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Case No. EO-2005-0263
Date Testimony Prepared: June 22, 2005

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

DIRECT TESTIMONY

OF

JILL S. TIETJEN

JUNE 2005

" * _____ *" Designates "Highly Confidential" Information.
Such Information Should Be Treated Confidentially
Pursuant To The Protective Order In This Proceeding

AFFIDAVIT

STATE OF COLORADO)
) ss
COUNTY OF ARAPAHOE)

On the 21st day of June, 2005, before me appeared Jill S. Tietjen, to me personally known, who, being by me first duly sworn, states that she is a Self Employed Engineering Consultant and acknowledged that she has read the above and foregoing document and believes that the statements therein are true and correct to the best of her information, knowledge and belief.

Jill S. Tietjen

Subscribed and sworn to before me this 21st day of June, 2005

Notary Public

My commission expires: 1-03-2006

JO ANN DOBSON
NOTARY PUBLIC
STATE OF COLORADO
MY COMMISSION EXPIRES 01/03/2006

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ON BEHALF OF
THE EMPIRE DISTRICT ELECTRIC COMPANY
BEFORE THE
MISSOURI PUBLIC SERVICE COMMISSION

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I. INTRODUCTION

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. Jill S. Tietjen. My business address is 7377 S. Hudson Way, Littleton, Colorado.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am self-employed as an engineering consultant.

Q. PLEASE DESCRIBE YOUR EDUCATIONAL AND WORK BACKGROUND.

A. I graduated from the University of Virginia with a BS in Applied Mathematics (minor in Electrical Engineering) in 1976. I began my career with Duke Power Company and spent five years as a Planning Engineer in the System Planning Department (1976-1981). While at Duke Power Company, I earned my MBA from the University of North Carolina at Charlotte in 1979. I subsequently joined Mobil Oil Corporation's Mining and Coal Division where I worked from 1981-1984 as a planning analyst. I became a registered professional engineer in Colorado in 1982. I joined Stone & Webster Management Consultants in 1984 and by the time I left in 1992 had progressed to Assistant Vice President. I served as Principal and leader of the utility planning practice at Hagler Bailly Consulting during 1992-1995. In 1995, I rejoined Stone & Webster Management Consultants as an Assistant Vice President and office manager for the Denver office, a position that I served in

am currently serving as a member of a team advising the Iowa Utilities Board on matters related to establishing a priori ratemaking principles prior to utility construction of power plants.

Q. WHAT IS THE PURPOSE OF THIS TESTIMONY?

A. My testimony provides background on resource planning. It describes the assumptions used by Empire in examining its resource needs and options for the future. It discusses the resource options available for consideration by Empire. Next, it describes the analysis undertaken by Empire in examining how to meet the electricity needs of its customers due to growth and the expiration of the power purchase agreement with Westar from the Jeffrey Energy Center on May 31, 2010. The results of that analysis are provided as well as a description of the risk analysis undertaken by the company. I then present a discussion of the resource plan selected, itemizing the resources that Empire will use to meet its obligations to provide economic, safe, and reliable power to its customers. My testimony discusses the certificate of public convenience and necessity for Iatan 2 and concludes with a discussion relative to decisional prudence.

II. RESOURCE PLANNING

Q. WOULD YOU PLEASE PROVIDE A DEFINITION OF RESOURCE PLANNING?

A. Resource planning is an identification of the resources that cost effectively and reliably meet the future electric requirements of customers in such a manner as to mitigate risk. Capacity expansion and production costing computer models are used to determine the most cost effective means of using existing and potential new

resources to meet the projected hourly obligations and planning reserve requirements over the planning horizon. Risk analysis and scenario analysis are conducted resulting in an action plan that identifies the preferred portfolio of resources.

Q. IN YOUR OPINION, HOW HAS THE FOCUS OF RESOURCE PLANNING CHANGED OVER THE PAST TWENTY YEARS?

A. In today's uncertain environment, resource plans can no longer only identify "least cost" resources; these plans must explicitly consider risks and uncertainties. Such risks and uncertainties include regulatory policy changes (both at the federal and state level), new environmental regulations (both at the federal and state level), volatility of natural gas and other fuel prices, and requirements to install renewable resources (both at the federal and state level).

Q. WHAT RISKS MUST EMPIRE CONSIDER IN PREPARING ITS RESOURCE PLAN?

A. Empire considered the following risks in preparing its resource plan: 1) timing/availability, 2) capital or acquisition cost, 3) fuel cost, 4) transmission, 5) environmental, 6) regulatory, 7) construction, and 8) financial.

Q. PLEASE PROVIDE AN OVERVIEW OF EMPIRE'S OBJECTIVES IN PREPARING ITS RESOURCE PLAN.

A. Empire's objectives in preparing its resource plan were to identify those resources that would provide economic, safe, and reliable power in such a way as to comply with all environmental standards, to minimize short-term and long-term rate

impacts, to manage and minimize risk, and to maintain investment grade ratings on its debt.

III. ASSUMPTIONS

Q. PLEASE PROVIDE AN OVERVIEW OF THE ASSUMPTIONS REQUIRED IN DEVELOPING A RESOURCE PLAN.

A. A wide array of assumptions are required to prepare a resource plan. These assumptions include the load forecast, fuel price projections, availability and price projections associated with the purchase and sale of energy into the market, and planning reserve criteria. These assumptions are in addition to the technical parameter assumptions required to model existing and future resources including such items as heat rate curves, ramp rates, minimum down times, forced outage rates, and maintenance schedules.

Q. PLEASE PROVIDE INFORMATION ON EMPIRE'S LOAD FORECAST.

A. Empire projects that demand will increase from the 1,014 MW peak load experienced in 2004 (a very mild weather year that reflected a decrease in load from the 1,041 MW peak load experienced in 2003 – a more extreme weather year) to 1,170 MW by 2009 and 1,253 MW by 2012. This represents average annual growth of about 2.3% per year, which is at or slightly above the national average load growth projections for demand growth. Even without any growth in load, Empire will require a new resource in 2010 when its contract with Westar expires as shown in Schedule JST-2.

Q. WHAT LEVELS OF FUEL PRICES WERE USED IN THE ANALYSIS?

A. The fuel price that has the most significant impact on the resource plan results is the natural gas price. The Black & Veatch study assumed a natural gas price in 2005 of $4.24/MMBtu that had escalated to a value of $4.81 by 2010. Natural gas prices starting at 2005 values of $4/MMBtu, $6/MMBtu, and $8/MMBtu were used in the risk analysis to evaluate fuel price risk. Coal prices reflecting current conditions were used for each of the existing coal-fired power plants and for the future resource alternatives examined, escalating at inflation.

Q. HOW DO THE PRICES OF NATURAL GAS COMPARE WITH THE FUTURES PRICES OF NATURAL GAS TODAY ON THE NEW YORK MERCANTILE EXCHANGE (NYMEX)?

A. The futures prices of natural gas change daily on the NYMEX. As of late June 2005, futures prices ranged from a low of $5.90/MMBtu (for May 2010) to a high of $8.91/MMBtu (for February 2006) (see Schedule JST-3). These values start at a higher value than those used in any of the analyses conducted by Empire to date as they never fall below $5.90/MMBtu, and exceed the high value of $8/MMBtu used in the risk analysis.

Q. PLEASE EXPLAIN THE CURRENT AND PROJECTED AVAILABILITY AND PRICE OF POWER IN THE MARKET.

A. The marginal price of power available on the market during peak hours of the day reflects the price of the marginal unit, which for the large majority of the United States is natural gas. Thus, with the natural gas prices projected by NYMEX as displayed in Schedule JST-3, prices of power during peak hours are projected to range upward from a very conservative value of $40/MWh (which assumes natural

gas price energy provided by a combined cycle unit with a 7,500 Btu/kWh heat rate). A more realistic value is $60-70/MWh reflecting power purchased from a natural gas-fired combustion turbine unit. Power is available during the off-peak period at much lower prices, reflecting the availability of coal-fired capacity on the margin in this region of the country.

