and record keeping requirements applicable to any Missouri Public Service Commission (commission) regulated gas corporation whenever such corporation participates in transactions with any affiliated entity (except with regard to HVAC services as defined in section 386.754, RSMo Supp. 1998, by the General Assembly of Missouri). The rule and its effective enforcement will provide the public the assurance that their rates are not adversely impacted by the utilities' nonregulated activities.

In the Governing Regulations section, the rule is broken down into several parts and shown in Exhibits with commentary regarding Spire's Missouri situation and compliance following the exhibit. *Exhibit IV-5* has the first section of the Rules: Definitions.[90]

Exhibit IV-5
Section 1 of the MO Affiliate Rules: Definitions
in effect as of 2022

(1) Definitions.

(A) Affiliated entity means any person, including an individual, corporation, service company, corporate subsidiary, firm, partnership, incorporated or unincorporated association, political subdivision including a public utility district, city, town, county, or a combination of political subdivisions, which directly or indirectly, through one (1) or more intermediaries, controls, is controlled by, or is under common control with the regulated gas corporation.

(B) Affiliate transaction means any transaction for the provision, purchase or sale of any information, asset, product or service, or portion of any product or service, between a regulated gas corporation and an affiliated entity, and shall include all transactions carried out between any unregulated business operation of a regulated gas corporation and the regulated business operations of a gas corporation. An affiliate transaction for the purposes of this rule excludes heating, ventilating and air conditioning (HVAC) services as defined in section 386.754, RSMo by the General Assembly of Missouri.

(C) Control (including the terms "controlling," "controlled by," and "common control") means the possession, directly or indirectly, of the power to direct, or to cause the direction of the management or policies of an entity, whether such power is exercised through one (1) or more intermediary entities, or alone, or in conjunction with, or pursuant to an agreement with, one or more other entities, whether such power is exercised through a majority or minority ownership or voting of securities, common directors, officers or stockholders, voting trusts, holding trusts, affiliated entities, contract or any other direct or indirect means. The commission shall presume that the beneficial ownership of ten percent (10%) or more of voting securities or partnership interest of an entity constitutes control for purposes of this rule. This provision, however, shall not be construed to prohibit a regulated gas corporation from rebutting the presumption that its ownership interest in an entity confers control.

(D) Corporate support means joint corporate oversight, governance, support systems and personnel, involving payroll, shareholder services, financial reporting, human resources, employee records, pension management, legal services, and research and development activities.

(E) Derivatives means a financial instrument, traded on or off an exchange, the price of which is directly dependent upon (i.e., "derived from") the value of one or more underlying securities, equity indices, debt instruments, commodities, other derivative instruments, or any agreed-upon pricing index or arrangement (e.g., the movement over time of the Consumer Price Index or freight rates). Derivatives involve the trading of rights or obligations based on the underlying product, but do not directly transfer property. They are used to hedge risk or to exchange a floating rate of return for fixed rate of return.

(F) Fully distributed cost (FDC) means a methodology that examines all costs of an enterprise in relation to all the goods and services that are produced. FDC requires recognition of all costs incurred directly or indirectly used to produce a good or

service. Costs are assigned either through a direct or allocated approach. Costs that cannot be directly assigned or indirectly allocated (e.g., general and administrative) must also be included in the FDC calculation through a general allocation.

(G) Information means any data obtained by a regulated gas corporation that is not obtainable by nonaffiliated entities or can only be obtained at a competitively prohibitive cost in either time or resources.

(H) Preferential service means information or treatment or actions by the regulated gas corporation which places the affiliated entity at an unfair advantage over its competitors.

(I) Regulated gas corporation means every gas corporation as defined in section 386.020, RSMo, subject to commission regulation pursuant to Chapter 393, RSMo.

(J) Unfair advantage means an advantage that cannot be obtained by nonaffiliated entities or can only be obtained at a competitively prohibitive cost in either time or resources.

(K) Variance means an exemption granted by the commission from any applicable standard required pursuant to this rule.

Source: Information Response #48

Section 1 of the Rules is used for reference going forward, with as the rest of the rule is laid out in this section-by-section format.[91]

Exhibit IV-6
Section 2A1. of the MO Affiliate Rules: Standards, 2A
In effect as of 2022

(2) Standards.