Q. WHAT LEVEL OF PLANNING RESERVE MARGIN WAS ASSUMED FOR THIS RESOURCE PLANNING ANALYSIS?

A. Empire uses a planning reserve capacity margin criterion of 12%, which is the minimum reserve margin required by the Southwest Power Pool (SPP). Reserve margins are necessary for utilities for two significant reasons. First, extreme temperatures could cause the peak load to be higher than forecast, as actually happened most recently in 2003. Second, equipment breakdowns could mean that one or more generating units are not available at the time of system peak. Some utilities use a 15% level for planning reserve criteria, but this number is not consistent throughout the industry.

IV. RESOURCE OPTIONS AVAILABLE

Q. PLEASE PROVIDE AN OVERVIEW OF THE EXISTING EMPIRE GENERATION SYSTEM.

A. Empire's existing generating resources include coal-fired baseload capacity, natural gas-fired intermediate units, and natural gas-fired peaking generators. Two plants are jointly owned with other investor-owned utilities. In addition, Empire currently purchases power from Westar's Jeffrey Energy Center. This power purchase agreement (PPA) terminates on May 31, 2010. Today, this PPA represents about

11% of Empire's total capacity and provides roughly 20% of Empire's on-system energy.

Q. WHAT IS THE FUEL DIVERSITY PICTURE FOR EMPIRE?

A. Today, about 30% of Empire's energy is supplied by natural gas and the wholesale power market. As early as 2006, Empire anticipates that wind will be providing approximately 9% of its energy requirements. Empire plans to use the wind energy to provide power that would have otherwise been produced by burning natural gas. But by the beginning of 2010, it is anticipated that about 30% of Empire's energy will again be supplied by natural gas and the wholesale power market, although Empire's desired position is that energy from natural gas and the wholesale power market provide no more than 20% of Empire's total energy requirements over the long term (see Schedule JST-4).

Q. PLEASE PROVIDE INFORMATION ON ANY PENDING RETIREMENTS ON THE EMPIRE SYSTEM AND ANY MAJOR EQUIPMENT MODIFICATIONS THAT WILL BE REQUIRED ON EMPIRE'S UNITS.

A. At present, Empire does not plan to retire any of its existing units during the planning horizon. The PPA with Westar for the Jeffrey Energy Center expires on May 31, 2010. Installation of pollution control equipment is now planned for Iatan 1 and Asbury. Empire anticipates that selective catalytic reduction (SCR) for nitrogen oxide (NO_x) control, flue gas desulfurization (FGD or scrubber) for sulfur dioxide (SO_2) control, and a baghouse will be installed at Iatan 1 in 2008. Due to environmental regulations, an SCR will need to be installed at Asbury by 1/1/2009. Empire's current plans call for completion of the Asbury SCR in November 2008.

Q. PLEASE PROVIDE AN OVERVIEW OF THE RESOURCE OPTIONS AVAILABLE TO EMPIRE OVER THE NEXT FIVE TO TEN YEARS.

A. Resource options available to Empire consist of combustion turbines (including the V84) and possible subsequent conversion to a combined cycle unit, participation in jointly-owned coal-fired baseload units (Iatan 2), purchase of power from existing coal-fired units (*_____*), and construction of small coal-fired independently owned units (Asbury 3 and 4). It is possible that independent power projects might be available for Empire to consider.

Q. PLEASE DESCRIBE THE COMBUSTION TURBINE.

A. Combustion turbines are a natural gas-fired, low capital cost resource alternative. They are installed to provide needed reserve margin and are not expected to run for very many hours during the year (possibly only during the highest peak hours) and thus are not expected to provide much energy or burn much natural gas. Empire has been able to locate a distressed unit, available for a discounted price, of 155 MW. This is a brand new, undamaged unit that is distressed only in the sense that the original owner no longer has a use for it and needs to convert it into liquid assets quickly, resulting in a discounted price. This unit is a Siemens Westinghouse V84.3A2 Econopac unit (referred to as the V84 CT) and is currently scheduled for commercial operation at the Riverton generating station in Riverton, Kansas in 2007. If it became economic, this CT could be converted to a combined cycle unit at some point in the future.

Q. PLEASE DESCRIBE IATAN 2.

A. Iatan 2 is a new supercritical coal-fired unit planned by Kansas City Power & Light (KCPL) at the Iatan site in Platte County, Missouri. The unit, expected to be 800-850 MW, is planned for commercial operation in 2010. Possible partners for KCPL include Aquila; Kansas City, Kansas Board of Public Utilities (KCKBPU); Missouri Joint Municipal Electricity Utility Commission (MJMEUC); City Utilities Springfield (CU); Independence; and Westar, in addition to Empire. Although the amount of capacity available to Empire is currently expected to be in the range of 100 MW, a ratio share of the second unit comparable to the ratio share Empire owns of Iatan 1, Empire has expressed a preference to KCPL of being able to participate at a level of 150 MW in Iatan 2.

Q. PLEASE DESCRIBE THE *_____* POWER PURCHASE AGREEMENT (PPA) ALTERNATIVE.

A. *_____

_____

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_____

_____

_____

_____*

Q. PLEASE DESCRIBE ASBURY 3 AND 4.

A. Empire could build new small (85-100 MW) coal-fired units at Asbury where two units are already in operation. These new units would be owned solely by Empire.

Approximate capital costs are *___*/kW for Asbury 3 and *___*/kW for Asbury 4. Although construction time would be shorter for smaller units as compared to the construction time for an 800 MW unit, the per unit cost is higher for smaller units because of the inability to realize as many economies of scale as with larger units.

Q. WHAT RENEWABLE RESOURCES WERE ASSUMED TO BE AVAILABLE TO EMPIRE OVER THE PLANNING HORIZON?

A. Empire has already agreed to purchase wind energy from PPM Energy generated at its Elk-River Windfarm located in Butler County, Kansas under a 20-year contract. Scheduled for commercial operation by the end of 2005, Empire will receive energy from 150 MW of wind turbines once the wind farm has begun operation.

Q PLEASE DESCRIBE THE TRANSMISSION ISSUES THAT EMPIRE CONSIDERED IN THE COURSE OF EXAMINING THESE RESOURCE ALTERNATIVES.

A. Transmission issues are expected to be relatively minimal for the installation of the V84 CT or with the construction of Asbury 3 and 4, as both would be within Empire's service territory. Empire believes that transmission service would be required in order to deliver its ownership share of Iatan 2. To this end, Empire has filed a transmission service request with SPP. * _____

_____

_____*

V. ANALYSIS UNDERTAKEN

Q. PLEASE PROVIDE AN OVERVIEW OF THE ANALYSIS THAT EMPIRE HAS UNDERTAKEN TO EXAMINE ITS RESOURCE OPTIONS.

A. Empire has independently performed or contracted with other parties to perform a wide variety of analyses to examine its resource alternatives. Black & Veatch provided assistance in examining Empire's Generation Expansion Plan in September 2003. Empire has independently performed MIDAS analyses associated with its decision to pursue participation in the Elk-River Windfarm and in conjunction with the financial analysis requested from the rating agency. Standard & Poor's Rating Evaluation Service (S&P) evaluated the financial risks associated with a range of alternative resource plans, specifically evaluating the effects on Empire's financial ratings.