(A) A regulated gas corporation shall not provide a financial advantage to an affiliated entity. For the purposes of this rule, a regulated gas corporation shall be deemed to provide a financial advantage to an affiliated entity if-

1. It compensates an affiliated entity for goods or services above the lesser of-

A. The fair market price; or

B. The fully distributed cost to the regulated gas corporation to provide the goods or services for itself; or

2. It transfers information, assets, goods or services of any kind to an affiliated entity below the greater of-

A. The fair market price; or

B. The fully distributed cost to the regulated gas corporation.

Source: Information Response #48

This portion of the Rules:2A1, shown in *Exhibit IV-6*, focuses on the price that a regulated entity will pay a non-regulated affiliate. Its purpose is to guard against funds following from the regulated entity to the non-regulated entity with the purchase of goods at above market rates. In this case, Spire Missouri East is paying a negotiated rate to Spire STL Pipeline of $0.25 Dth/d which is below the authorized tariff FERC rate of $0.357 Dth/d. Further, the Spire STL Pipeline is allowed a 14% ROE according to its FERC certificate and current filings show that the pipeline ROE is in the range of 8%.[92] Our review

suggests that Spire Inc./Spire STL did not receive a financial advantage from Spire Missouri East in the price Spire Missouri East paid for gas. Spire STL pipeline is a new business for Spire, and Spire Missouri its largest customer, with Spire Missouri East passing on transportation costs to its customers through the purchased gas adjustment.[93]

The second part of this Rule section, Rules:2A2, shown in *Exhibit IV-6*, is not applicable to the Spire Missouri / Spire STL Pipeline situation. Information, assets, goods or services other than gas and shared services (covered above) does not flow from Spire Missouri to Spire STL Pipeline.[94]

Exhibit IV-7
Section 2B-F. of the MO Affiliate Rules: Standards 2B-2F
In effect as of 2022

(B) Except as necessary to provide corporate support functions, the regulated gas corporation shall conduct its business in such a way as not to provide any preferential service, information or treatment to an affiliated entity over another party at any time.

(C) Specific customer information shall be made available to affiliated or unaffiliated entities only upon consent of the customer or as otherwise provided by law or commission rules or orders. General or aggregated customer information shall be made available to affiliated or unaffiliated entities upon similar terms and conditions. The regulated gas corporation may set reasonable charges for costs incurred in producing customer information. Customer information includes information provided to the regulated utility by affiliated or unaffiliated entities.

(D) The regulated gas corporation shall not participate in any affiliated transactions which are not in compliance with this rule, except as otherwise provided in section (10) of this rule.

(E) If a customer requests information from the regulated gas corporation about goods or services provided by an affiliated entity, the regulated gas corporation may provide information about its affiliate but must inform the customer that regulated services are not tied to the use of an affiliate provider and that other service providers may be available. The regulated gas corporation may provide reference to other service providers or to commercial listings, but is not required to do so. The regulated gas corporation shall include in its annual Cost Allocation Manual (CAM), the criteria, guidelines and procedures it will follow to be in compliance with the rule.

(F) Marketing materials, information or advertisements by an affiliate entity that share an exact or similar name, logo or trademark of the regulated utility shall clearly display or announce that the affiliate entity is not regulated by the Missouri Public Service Commission.

Source: Information Response #48

Section 2 B through F, shown in *Exhibit IV-7*, covers preferential treatment given by the regulated to the non-regulated entity in various circumstances. The Schumaker & Company work, interviews, and document review did not indicate any cases or situations where Spire STL Pipeline was treated any differently than another supplier.[95]

Exhibit IV-8
Section 3 of the MO Affiliate Rules: Evidentiary Standards for Affiliated Transaction
In effect as of 2022

(3) Evidentiary Standards for Affiliated Transactions.

(A) When a regulated gas corporation purchases information, assets, goods or services from an affiliated entity, the regulated gas corporation shall either obtain competitive bids for such information, assets, goods or services or demonstrate why competitive bids were neither necessary nor appropriate.

(B) In transactions that involve either the purchase or receipt of information, assets, goods or services by a regulated gas corporation from an affiliated entity, the regulated gas corporation shall document both the fair market price of such information, assets, goods and services and the fully distributed cost to the regulated gas corporation to produce the information, assets, goods or services for itself.

(C) In transactions that involve the provision of information, assets, goods or services to affiliated entities, the regulated gas corporation must demonstrate that it-

1. Considered all costs incurred to complete the transaction;

2. Calculated the costs at times relevant to the transaction;

3. Allocated all joint and common costs appropriately; and

4. Adequately determined the fair market price of the information, assets, goods or services.

(D) In transactions involving the purchase of goods or services by the regulated gas corporation from an affiliated entity, the regulated gas corporation will use a commission-approved CAM which sets forth cost allocation, market valuation and internal cost methods. This CAM can use benchmarking practices that can constitute compliance with the market value requirements of this section if approved by the commission.

Source: Information Response #48

Section 2 B through F, shown in *Exhibit IV-8*, covers the evidence required to be provided by the regulated entity to the Commission to document that the transaction did not benefit the non-regulated entity at the expense of the regulated entity. In the case of Spire Missouri East and Spire STL pipeline, Spire Missouri East determined that need for additional supply and the idea of a spur from an existing pipeline was voiced. After looking at various options, the spur was deemed the best solution and 3 outside companies partnered with Spire Missouri East to take this idea further. Confidentiality agreements were executed, RFPs were issued, responses received and considered, from each of the companies. Good faith negotiations occurred with these companies and in some instances resulted in term sheets with enough information to estimate project costs, risk sharing, and proposed reservation rates for the ultimate product. With this information, Spire Missouri was able to conduct models and run analysis to be sure that this venture would not raise rates to customers and in fact would reduce customer costs after the new pipeline was supplying product as well as providing benefits regarding reliability and supply diversity.[96]

Also, thorough review of the RFPs and negotiations with other pipeline operators indicates that it does not appear that the other parties could have offered this service for a lower rate than that being charged

by STL Pipeline. Regarding the question of a measurement of fully distributed costs for the project, Spire Missouri states: "given that this was a FERC-jurisdictional asset, Spire Missouri East likely could not have developed this project solely on its own. Even assuming Spire Missouri East could have developed this project on its own, its own fully distributed costs would have been substantially the same as those incurred by Spire STL Pipeline."

Please refer to the Staff's memorandum filed simultaneously with this report for further discussion of this section.

Exhibit IV-9
Section 4 of the MO Affiliate Rules: Record Keeping Requirements
In effect as of 2022

(4) Record Keeping Requirements.

(A) A regulated gas corporation shall maintain books, accounts and records separate from those of its affiliates.

(B) Each regulated gas corporation shall maintain the following information in a mutually agreed-to electronic format (i.e., agreement between the staff, Office of the Public Counsel and the regulated gas corporation) regarding affiliate transactions on a calendar year basis and shall provide such information to the commission staff and the Office of the Public Counsel on, or before, March 15 of the succeeding year:

1. A full and complete list of all affiliated entities as defined by this rule;

2. A full and complete list of all goods and services provided to or received from affiliated entities;

3. A full and complete list of all contracts entered with affiliated entities;

4. A full and complete list of all affiliate transactions undertaken with affiliated entities without a written contract together with a brief explanation of why there was no contract;

5. The amount of all affiliate transactions, by affiliated entity and account charged; and

6. The basis used (e.g., fair market price, FDC, etc.) to record each type of affiliate transaction.

(C) In addition each regulated gas corporation shall maintain the following information regarding affiliate transactions on a calendar year basis:

1. Records identifying the basis used (e.g., fair market price, FDC, etc.) to record all affiliate transactions; and

2. Books of accounts and supporting records in sufficient detail to permit verification of compliance with this rule.

Source: Information Response #48

Section 4, shown in *Exhibit IV-9*, covers the Record Keeping Requirements of the Affiliate Rules. The CAM and financial statements from Spire STL Pipeline and Spire Missouri East are just a few examples that support the fact that the Spire companies maintain separate books and records.[97]

Exhibit IV-10
Section 5 – 9 of the MO Affiliate Rules
In effect as of 2022

(5) Records of Affiliated Entities.

(A) Each regulated gas corporation shall ensure that its parent and any other affiliated entities maintain books and records that include, at a minimum, the following information regarding affiliate transactions:

1. Documentation of the costs associated with affiliate transactions that are incurred by the parent or affiliated entity and charged to the regulated gas corporation;

2. Documentation of the methods used to allocate and/or share costs between affiliated entities, including other jurisdictions and/or corporate divisions;

3. Description of costs that are not subject to allocation to affiliate transactions and documentation supporting the nonassignment of these costs to affiliate transactions;

4. Descriptions of the types of services that corporate divisions and/or other centralized functions provided to any affiliated entity or division accessing the regulated gas corporation's contracted services or facilities;

5. Names and job descriptions of the employees from the regulated gas corporation that transferred to a nonregulated affiliated entity;

6. Evaluations of the effect on the reliability of services provided by the regulated gas corporation resulting from the access to regulated contracts and/or facilities by affiliated entities;

7. Policies regarding the availability of customer information and the access to services available to nonregulated affiliated entities desiring use of the regulated gas corporation's contracts and facilities; and

8. Descriptions of, and supporting documentation related to, any use of derivatives that may be related to the regulated gas corporation's operation even though obtained by the parent or affiliated entity.