Q. PLEASE PROVIDE AN OVERVIEW OF THE ANALYSIS CONDUCTED BY BLACK & VEATCH AND THE RESULTS OF THE 2003 STUDY.

A. Black & Veatch examined Empire's load forecast, identified future power supply options, and conducted economic and financial analyses as to which resource options were the most economic and the most feasible for Empire to finance given its objectives of minimizing short-term and long-term rate impacts; providing safe, economic and reliable electricity service to its customers while complying with all environmental standards; managing and minimizing risks; and maintaining investment grade ratings on its debt. The conclusions from this analysis were that 1) Empire should install simple cycle combustion turbines in the short term 2) Empire should participate or build approximately 300 MW of coal in the 2010 time frame although this level of capacity addition would put a significant financial strain on Empire, 3) access to combined cycle capacity to the south of Empire's service territory would not be feasible from a transmission standpoint, 4) although

power purchase agreements would reduce Empire's capital requirements, credit downgrades were still possible because of rating agencies' treatment of PPAs, 5) planning for the retirements of Riverton 7 and 8 should be commenced because it will not be financially feasible to install additional environmental control equipment on these units, 6) planning for small coal-fired units to be built on the Empire system should be undertaken as a backup plan in case the other larger jointly-owned projects do not move forward, and 7) Empire should enter into discussions with rating agencies to help influence and understand its future ratings.

Q. WHY IS EMPIRE INTERESTED IN PURSUING PARTICIPATION IN JOINTLY-OWNED UNITS?

A. Participation in jointly-owned units provides Empire the opportunity to benefit from the economies of scale associated with larger units. Empire would be interested in participating in such units unless the cost of the transmission upgrades required offset the economies of scale of the unit versus smaller units located in Empire's service territory.

Q. WHAT EVENTS HAVE TRANSPIRED SINCE THE BLACK & VEATCH ANALYSIS WAS PERFORMED?

A. Many developments have occurred within the energy markets since the time the Black & Veatch study was performed that have direct implications for Empire's resource plan. First and most significantly, natural gas prices have risen dramatically. As I described earlier, the futures prices as of June 20, 2005 are at levels that were outside of or at the very high end of sensitivity analyses conducted earlier, and they are not expected to decrease much over the next several years.

Next, Empire has contracted for 150 MW of wind from the Elk-River Windfarm. Third, * _____ _____* Fourth, KCPL has pursued stipulations and agreements with the Commissions in both Missouri and Kansas to pave the way for construction of Iatan 2 for which Empire has the possibility to participate at the 100-150 MW level. Additionally, Empire has determined that converting Riverton 7 and 8 to natural gas is feasible, when it becomes environmentally necessary, as opposed to retiring them in the near term. However, these units will continue to operate as coal-fired units as long as such operation is environmentally feasible. And, in conformance with the Black & Veatch recommendation of installing combustion turbines to meet short term capacity needs, Empire was able to locate a distressed combustion turbine, the V84 CT, and is now planning to install this unit for service in 2007.

Q. PLEASE DESCRIBE THE MIDAS COMPUTER MODEL.

A. MIDAS is an integrated system dispatch and financial model used for resource planning. It allows the assessment of multiple resource plan scenarios under a range of uncertainties.

Q. PLEASE DESCRIBE THE ANALYSIS UNDERTAKEN BY EMPIRE AND THE RESULTS OBTAINED FROM THAT ANALYSIS.

A. Empire has evaluated a range of scenarios based on the changing market conditions and its need for a resource in the 2010 time frame. Specifically, the MIDAS model was used to model the cases that were provided to S&P for financial evaluation.

Analysis was conducted to examine production costing and financial impacts of each scenario.

Q. PLEASE DESCRIBE THE FINANCIAL ANALYSIS UNDERTAKEN BY S&P AND THE RESULTS OF THAT ANALYSIS.

A. Empire requested S&P to examine the credit rating impacts of its need for resources in the 2010 time frame. In order for S&P to accomplish this, Empire evaluated and provided for analysis to S&P cases that are shown in Table 1.

Table 1
Cases Provided to S&P

Plan	MW	Resource	Year
1	200	Iatan 2	2010
	162	Short-Term Purchase	2010-2014
	90	Long-Term Purchase	2010-2030
	72	New Coal Ownership	2014
	362		
2	200	Iatan 2	2010
	162	Long-Term Purchase	2010-2030
	362		
3	150	Iatan 2	2010
	162	Long-Term Purchase	2010-2030
	50	New CT (FT8)	2015
	362		
4	100	Iatan 2	2010
	162	Long-Term Purchase	2010-2030
	100	Convert V84 to CC	2015
	362		
5	160	Iatan 2	2010
	100	Long-Term Purchase	2010-2030
	100	Convert V84 to CC	2015
	360		

S&P examined each scenario and provided its opinion as to the ratings for corporate credit, senior secured, senior unsecured, and preferred stock. For the cases examined, which in all instances indicated that Iatan 2 and the *_____* were preferred resources, S&P opined that constructive ratemaking will be

necessary to allow Empire both to provide reliable and economic electricity to its customers and to maintain investment grade debt ratings.

Q. HAS ANY ADDITIONAL ANALYSIS BEEN UNDERTAKEN IN SUPPORT OF EMPIRE'S REGULATORY PLAN?

A. Yes, at the request of Empire, Global Energy Decisions has been running the MIDAS CEM model (its capacity expansion module) to provide some additional capacity planning analysis. That analysis has not been completed as of the date that this testimony is being filed. The MIDAS CEM module will be used at such point in time that Empire receives responses to the RFP it plans to issue in the summer of 2005 to examine options for the portion of the "2010" resource that will not be met by Iatan 2.

VI. RISK EVALUATION

Q. WHAT RISKS WERE EXAMINED AS A PART OF THIS RESOURCE PLAN?

A. The risks examined include: 1) timing/availability, 2) capital or acquisition cost, 3) fuel cost, 4) transmission, 5) environmental risks, 6) regulatory, 7) construction, and 8) financial.

Q. PLEASE DESCRIBE THE TIMING/AVAILABILITY RISK.

A. This is the risk associated with whether the resource will actually be constructed or otherwise available at the promised date of commercial operation and how well that particular resource correlates with Empire's need for resources. It also addresses the likelihood that the amount of capacity that Empire desires to have from the resource is proffered.

Q. WHAT OTHER RESOURCES THAT WERE PROPOSED IN THE PAST TEN YEARS HAVE NEVER MATERIALIZED?

A. A number of projects proposed by a wide range of parties have not materialized in the past five to ten years. These include Associated Electric Cooperative, Inc; City Utilities Springfield/Tenaska; LS Power; Oklahoma Gas & Electric; Peabody Energy; and Sand Sage. This performance record causes Empire concern as it looks toward resource options for 2010 that do not come from existing units *_____ _____* or units over which it exerts control (Asbury 3 and 4).

Q. PLEASE DESCRIBE THE CAPITAL OR ACQUISITION COST RISK.

A. This is the risk associated with the level of the capital/acquisition cost itself and whether or not that cost ensures that the resource will be cost effective for Empire to construct or otherwise participate in.

Q. PLEASE DESCRIBE THE FUEL COST RISK.

A. Because the resources being examined are all coal-fired, this risk ends up being associated primarily with location and transportation. The risk indicates whether one location is preferable to another due to the transportation logistics.

Q. PLEASE DESCRIBE THE TRANSMISSION RISK.

A. This risk relates to whether or not transmission is already available, whether or not it can be readily procured, or if it has to be procured or built.

Q. PLEASE DESCRIBE THE ENVIRONMENTAL RISKS.

A. The environmental risk being referred to here is whether or not a particular resource is expected to experience permitting issues that could delay its date of commercial operation.

Q. PLEASE DESCRIBE THE REGULATORY RISKS.

A. This risk recognizes that Empire provides service in multiple jurisdictions and that regulatory regimes are not the same. It is meant to capture locational preferences by regulatory bodies as well as issues related to capital cost recovery for investments in resources.