(6) Access to Records of Affiliated Entities.

(A) To the extent permitted by applicable law, and pursuant to established commission discovery procedures, a regulated gas corporation shall make available the books and records of its parent and any other affiliated entities when required in the application of this rule.

(B) The commission shall have the authority to-

1. Review, inspect and audit books, accounts and other records kept by a regulated gas corporation or affiliated entity for the sole purpose of ensuring compliance with this rule and make findings available to the commission; and

2. Investigate the operations of a regulated gas corporation or affiliated entity and their relationship to each other for the sole purpose of ensuring compliance with this rule.

(C) That this rule does not modify existing legal standards regarding which party has the burden of proof in commission proceedings.

(7) Record Retention.

(A) Records required under this rule shall be maintained by each regulated gas corporation for a period of not less than six (6) years.

(8) Enforcement.

(A) When enforcing these standards, or any order of the commission regarding these standards, the commission may apply any remedy available to the commission.

(9) The regulated gas corporation shall train and advise its personnel as to the requirements and provisions of this rule as appropriate to ensure compliance.

Source: Information Response #48

The last sections of the Rules, sections 5 - 9, shown in *Exhibit IV-10*, covers Records of Affiliate Entities, Access to Records, Record Retention, Enforcement and Training. Through discussions and review of documents we noted that books and records are being maintained by each of the Spire affiliates (Spire STL and Spire Missouri East specifically), and that access was made available.[98]

Gas Sales To / From Affiliates

The Spire CEO is the person in the Spire organization who has common authority over the LDC and marketing affiliates when it comes to gas supply purchases and sales transactions between the utilities and its affiliates. The number of people in the Gas Supply area of Spire Missouri who are involved with the purchased gas or the transportation from or sold gas to transportation to any affiliate is small with limited turnover. Training is provided including the Gas Supply and Transportation Standards of Conduct as well as FERC Affiliate Relations Rules upon entry to the department. Adherence to the applicable affiliated transaction standards and rules and knowledge of the regulatory process at both the state and federal levels and the ability to ensure all actions of the department company with regulations imposed by those entities is an essential job skill for the people in these areas. Additional training occurs periodically, annually for Affiliate Rules training and when deemed necessary for Gas Supply and Transportation Standards. The Regulatory team works closely with the Gas Supply team to ensure compliance and transparency.[99]

FERC Standards of Conduct Training

Training is a critical component of a company's ability to adhere to the FERC Affiliate Relations Rules. The FERC Standards of Conduct (SOC) Training was first given in 2019 and is given every couple of years. The presentation opens with introductions and a "guarantee" statement that SOC questions are always encouraged, and several methods given to contact either within the Spire organization directly or anonymously using a hotline and forbids retaliation against a good faith SOC violation report. Then the SOC framework is summarized into 4 definitions and 4 "Golden Rules": [100]

- 4 key definitions:
  - Transmission Function Employee (TFE)
  - Marketing Function Employee (MFE)
  - No-Conduit Employee (NCE)
  - Prohibited Transmission Function Information
- 4 Golden Rules
  - Independent Function Rules
  - No Conduit Rule
  - Non-Discrimination Rule
  - Transparency Rule

Once the key terms are defined, the training rules are stated and expounded upon, then examples and scenarios for what a violation would look like are presented. The training also specifies what Spire has done logistically to make compliance easier. For example:[101]

1. Access Restrictions on physical facilities:
    a. 700 Market St. St Louis – All STL pipeline personnel at this location are shared services employees; their STL pipeline material is maintained in secure locations that are inaccessible to MFEs and their computers are password-protected.
    b. 800 Market St. St Louis – STL pipeline's Gas Control operations are restricted with key-card protection, a logbook maintained to identify all individuals who enter, and access by MFEs is prohibited (except in special circumstances authorized and supervised by the define acronym SOC CCO).
    c. Spire Houston Office – STL pipeline's commercial group (President and one other commercial manager) maintain all STL pipeline information in secure locations that are inaccessible to MFEs and computers are password protected.
2. Restrictions on other areas:
    a. Information Systems – STL pipeline must ensure that MFEs are not able to access any electronic records of STL pipeline.
    b. Contractors and Consultants – STL pipeline must ensure that any contactors or consultants that fit the definition of TFEs follow the SOC rules and are trained within 30 days of coming on board.
    c. Books and records – All STL pipeline books and records should be protected against disclosure to MFEs (or any other selective disclosure) unless specifically designated as no longer Prohibited TFI (Transmission Function Information)

The training then goes on to call out exceptions to the SOC (emergencies, communications regarding the Affiliate's own request for service, and shipper's voluntary request). With the definitions and exceptions presented, the training then focuses on the SOC rules. Each rule is presented, tips given for compliance, and the SOC enforcement settlements discussed. Lastly various scenarios are presented describing situations where the SOC rules are violated and are not in the course of business operations.[102]

B. Internal Audit

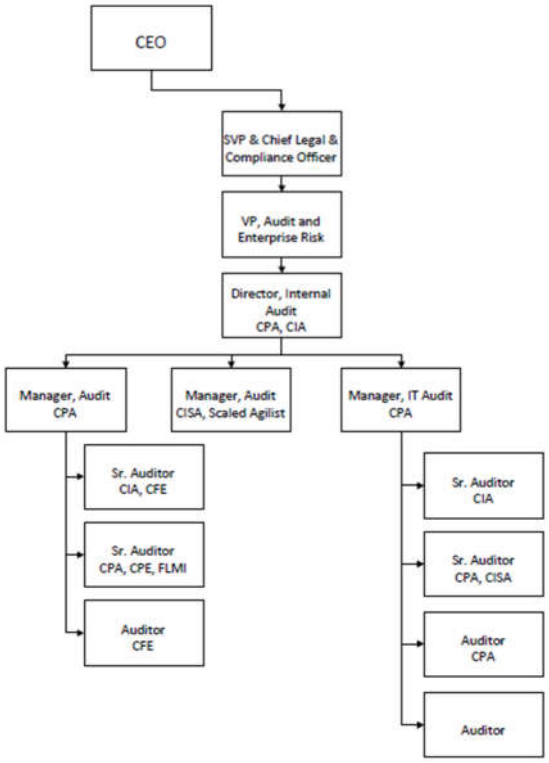
Internal Audit

Internal Audit plays an oversight role for affiliate transactions which are conducted in accordance with the CAM. The CAM and the affiliate transaction processes are audited every three years by internal

audit. Since Internal Audit plays an important in the affiliate transaction process through oversight, the Internal Audit department organization and processes were reviewed.[103]

Internal Audit is organized with the Audit VP reporting through legal to the CEO. It is not unusual for the Audit VP to report to the CFO for all issues or for administrative purposes only. But neither of these organizational structures sets up a conflict as the Internal Audit Department is charged with auditing financial areas as well as other areas through the company. The Audit department is comprised of 12 professionals as shown in *Exhibit IV-11*. The goal of the department is to have all auditors accredited with at least one certification and more are encouraged. Currently five of the department professionals have multiple accreditations.[104]

Exhibit IV-11
Spire Internal Audit Organization
as of February 28, 2022



Source: Information Response IR 50

Audits are well organized, starting with risk planning and creation of the annual audit schedule. When a specific audit begins it starts with the planning phase, moves to client outreach, fieldwork, wrap up and report issuance. Any recommendations in an audit report and tracked and resolved. Workpapers are all electronic and organized using the Galileo tool which has a dashboard for ease of seeing the status of engagements at any time.[105]

Spire Organization

Finding IV-1 **Spire Inc. has created an organization similar to what we have observed at other electric and gas utilities.**

Spire Inc. evolved out of what was previously Laclede Gas Company, which was basically strictly a Natural Gas Local Distribution Company (LDC). As Laclede Gas evolved into Spire Inc., the LDCs (Spire Missouri, Inc, Spire Alabama, Inc., Spire Energy South Inc. including Spire Gulf, Inc. and Spire Mississippi, Inc.) have been organizationally grouped together and the non-regulated entities have been grouped together into a separate organizational group – as shown in *Exhibit IV-1.* Spire STL (a FERC regulated entity) has been located within another organizational group (Spire Midstream, Inc.). There is discussion regarding the establishment of a service company (a shared services organization), although this has not been totally implemented at this time.