Q. PLEASE DESCRIBE THE CONSTRUCTION RISKS.

A. Construction risks relate to whether or not the resource will be completed on schedule and within budget.

Q. PLEASE DESCRIBE THE FINANCIAL RISKS.

A. Various resource options will affect Empire's ratings in different manners. This risk factor recognizes the different risks of options and provides a measure of Empire's ability to effectively raise the equity required under alternative resource plans without adversely affecting its credit ratings.

Q. PLEASE PROVIDE AN OVERVIEW OF THE RISK ASSESSMENT METHODOLOGY.

A. Each risk factor was examined for each option and a value was assigned to each risk. These values range from least favorable to most favorable and were designated by symbols:

○ Least Favorable

◔ Less Favorable

◑ Neutral

◕ More Favorable

● Most Favorable

Q. PLEASE DESCRIBE THE RISK ASSESSMENT FOR THE *_____* PPA.

A. *_____

_____

_____

_____

_____

_____*

Table 2
*** * PPA Risk Assessment**

Risk Factor	Risk Assessment	Comments
Timing/Availability	* *	*_____ _____ _____ _____*
Capital or Acquisition Cost	* *	*_____ _____ _____ _____ *
Fuel Cost	* *	*_____ _____*
Transmission	* *	*_____ _____ *
Environmental Risks	* *	*_____ _____ _____ _____ *

Regulatory		* *
Construction Risk	* *	* *
Financial	* *	* *

Q. PLEASE DESCRIBE THE RISK ASSESSMENT FOR IATAN 2.

A. The Iatan site has the lowest delivered fuel costs of any of the options examined and thus shows a Most Favorable in the fuel cost category. Regulatory and capital or acquisition cost risks are More Favorable due to the brownfield site resulting in economies of scale and the fact that the facility will be built in Missouri. Neutral risk categories include transmission, environmental, construction, and financial as the timing and size of the unit are uncertain, transmission is not currently available, regulatory treatment of cost recovery has not been finalized, and KCPL plans to accelerate equipment installation on other units to expedite Iatan 2. Timing/availability is Less Favorable as the date of this unit is quite uncertain.

Table 3
Iatan 2 Risk Assessment

Risk Factor	Risk Assessment	Comments
Timing/Availability	◔	Timing uncertain. Capacity available to Empire uncertain.
Capital or Acquisition Cost	◕	Shared facilities with Iatan 1 lead to economies of scale.
Fuel Cost	●	Lowest coal costs in the region.
Transmission	◑	Network transmission service request placed. Many unresolved questions.

Environmental Risks	◑	To expedite Iatan 2, KCPL plans to accelerate equipment installation at Iatan 1 and LaCygne.
Regulatory	◕	Risk regarding cost recovery; Missouri location should be favored.
Construction Risk	◑	Actual timing and costs could conflict with Commission decision on prudency.
Financial	◑	Dependent on Empire results, MPSC policy, and S&P action.

Q. PLEASE DESCRIBE THE RISK ASSESSMENT FOR ASBURY 3 AND 4.

A. The risks for Asbury 3 and 4 in the More Favorable category include timing/availability and transmission since this facility would be under Empire's control and in its service territory. Many of the risks fall into the Less Favorable category due to the high capital cost for the units and associated issues with cost recovery. The financial risk area received a Least Favorable risk assessment because of the high risk of credit downgrades from the rating agencies due to the high capital costs of the units.

Table 4
Asbury 3 and 4 Risk Assessment

Risk Factor	Risk Assessment	Comments
Timing/Availability	◕	Empire would dictate timing.
Capital or Acquisition Cost	◔	Capital cost high for smaller units – no economies of scale.
Fuel Cost	◔	Coal from Wyoming Powder River Basin.

Transmission	◕	Located within Empire service territory.
Environmental Risks	◔	Some potential air issues.
Regulatory	◔	Issues with cost recovery. MPSC may favor Iatan 2.
Construction Risk	◔	Smaller than typical size, high risks on cost and schedule.
Financial	○	High capital cost cases result in negative rating agency reaction.

Q. WHAT ARE YOUR CONCLUSIONS FROM THE RISK ASSESSMENT?

A. Looking at the three resources on a side-by-side basis, I can conclude that Asbury 3 and 4 represent the most significant risks to Empire. Empire should pursue *___ _____* and take the necessary steps to participate in a second unit at Iatan.

Table 5
Resource Comparison – Risk Profiles

Risk Assessment	***_____* PPA**	**Iatan 2**	**Asbury 3 and 4**
Timing/Availability	*__*	◔	◕
Capital or Acquisition Cost	*__*	◕	◔
Fuel Cost	*__*	●	◔
Transmission	*__*	◑	◕
Environmental Risks	*__*	◑	◔

Regulatory	*__*	◕	◔
Construction Risk	*__*	◑	◔
Financial	*__*	◑	○

VII. PLAN SELECTED

Q. WHAT ARE THE RESOURCES IN THE PLAN THAT WAS SELECTED?

A. The resources in the plan selected include a V84 CT in 2007, and Iatan 2 and *_____ _____* in 2010.

Q. WHY WERE THESE RESOURCES SELECTED?

A. The resources identified fulfill Empire's objectives of providing safe, economic and reliable electric power to its customers while still complying with environmental standards; managing and minimizing risks; minimizing short-term and long-term rate impacts; and maintaining investment grade debt ratings. Resource planning decisions require balancing the many factors that must be considered. No plan will ever be perfect nor least cost in every manner. These resources, however, provide the desired balance.

Q. HOW DOES EMPIRE INTEND TO MINIMIZE THE RISK ASSOCIATED WITH THE RESOURCE OPTIONS IDENTIFIED?

A. Empire intends to monitor the marketplace, maintain contacts with project developers in the area including other electric utilities, and keep its options open with regard to the selection of resources. Empire will keep Asbury 3 and 4 in its "back pocket" so that if Iatan 2 does not move forward satisfactorily, Empire will

still be able to satisfy the demands of its customers for electricity by building these units. Flexibility and adaptability are necessary with the wide range of uncertainty and risk in the marketplace.

VIII. CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY FOR IATAN 2

Q. WHAT DOES EMPIRE SEEK WITH REGARD TO A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY FOR IATAN 2?

A. Empire seeks confirmation from the Commission that it has a certificate to participate in Iatan 2 in an ownership capacity. If, however, the Commission decides that a new certificate is necessary, Empire requests a certificate of public convenience and necessity to construct, install, own, operate, control, manage, and maintain a steam electric generating station in Platte County, Missouri (Iatan 2).

Q. WHAT CERTIFICATE RELATING TO THIS PROJECT DOES EMPIRE HOLD?

A. Empire received a certificate to participate in the Iatan Station in Commission Case No. EM-78-277.

Q. WHAT AUTHORITY WAS PROVIDED TO EMPIRE IN THAT CASE?

A. Empire received a "Certificate of Public Convenience and Necessity to participate in the construction, ownership, operation, maintenance, removal, replacement, control and management of Iatan Station as a tenant in common." *In the matter of the application of Kansas City Power & Light Company, St. Joseph Light & Power Company and The Empire District Electric Company*, Report and Order, 22 Mo.P.S.C. (N.S.) 249 (July 28, 1978).

Q. IS IATAN 2 PART OF THE IATAN STATION?

A. Yes. The original certificate granted to Kansas City Power and Light Company referred to the "Iatan Station" as being a "multi-unit site designed for four generating units to be constructed and operated by KCPL." Case No. 17,895 (November 14, 1973). Iatan 1 was considered to be the first of these units. Iatan 2 is the second unit planned for construction on this site. Empire therefore believes that its existing certificate provides sufficient authority for Empire to participate in Iatan 2 in an ownership capacity.