Finding IV-2 **The Spire STL pipeline affiliate was created due to anticipated supply need and the absence of a company available that met Spire standards to partner with Spire on this effort.**

At a Board of Director's meeting in April 2016, Spire STL Pipeline Company was created with two other new Spire affiliates. The creation of Spire STL pipeline was the culmination of a process starting in early 2011. In 2011, a 3rd party developer proposed a REX lateral to St Louis and Spire Missouri filed a settlement stipulation with the PSC to interconnect with this pipeline, if constructed. It was never constructed. Sometime in the next couple of years, Spire began looking at other lateral options and spoke with a few potential partners for this project. Later in 2013, Spire created a cross-functional group (Project Gas Assets and Supply, also referred to as Project Gas) to take a fresh look at all Spire gas sources. In early 2015, Project Gas found among other things limited capacity into the citygate relative to peak demand. Soon after this, discussions began with various companies to potentially partner with Spire in a JV to build a St Louis lateral pipeline (see Chapter 2 for details). When the JV options were exhausted, Spire looked at building the pipeline and bringing the needed people in-house to achieve that goal. To further that goal, in April 2016, the Spire STL pipeline affiliate was created.[106]

Finding IV-3 **Shared services division currently resides in the Spire Missouri East organization but is planned to be split out into a separate affiliate.**

The shared services area is currently embedded in the operating company, Spire Missouri, but plans are in place to separate out this division into a separate affiliate which we typically in other large natural gas utilities. Although we understand that plans are in place, there is currently no definitive timeline for when this will be completed.[107]

Finding IV-4 **Spire STL pipeline provides gas transportation services to Spire Missouri at a rate lower than the FERC maximum rate that was established in the precedent agreement whereas services provided to STL pipeline by Spire Missouri are provided at fully distributed cost to STL Pipeline.**

Spire STL pipeline provides gas transportation services for Spire Missouri East. Spire Missouri East is paying a negotiated rate to Spire STL pipeline of $0.25 Dth/d which is below the authorized tariff FERC rate of $0.375 Dth/d. The Spire STL pipeline is allowed a 14% ROE according to its FERC certificate and current filings show that the pipeline ROE is in the range of 8%.[108] [109] Spire STL pipeline can acquire support such as accounting services, human resources, and others from Spire as shown in *Exhibit IV-4*. This arrangement is like our experience with other pipeline companies which have both interstate and local facilities.

Finding IV-5 **The Internal Audits organization is well positioned in Spire, operating with credentialed professionals and is using automation appropriately.**

As shown in *Exhibit IV-11,* the Internal Audit organization reports through the legal organization to the CEO. An alternate configuration used in other organizations has the Internal Audit organization reporting through the financial area and CFO which has the appearance of a conflict of interest due to the fact that a significant number of internal audits are performed in areas that report to the CFO. However, at Spire the organization reports directly to the CEO, through the legal organization, avoiding this potential conflict of interest. Also, the auditors at Spire are appropriately credentialed with one or more certification per auditor for most in the department. Audits are well planned, and automation being used where most appropriate, i.e. with workpaper systems, from engagement planning to conclusion, and recommendation tracking.[110]

Finding IV-6 **Spire is in compliance with the Missouri Affiliate Rules with respect to STL Pipeline.**

Based on all the work performed in the course of this engagement, i.e. interviews, document review and analysis, which is summarized in the Governing Regulations section above, Spire is in general compliance with the Missouri Affiliate Rules.