IX. DECISIONAL PRUDENCE

Q. FOR WHICH MAJOR CONSTRUCTION PROJECTS IS EMPIRE SEEKING DECISIONAL PRUDENCE?

A. In order of their proposed in-service dates, Empire is seeking decisional prudence for the 2007 V84 combustion turbine, environmental retrofits on Iatan 1 scheduled for 2008, installation of an SCR on Asbury scheduled for 2008, and construction of Iatan 2.

Q. WHY IS THE PPA *_____* NOT INCLUDED IN THE DECISIONAL PRUDENCE LIST?

A. To reduce its exposure to natural gas upon the expiration of the current 162-MW Jeffrey purchase power agreement in 2010, Empire will need baseload capacity in addition to Iatan 2. Currently, *_____ _____* is part of Empire's preferred resource plan. However, this PPA has not yet been signed and Empire's evaluation of this option is still continuing. Empire plans to

issue an RFP for this additional 2010 resource, and may seek decisional prudence on this resource after the proper amount of study and due diligence has been performed.

Q. THE BLACK AND VEATCH STUDY RECOMMENDED THE COMBUSTION TURBINE IN 2007. WAS COAL OWNERSHIP OR A COAL PPA EVALUATED FOR THE 2007 CAPACITY?

A. At the time of the Black and Veatch study, a combustion turbine in 2007 was the low cost option. There were no large jointly-owned coal options available for consideration. Empire did issue an RFP for 150 MW of firm baseload or intermediate energy in conjunction with the Black and Veatch study. All of the responses were from resources to the south of Empire's service territory where transmission upgrades were found to be cost prohibitive.

Q. PLEASE DESCRIBE WHY DECISIONAL PRUDENCE IS REQUESTED FOR THE IATAN 1 ENVIRONMENTAL RETROFIT.

A. Iatan 1 was selected by KCPL as their first candidate for environmental retrofits of their existing coal-fired generating units because it represents the largest potential decrease in emissions. Retrofit completion is scheduled for 2008, prior to the effective date of new emissions limitations. Empire is a 12% owner of Iatan 1.

Q. PLEASE DESCRIBE WHY AN SCR IS REQUIRED AT ASBURY BY 2009.

A. Current NO_x regulations require Asbury to be below 0.68 lbs/MMBtu of NO_x emissions during the months of May through September and below 0.86 lbs/MMBtu of NO_x emissions during the months of October through April. Asbury's NO_x emissions are currently 0.65 lbs/MMBtu and 0.80 lbs/MMBtu,

respectively. When the first stage of the Clean Air Interstate Rule (CAIR) becomes effective in January 2009, NO_x emissions will need to be below 0.145 lb/MMBtu in all months. The emission restriction for the second stage of CAIR, which becomes effective in January 2015, is less than 0.12 lbs/MMBtu of NO_x. Empire expects the SCR at Asbury to reduce NO_x emissions by approximately 85%, which will satisfy both stages 1 and 2 of CAIR.

Q. PLEASE DESCRIBE WHY DECISIONAL PRUDENCE IS REQUESTED FOR IATAN 2.

A. Joint ownership in Iatan 2 requires a significant investment by Empire. As stated in Dr. James H. Vander Weide's testimony, a determination of prudence by this Commission regarding Empire's investment plan would assure the financial community that Empire will have a reasonable opportunity to earn a fair rate of return on its proposed capital investments.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

JILL S. TIETJEN

Consulting Engineer

An electrical engineer experienced in electric utility and related planning processes and analyses, primarily in the areas of generation, transmission, and fuels. Experienced expert witness.

EMPLOYMENT CHRONOLOGY

2001 - present	Technically Speaking, Founder and Principal University of Colorado at Boulder, Various Titles Independent Consultant; Senior Engineer, McNeil Technologies Senior Management Consultant, R.W. Beck (since 2003)
1997-2000	University of Colorado at Boulder Director, Women in Engineering Program and Independent Consultant
1995-1997	Stone & Webster Management Consultants, Inc. Assistant Vice President
1992-1995	Principal, Hagler Bailly Consulting (Previously RCG/Hagler Bailly) Boulder, Colorado
1984-1992	Stone & Webster Management Consultants, Inc. Assistant Vice President
1981-1984	Mobil Oil Corporation Planning Analyst, Mining and Coal Division
1976-1981	Duke Power Company Planning Engineer

CONSULTING ASSIGNMENTS

Clean Air

Examined the process used by Big Rivers Electric Corporation to determine that a scrubber should be installed at Henderson Station Two. Presented testimony on the proposed environmental surcharge before the Kentucky Public Service Commission.

Prepared acid rain workshops for company's Utility Management Development Program. Analyzed coal price projections associated with acid rain compliance plans for Illinois Power and the Allegheny Power System. Authored papers on impacts of acid rain legislation.

Cogeneration/Independent Power Production

Managed several projects relating to the efficiency of qualified facilities. One project involved preparation of an affidavit in a Federal Energy Regulatory Commission hearing. Managed an appraisal of an IPP in bankruptcy.

Evaluated fuel contracts - primarily coal and petroleum coke - associated with cogeneration projects in various states. Evaluated steam and power sales contracts as well as operational aspects, avoided cost projections, and transmission issues of projects. Prepared feasibility studies and financial viability analysis.

Assisted Public Service Company of Colorado evaluate the options available with regard to the possible repowering/conversion of the Fort St. Vrain nuclear power plant. Assistance included solicitation and evaluation of potential bidders and preparation of request for proposal.

Competitive Bidding

Managed competitive bidding solicitations for supply-side and/or renewable resources. Projects included RFP and PPA development and evaluations of bids. Clients: Northern States Power, The Empire District Electric Company, San Diego Gas & Electric, SaskPower, and Southwestern Public Service.

Economic Analysis

Investigated the competitive market price for the sale of power from coal-fired, geothermal, and hydroelectric power plants. Performed earnings value evaluations for appraisal evaluations.

Projected levelized annual costs for generating units planned for construction. Analysis included evaluation of fuel costs (including both mine and transportation components), escalation rates, operating and maintenance costs, levelizing factors and appropriate capacity factors.

Expert Testimony

Ms. Tietjen has prepared testimony or affidavits for cases before the Federal Energy Regulatory Commission and before regulatory agencies in the states of Illinois, Kansas, Kentucky, Maine, Missouri, Ohio, South Dakota, and Wyoming. Topics have included fuel procurement practices, policies, and procedures; integrated resource planning; nonutility generation markets; economic dispatch practices; avoided costs; fuel and purchased power expenses; and electric system reliability.

Fuels

Assessed market potential for international coals to various destinations including Egypt and South America. Reviewed the economics of several Australian coals for a power plant in South Australia. Analysis included lignite, subbituminous and bituminous coals under various environmental scenarios.

Analyzed projected fuel costs, supply and availability for coal-fired power plants. Evaluated coal contracts and prepared market assessments.

Generation Planning

Evaluated capacity planning alternatives using several models.

Performed production costing and generation expansion modeling for a wide range of domestic and international utilities.

As project manager, developed and applied a decision methodology to evaluate plant life management option decisions for the gas and oil-fired units in California for the California Energy Commission.

Integrated Resource Planning

Project manager of integrated resource planning studies for Bangor Hydro-Electric, Black Hills Power and Light, and the Empire District Electric Company. Efforts supported with testimony filed in multiple jurisdictions.

Management Audits

Managed fuel practices and policies audits of utilities. Participated in a management audit investigating issues of generation planning. Participated in evaluations of system dispatch practices and procedures.

Mergers/Acquisitions

Evaluated impacts of a proposed merger and later a proposed acquisition for Tri-State Generation and Transmission and Colorado-Ute Electric Association. Areas examined included production costs, power purchases, power sales, and fuel contracts.

Power Pooling

Evaluated power pooling costs and benefits for utilities in Indiana and Ohio. Analysis included centralized dispatch, energy brokering system, and economy interchanges. Examined spinning reserve requirements and fuel impacts of pooling operation.

Pre-Audit Counsel

Helped utilities prepare to undergo management audits. Areas assisted include fuels, purchasing, power production, environmental affairs, gas supply and planning. Assisted in interview training.

Ratemaking Principles

Served as advisor to the Iowa Utilities Board on a priori ratemaking principles for utility construction of electric power generation in Iowa.

Renewable Resources

Served as project manager for assessment of alternative wind technologies for a Midwestern utility. Examined the feasibility and economics of biomass generation for a sawmill in Wyoming, an electric utility in Arizona, a reservation in Minnesota, and a public utilities district in California.

Transmission Planning

Identified potential transmission corridor development in California. Examined related environmental issues. Established an advisory committee composed of utilities, federal and state agencies and special interest groups to facilitate transmission line planning. Evaluated bulk power transmission system issues in California. Examined impacts of Qualifying Facility development in certain areas of the Pacific Gas and Electric and Southern California Edison systems.

Examined the impacts of regional operation on Iowa Power's transmission system. Analyzed associated transmission issues including some MAPP proposals. ENEREX operation and the condition of the Company's 161-kV system.

Participated in audits of transmission and distribution loss calculation practices for Northern States Power and Alberta Power Limited.

Other

Project manager and expert witness for a proceeding in Illinois with regard to a reliability rule proposed by the staff of the Illinois Commerce Commission.

UTILITY BACKGROUND

System Planning

Conducted generation planning studies including production costing and capacity mix analyses using modern computerized planning tools including. Investigated alternative and renewable technologies.

Prepared economic analyses. Examined fuel use requirements. Assisted in fuel budget preparation. Evaluated maintenance scheduling and generation dispatching practices.

Evaluated alternative load control strategies. Studies included cost/benefit analysis and simulation of strategies with examination of resultant impact on utility operations.

Other

Member of McGuire Nuclear Station's Crisis Management Team. Speaker's Bureau. On-campus recruitment.

COAL EXPERIENCE

Fuels

Prepared competitive marketability studies of coals throughout the United States. Examined the competitiveness of U.S. coals in markets outside the country primarily the Pacific Rim and Europe as compared to Australian, South African and Canadian coals. Conducted utilization studies of coals for use in the marketing of coal to a number of U.S. utilities.

Cogeneration

Studies the feasibility of coal-fired cogeneration for enhanced oil recovery at Mobil's facilities in Kern County, California.

Economic Analysis

Assess the economics of various pricing scenarios for coal contracts. Evaluated mining costs and profitability.

OTHER

Strategic Planning

Participated in the development of the five-year strategic plan and associated budgets and justifications for an alternative energy entity.

Marketing

Participated in marketing coal from the Powder River Basin, Wyoming to a wide spectrum of utilities.

AFFILIATIONS

Society of Women Engineers — 1991-92 National President, Fellow.
Georgia Transmission Corporation, Board of Directors, 1997 – present.
Colorado State Board of Registration for Professional Engineers and Professional Land Surveyors, 1996-2004, Chair, 2001-2003.
Institute of Electrical and Electronics Engineers, Power Engineering Society, Senior Member.
International Women's Forum (Colorado), Board of Directors, 1998 – 2000.
Women's Forum of Colorado Foundation, Board of Directors, 1997 - 2000, President, 1998 – 2000.
Rocky Mountain Electrical League Board of Directors, 1994-2002; President, 1999-2000.
Rocky Mountain Electrical League Foundation Board of Directors, 1999-present, Chair, 2002-present.
Girl Scouts – Mile Hi Council Board of Directors, 1999-present, Chair, 2003-present.
Board of Trustees, Arapahoe Library District, 1995-2000, President, 1997 – 1999.
Women in Engineering Programs & Advocates Network - Board of Directors, 1995 – 2001.
Leadership Denver 1996.

HONORS

1990 Certificate of Honor — Colorado Engineering Council.
Listed in *Who's Who in Engineering, Who's Who in Science and Engineering,* and *Who's Who in Technology.*
1991 John E. Daly Award for Consulting Excellence — Stone & Webster Management Consultants.
Soroptomist International Women of Distinction Award, 1995.
Woman of Distinction, Mile Hi Girl Scouts Council, 1997.
IEEE *Spectrum* Advisor of the Year, 2000.
Presidential Citation Award, Professional Land Surveyors of Colorado, 2000,
Woman in Technology Award from the Women's Foundation of Colorado, Subaru, and News4, 2001.
Distinguished Service Award, Society of Women Engineers, 2002.
Horizon Award, Outstanding Professional, The Partnership to Advance Science, Engineering, and Technology, 2003.
Colorado Women's Leadership Coalition, 2004 Woman Leader of Excellence.
Virginia Engineering Foundation, 2004, Distinguished Alumni Award.
Tau Beta Pi, 2004 Distinguished Alumna Award.
One of 50 2004 Trendsetters, *Public Works* Magazine.

EDUCATION AND OTHER

University of Virginia, B.S., Applied Mathematics with a minor in Electrical Engineering, 1976. (Tau Beta Pi, Virginia Alpha).
University of North Carolina at Charlotte, M.B.A., 1979.
Registered Professional Engineering, Colorado.

12/2004

JILL S. TIETJEN

Consulting Engineer

Articles/Speeches

Known as Karen Jill Stein 1954-1976

Known as Jill S. Baylor May 1976-August 1996

Books

1. Quoted in *Members of the Club: The Coming of Age of Executive Women*. 1993. Dawn-Marie Driscoll and Carol R. Goldberg. New York: The Free Press, A Division of Macmillan, Inc.
2. *She Does Math! Real-Life Problems from Women on the Job* (contributing author). 1995. M. Parker, ed. Washington, DC: The Mathematical Association of America.
3. *Keys to Engineering Success*. 2001. Jill S. Tietjen, Kristy A. Schloss, et. al. Upper Saddle River, New Jersey: Prentice Hall. [Brief review in *SWE: Magazine of the Society of Women Engineers*, March/April 2001, p. 4.]
4. *Setting the Record Straight: An Introduction to the History and Evolution of Women's Professional Achievement*. 2001. Betty Reynolds, Ph.D. and Jill S. Tietjen, P.E. Denver, Colorado: White Apple Press.
5. *Setting the Record Straight: The History and Evolution of Women's Professional Achievement in Engineering*. 2001. Betty Reynolds, Ph.D. and Jill S. Tietjen, P.E. Denver, Colorado: White Apple Press.
6. *Setting the Record Straight: The History and Evolution of Women's Professional Achievement in Accounting*. 2005. Betty Reynolds, Ph.D. and Jill S. Tietjen, P.E. Denver, Colorado: White Apple Press.
7. *Setting the Record Straight: The History and Evolution of Women's Professional Achievement in Science*. In press. Betty Reynolds, Ph.D. and Jill S. Tietjen, P.E. Denver, Colorado: White Apple Press.

Technical Reports

1. *RDI's Outlook for Power in the U.S.* (contributing author), Resource Data International, 1998.
2. *Outlook for Power in North America, 1999 Annual Edition* (contributing author), Resource Data International, 2000.
3. *Electric Transmission: Pathway To Power*, Financial Times *Energy*, 2000.
4. Quoted and pictured in the Executive Summary, *Women In Technology Report*, Status of Women and Girls in Colorado, Women's Foundation of Colorado, 2001.