[1] / Concentric Report 7/17
[2] / Appendix 1 to RFPS30034902200336 REQ NO.: RL122100087 TITLE: Gas Procurement Case Audit, Review, and Testimony Services
[3] / Concentric Report 7/17
[4] / Concentric Report 7/17
[5] / Spire Inc.
[6] / EDF>News and Blogs>for the media> Press release archive
[7] / *Environmental Defense Fund v. Federal Energy Regulatory Commission*, No. 20-1016 (D.C. Cir. 2021 June 22), p. 31.
[8] / *Environmental Defense Fund v. Federal Energy Regulatory Commission*, No. 20-1016 (D.C. Cir. 2021 June 22), p. 5.
[9] / Environmental Defense Fund v. Federal Energy Regulatory Commission, No. 20-1016 (D.C. Cir. 2021 June 22), p. 34.
[10] / US News and world report.com by Associated Press Wire Service Content 10/15/21 at 11:39 a.m.
[11] / *In the Matter of the Determination of In-Service Criteria for the Union Electric Company's Nuclear Plant and Callaway Rate Base and Related Issues* and *In the Matter of Union Electric Company of St. Louis, Missouri, for Authority to File Tariffs Increasing Rates for Electric Service Provided to Customer in the Missouri Service Area of the Company,* Case Nos. EO-85-17 and ER-85-160, March 29, 1985 *Report and Order*, 27 Mo.P.S.C.(N.S.) 183, 194 (1985), quoting *Consolidated Edison Company of New York, Inc*., 45 P.U.R. 4th 331 (1982).
[12] / *In the Matter of the Determination of In-Service Criteria for the Union Electric Company's Nuclear Plant and Callaway Rate Base and Related Issues* and *In the Matter of Union Electric Company of St. Louis, Missouri, for Authority to File Tariffs Increasing Rates for Electric Service Provided to Customer in the Missouri Service Area of the Company,* Case Nos. EO-85-17 and ER-85-160, March 29, 1985 *Report and Order*, 27 Mo.P.S.C.(N.S.) 183, 194 (1985), quoting *Consolidated Edison Company of New York, Inc*., 45 P.U.R. 4th 331 (1982).
[13] / BAFO 01 State of Missouri 10/13/21
[14] / Spire Missouri STL Contracting Decision Timeline
[15] / ** [redacted] **
[16] / Information Request # 42
[17] / Spire Missouri STL Contracting Decision Timeline
[18] / ** [redacted] **
[19] / ** [redacted] **
[20] / ** [redacted] **
[21] / ** [redacted] **
[22] / ** [redacted] **
[23] / Spire Missouri STL Contracting Decision Timeline
[24] / ** [redacted] **
[25] / 4 /20/16 MPSC Presentation Deck
[26] / ** [redacted] **
[27] / ** [redacted] **
[28] / Spire Missouri STL Contracting Decision Timeline
[29] / ** [redacted] **
[30] / Interview# 2&3 and Spire Missouri STL Contracting Decision Timeline
[31] / Spire Missouri STL Contracting Decision Timeline
[32] / Concentric Report 7/17
[33] / Interview # 2&3
[34] / Concentric Report 7/17
[35] / Interview #5&6
[36] / Information Request 51
[37] / Interview # 2&3

[38] / Concentric Report 7/17
[39] / Concentric Report 7/17
[40] / Concentric Report 7/17
[41] / Concentric Report 7/17
[42] / Concentric Report 7/17
[43] / Concentric Report 7/17
[44] / Concentric Report 7/17
[45] / Concentric Report 7/17
[46] / Concentric Report 7/17
[47] / Concentric Report 7/17
[48] / Concentric Report 7/17
[49] / Concentric Report 7/17
[50] / Interview 5&6
[51] / ** [redacted] **
[52] / Concentric Report 7/2017
[53] / Interview #5&6
[54] / Interview 5&6
[55] / Concentric report 7/17
[56] / Concentric report 7/17
[57] / Concentric report 7/17
[58] / Concentric report 7/17
[59] / Concentric Report 7/17
[60] / Concentric Report 7/17
[61] / Interview 5&6
[62] / Concentric Report 7/17
[63] / Ibid
[64] / Ibid
[65] / Ibid
[66] / Concentric report 7/17
[67] / Spire Missouri STL Contracting Decision Timeline
[68] / ** [redacted] **
[69] / ** [redacted] **
[70] / Spire Missouri STL Contracting Decision Timeline
[71] / ** [redacted] **
[72] / Spire Pipeline Draft resource plan
[73] / Interview #9
[74] / Documents Dated 10/17 viewed on 2/9 on site.
[75] / Information request # 43
[76] / FERC document #2020-12235 publication date 6/5/2020
[77] / ** [redacted] **
[78] / Spire STL pipeline LLC Docket No. CP 17-40
[79] / Spire STL pipeline LLC Docket No. CP 17-40
[80] / Spire Missouri STL Contracting Decision Timeline
[81] / Interview #9
[82] / Interview #9
[83] / PMIA Information Response #6
[84] / ** [redacted] **
[85] / PMIA Information Response #8

[86] / PMIA Information Response #41
[87] / PMIA Information Response #31
[88] / Onsite meetings 2-9-22
[89] / Information Response #48
[90] / Information Response #48
[91] / Information Response #48
[92] / Information Response # 58
[93] / Staff's Investigation of Spire STL Pipeline's Application at FERC for a Temporary Certificate to Operate, August 16, 2020, Case No. GO-2022-0022 (EFIS Item No. 2).
[94] / Information Response #48
[95] / Information Response #48
[96] / Information Response #48
[97] / Information Response #8
[98] / Information Response #48 and 2/9/22 onsite interviews
[99] / Information Request Response #20 and 2/9 onsite interviews
[100] / Information Request Response #27
[101] / Information Request Response #27
[102] / Information Request Response #27
[103] / Onsite meeting 2/9/22
[104] / Onsite meeting 2/9/22 and Information Response 50
[105] / Onsite meeting 2/9/22
[106] / Information Response #48 and 2/9 onsite meeting discussion.
[107] / Information Response #48 and 2/9 onsite meeting discussion.
[108] / Information Response #48
[109] / Information Response #58
[110] / Onsite meeting 2/9/22 and Information Response #50