Articles (Technical)

1. "Transmission Loss Evaluation for Electric Systems" (with Martin W. Gustafson). IEEE 87 SM 467-4, *IEEE Transactions on Power Systems*, 3(3):1026-1032.
2. "Considerations in the Formation of Power Pooling Arrangements" (with Leslie A. Buttorff). 1987. *Public Utilities Fortnightly*, November 26.
3. "The Equivalent Hours Loss Factor Revisited" (with Martin W. Gustafson and Steven S. Mulnix). IEEE 88 WM 166-1, *IEEE Transactions on Power Systems*, 3(4):1502-1507.
4. "Operational Losses Savings Attributable to Load Management" (with Martin W. Gustafson). IEEE 88 SM 659-5, *IEEE Transactions on Power Systems*, 4(1):229-235.

5. "Approximating the System Losses Equation" (with Martin W. Gustafson). 1989. IEEE 89 WM 146-2 — PWRS, *IEEE Transactions on Power Systems*, 4(3):850-855.
6. "Power-System Loss Calculations Are Updated" (with Martin W. Gustafson). 1989. *Transmission and Distribution*, November.
7. "Acid Rain Impacts on Utility Plans for Plant Life Extension." 1990. *Public Utilities Fortnightly*, March.
8. "Making New Rules" (with Michael T. Burr, et al.). 1991. *Independent Energy*, July/August.
9. "The Fair Access Debate." 1991. *Independent Energy*. September.
10. "Direct Water Heater Load Control — Estimating Program Effectiveness Using an Engineering Model" (with Martin W. Gustafson and Gary Epstein). February 1993. IEEE 92 WM 130-5 — PWRS, *IEEE Transactions on Power Systems*, 8(1):137-143.
11. Discussion for "Bulk Transmission System Loss Analysis." Nadira, Wu, Maratukulam, Weber, and Thomas (with Martin W. Gustafson). May 1993. IEEE 92 WM 097-6 — PWRS, *IEEE Transactions on Power Systems*, 8(2):414.
12. "Estimating Air Conditioning Load Control Effectiveness Using an Engineering Model" (with Martin W. Gustafson and Gary Epstein). August 1993. IEEE 92 SM 420-0 PWRS, *IEEE Transactions on Power Systems*, 8(3):972-978.
13. "Communicating the Value of Dispatchability for Nonutility Generation Projects" (with D. Cotcher, K.D. Krauss, and D. Logan). January 1995. IEEE 95 WM 123-0 — PWRS, *IEEE Transactions on Power Systems*.

Articles (Nontechnical)

1. "Nuclear Power." 1980. *The Charlotte Observer*, Letter to the Editor, October 16.
2. "Nuclear Power Will Fill Energy Gap." 1980. *The Charlotte Observer*, Letter to the Editor, December 28.
3. "The 'Good Old Days': A Short Course in Appliance History." 1989. *U.S. Woman Engineer*, January/February.
4. "SWE Career-Guidance Programs." 1989. *The Woman Engineer*, SWE Column, April/May, pp. 16-17.
5. "SWE Co-Sponsors Program with NASA." 1989. *Woman Engineer*, Fall, pp. 12-13.
6. "SWE Highlights Women Achievers." 1989/1990. *Woman Engineer*, SWE Column, Winter.
7. "Women Engineers on the Job." 1990. *Engineering Horizons*, Spring.
8. "The SWE Achievement Award." 1990. *Woman Engineer*, SWE Column, Spring.
9. "Newsletter Award." 1990. *U.S. Woman Engineer*, September/October, p. 41.
10. "Break Through The Glass Ceiling." 1991. *Woman Engineer* (SWE Column). Spring.
11. "President's Note: Recognizing Our Achievements." 1991. *U.S. Woman Engineer*. July/August, p. 2.
12. "A Family Business: Opportunities for the Female Entrepreneur." 1991. *U.S. Woman Engineer*, July/August, pp. 23-24.
13. "President's Note: Providing Guidelines for Successful Projects." 1991. *U.S. Woman Engineer*. September/October, p. 3.
14. "President's Note: Awards: Keys to Visibility and Recognition." 1991. *U.S. Woman Engineer*. November/December, p. 2.
15. "Girls are not encouraged to be engineers." 1991. *The Denver Post* (Letter to the Editor). December 29.
16. "President's Note: One Person Can Make a Difference." 1992. *U.S. Woman Engineer*. January/February, p. 2.
17. "We Haven't Come Such a Long Way, Gary." 1992. *Business Week* (Letter to the Editor). January 20.
18. "Stepping Stones to Career Success." 1992. *Careers and the Engineer*, Spring.
19. "Today's society needs engineers of both sexes." 1992. *The Houston Chronicle*, February 27.
20. "Let's stop discouraging girls from careers in engineering and science." 1992. *The Denver Post*, February 29.
21. "President's Note: SWE Enhances Leadership Skills." 1992. *U.S. Woman Engineer*. March/April, p. 3.
22. "Encouraging girls in science, math: Steps are simple, vital." 1992. *The Cincinnati Post*, March 5.
23. "How about 'L.A. Engineer'?" 1992. *The News & Observer*, Raleigh, N.C., March 15.
24. "President's Note: Valuing Diversity." 1992. *U.S. Woman Engineer*. May/June, p. 3.

25. "What I Wish I Had Known When I Graduated from College: Lessons Learned in the Corporate World." 1992. *U.S. Woman Engineer*, November/December.
26. "The Value of Networking." 1993. *U.S. Woman Engineer*, January/February.
27. "Living a Better Life" (with Alexis C. Swoboda). 1993. *U.S. Woman Engineer*, March/April.
28. "The Importance of Networking." 1993. *The Woman in Engineering Program Newsletter* (University of Colorado - Boulder). Fall, page 4.
29. "Women in Motion: Pioneers in Transportation" (with Alexis C. Swoboda). 1994. *SWE Magazine of the Society of Women Engineers*, March/April.
30. "Why is That Woman Wearing a Balloon? Or GET A LIFE!" 1994. *SWE Magazine of the Society of Women Engineers*, May/June, p. 37.
31. "Engineers Can Be Leaders." 1994. *SWE Magazine of the Society of Women Engineers*, November/December.
32. "Turbines do kill raptors, but there's no free lunch." 1994. *The Denver Post*, Letter to the Editor, December 22, 1994.
33. "Admiral Grace Murray Hopper Inducted into National Women's Hall of Fame." 1995. *IEEE Annals of the History of Computing*, Volume 17, No. 1, pp. 59-61.
34. "Women Who Made a Difference: Technological Bridges" (with Alexis C. Swoboda). 1995. *SWE: Magazine of the Society of Women Engineers*, March/April, pp. 16-20.
35. "Snappy Responses to Obnoxious Comments," 1996. *SWE: Magazine of the Society of Women Engineers*, January/February, pp. 23-24.
36. "Steps to Leadership Success," 1996. *SWE: Magazine of the Society of Women Engineers*, May/June, pp. 42-46.
37. "Facilitated Discussion: An Interactive Look at Affirmative Action (with Kristy A. Schloss)," 1996. *SWE: Magazine of the Society of Women Engineers*, July/August, pp. 16-19.
38. "The View Through the Glass Ceiling (with Kristy A. Schloss)," 1996. *SWE: Magazine of the Society of Women Engineers*, September/October, pp. 36-39.
39. "Community Trusteeship," 1997. *SWE: Magazine of the Society of Women Engineers*, May/June, pp. 32-38.
40. "Reporting disappoints," 1997. *The Rocky Mountain News*, Letter to the Editor, July 1.
41. "Choices," 1997. *SWE: Magazine of the Society of Women Engineers*, July/August, pp. 14-15.
42. "Girls need encouraging to learn math, science" 1998. *The Denver Rocky Mountain News*, Letter to the Editor, November 2.
43. "Taking Humor Seriously (with Kristy A. Schloss)," 1999. *SWE: Magazine of the Society of Women Engineers*, May/June, pp. 68-72.
44. "Response to Letter to the Editor, 1999. *SWE: Magazine of the Society of Women Engineers*, September/October, p. 7, 77-79.
45. "Women in Engineering: The Dawn of an Era," *Colorado Engineer Magazine*, Fall 1999, Volume 96, Number 2, pp. 16-19.
46. "Engineering is energizing with WIEP," *Carillon*, January 21, 2000, Diversity Supplement.
47. "All Board Rules Being Overhauled!" *Board News*, Colorado Board of Registration for Professional Engineers and Professional Land Surveyors, Volume XI, April 2000, pp. 1 and 3.
48. "Joy Burns: Businesswoman, Sportswoman, Philanthropist, *Zenith Woman*, Fall 2000, Volume 4, Number 3, p. 28.
49. "Annie Dodge Wauneka: Legendary Mother of the Navajo," *SWE: Magazine of the Society of Women Engineers*, January/February 2001, p. 73.
50. "2001: A SWE Odyssey Invites You to Denver, Colorado," *SWE: Magazine of the Society of Women Engineers*, January/February 2001, pp. 77-79.
51. "2001: A SWE Odyssey Welcomes You to Denver, Colorado," *SWE: Magazine of the Society of Women Engineers*, June 2001, p. 16.
52. "Electronic Signatures & Other Rule Changes," *Board News*, Colorado Board of Registration for Professional Engineers and Professional Land Surveyors, Volume XIII, December 2001, pp. 5 and 7.
53. "End Note," *Virginia Engineering*, Winter 2002, p. 16.