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

In the Matter of Spire Missouri, Inc. d/b/a Spire (East) Purchased Gas Adjustment (PGA) Tariff Filing	)))	**Case No. GR-2021-0127**

AFFIDAVIT OF JOE DE FURIA

STATE OF Florida)
) ss.
COUNTY OF Martin)

COMES NOW Joe De Furia, and on his oath declares that he is of sound mind and lawful age; that he contributed to the foregoing *Report;* and that the same is true and correct according to his best knowledge and belief, under penalty of perjury.

Further the Affiant sayeth not.

Joe De Furia
JOE DE FURIA

JURAT

Subscribed and sworn before me, a duly constituted and authorized Notary Public, in and for the County of Martin, State of Florida, at my office in Stuart, on this 24 day of May, 2022.

Notary Public

NOTARY PUBLIC
JUDYTH MARTINEZ
Notary Public, State of Florida
Commission# GG 345273
My comm. expires June 16, 2023

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

In the Matter of Spire Missouri, Inc. d/b/a Spire (East) Purchased Gas Adjustment (PGA) Tariff Filing	)))	**Case No. GR-2021-0127**

AFFIDAVIT OF MARTHA KING

STATE OF Montana)
) ss.
COUNTY OF Madison)

COMES NOW Martha King, and on ~~his~~ her oath declares that ~~he~~ she is of sound mind and lawful age; that ~~he~~ she contributed to the foregoing *Report;* and that the same is true and correct according to ~~his~~ her best knowledge and belief, under penalty of perjury.

Further the Affiant sayeth not.

Martha J King
MARTHA KING

JURAT

Subscribed and sworn before me, a duly constituted and authorized Notary Public, in and for the County of Madison, State of Montana, at my office in Ennis, on this 23rd day of May, 2022.

LISA KIMMEY NOTARIAL SEAL STATE OF MONTANA
LISA KIMMEY
NOTARY PUBLIC for the
State of Montana
Residing at Ennis, Montana
My Commission Expires
June 08, 2022

Notary Public

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

In the Matter of Spire Missouri, Inc. d/b/a Spire (East) Purchased Gas Adjustment (PGA) Tariff Filing	)))	**Case No. GR-2021-0127**

AFFIDAVIT OF DENNIS SCHUMAKER

STATE OF MI)
) ss.
COUNTY OF Washtenaw)

COMES NOW Dennis Schumaker, and on his oath declares that he is of sound mind and lawful age; that he contributed to the foregoing *Report;* and that the same is true and correct according to his best knowledge and belief, under penalty of perjury.

Further the Affiant sayeth not.

DENNIS SCHUMAKER

JURAT

Subscribed and sworn before me, a duly constituted and authorized Notary Public, in and for the County of Washtenaw, State of MI, at my office in Ann Arbor, on this 20 day of May, 2022.

EMILY DUNN
Notary Public - State of Michigan
County of Washtenaw
My Commission Expires Jul 30, 2027
Acting in the County of Washtenaw

Notary Public

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

In the Matter of Spire Missouri, Inc. d/b/a Spire (East) Purchased Gas Adjustment (PGA) Tariff Filing	)))	**Case No. GR-2021-0127**

AFFIDAVIT OF PATRICIA SCHUMAKER

STATE OF MI)
) ss.
COUNTY OF Washtenaw)

COMES NOW Patricia Schumaker, and on his oath declares that he is of sound mind and lawful age; that he contributed to the foregoing *Report;* and that the same is true and correct according to his best knowledge and belief, under penalty of perjury.

Further the Affiant sayeth not.

patricia schumaker
PATRICIA SCHUMAKER

JURAT

Subscribed and sworn before me, a duly constituted and authorized Notary Public, in and for the County of Washtenaw State of MI, at my office in Ann Arbor on this 20 day of May, 2022.

Notary Public

EMILY DUNN
Notary Public - State of Michigan
County of Washtenaw
My Commission Expires Jul 30, 2027
Acting in the County of Washtenaw