54. "Conferences offer many networking opportunities," *Front Range TechBiz*, April 22-28, 2002, p. 16.
55. "Conferences offer many networking opportunities," *Mass High Tech*, April 22-28, 2002, p. 22.
56. "The FE Exam as an Assessment Tool," 2nd National Conference on Outcomes Assessment for Program Improvement, 2002 ABET Annual Meeting, Pittsburgh, Pennsylvania, November 1, 2002.
57. "GREAT women and their Stories," (with Alexis C. Swoboda, P.E.) *SWE: Magazine of the Society of Women Engineers*, Winter 2003, pp. 16-20.
58. "What is That P.E. After Your Name?" (with Alexis C. Swoboda, P.E.) *SWE: Magazine of the Society of Women Engineers*, Winter 2004, pp. 45-46.
59. "Blazing A Trail To A Utility Career," (with Rebecca Shiflea and Ed Blum) *Public Power*, July-August 2004, pp. 36-37.
60. "Sunset review in Colorado: our story," (with Angeline C. Kinnaird) *Licensure Exchange*, National Council of Examiners for Engineering and Surveying, October 2004, Volume 8, Issue 4, pp. 12-13.
61. "Why So Few Women, Still?" *IEEE Spectrum*, October 2004, pp. 57-58. (précis of article appeared in the *International Engineering Education Digest*, October 2004.)
62. "What is that PE in front [sic] of your name?" (with Alexis C. Swoboda, P.E.) *Colorado Engineer Magazine*, Fall 2004, Volume 101, Number 1, pp. 18-19.
63. "So what does an EAC/ABET engineering degree mean anyway?" *Licensure Exchange*, National Council of Examiners for Engineering and Surveying, February 2005, Volume 9, Issue 1, pp. 10-11.
64. "Turning Hope into a Strategy," (with Mary D. Petryszyn) *SWE: Magazine of the Society of Women Engineers*, Spring 2005, pp. 63-64.
65. "Yes, Engineering Is A Woman's Job," *Electronic Design*, April 14, 2005, www.elecdesign.com/Articles/Print.cfm?ArticleID=10117.

Articles (Featured in)

1. Profiled and pictured in "DAR Presents Good Citizen Awards to Hampton Girls," *Daily Press* (Hampton, Virginia), May 19, 1972, p. 39.
2. Profiled and pictured in "Former Deacon to be Engineer," by Peter Stein and David Mallinson, Hampton High School/Thorpe Junior High School Commemorative Edition (Hampton, Virginia), 1976, p. 7.
3. One of 10 engineers profiled in "What We Wish We Had Known," by Ellen Branddt, *Graduating Engineer*, March 1988.
4. Profiled in "Finding the Right Job," *The Woman Engineer*, Spring 1989.
5. Quoted in article titled "Engineering fails to break sex barriers," by Connie Pryzant, *The Dallas Morning News*, July 31, 1989.
6. Guest Editor, Pictured and biography presented, *U.S. Woman Engineer*, January/February 1990, p. 1.
7. Quoted in article titled "How We're Shortchanging Women Engineers," by George Nobbe, *Graduating Engineer*, February 1990.
8. Quoted in article titled "Nine Career Tips From Top Minority Managers," by Christopher C. Williams, *Graduating Engineer*, April 1990.
9. Quoted in article titled "Networking," by Peggy Schmidt, *Graduating Engineer*, October 1990.
10. Quoted in article titled "Dressing for Engineering Careers," by Courtney S. Susemiehl, *Engineering Horizons*, 1990/1991 Women's Edition.
11. Quoted in article titled "Taking Stock of Your Future," by Adriana Reyneri, *Graduating Engineer*, February 1991.
12. Profiled and pictured in an article titled "Women still rare in engineering," by Caryl Buckstein, *Rocky Mountain News*, May 12, 1991.
13. Profiled and pictured in an article titled "U.Va. Graduate is SWE President-Elect," *Virginia Engineering*, Spring 1991.
14. Pictured and biography presented in, "Meet the 1991-1992 Society President," Society of Women Engineers 1991 National Convention and Student Conference Program – Engineering Our Future Enhancing the Quality of Life, June 24-29, 1991, p. 143.

15. Quoted in an article titled "Salute to Excellence: Computer pioneer receives national recognition," *Around the Fleet*, September 20, 1991, p. 5.
16. Profiled and pictured in an article titled "Baylor Elected President of Engineering Society," *Rocky Mountain Electrical League News*, October 1991, p. 3.
17. Featured in an interview titled "Careers Unlimited," by Kathleen Groll Connolly, *Science and Engineering Horizons*, 1991/92 Women's Edition.
18. Pictured and biography presented in "Highlights From The Denver IRAC" by Gayle Langley, The American Society of Mechanical Engineers – Rocky Mountain Region XII Newsletter, February 1992, pp. 1-2.
19. Featured in an article titled "We Ask You: What is the toughest problem you've ever had to solve?" *Graduating Engineer*, February 1992.
20. Quoted in an article titled "Job Opportunity Barometer," by Valerie Law, *Graduating Engineer*, February 1992.
21. Quoted in an article titled "The Pond Factor," by Mary Ann Castronovo Fusco, *Graduating Engineer*, February 1992.
22. Featured in an article titled "New careers open to women, but overall progress is slow," by William Charland, *Rocky Mountain News*, March 15, 1992.
23. Featured in an article titled "Getting more women into the field of engineering," by William Charland, *Sentinel Enterprise*, Fitchburg, MA, April 2, 1992.
24. Quoted in an article titled "Erasing Gender Stereotypes in Engineering," *Mechanical Advantage*, Spring 1992.
25. Featured in an article titled "Woman blazes a trail in field of engineering," *Journal-Bulletin*, May 11, 1992.
26. Featured in an article titled "Engineers break gender stereotypes," by William Charland, *Seattle Times/Seattle Post Intelligencer*, October 18, 1992.
27. Featured in an article titled "Women Engineers Face Barriers, Opportunities," by Gabrielle Solomon, *National Business Employment Weekly*, February 26-March 4, 1993.
28. Profiled and pictured in an article titled "Baylor appointed to Women's Forum," *Rocky Mountain Electrical League News*, November 1993, p. 3.
29. Quoted and pictured in an article titled "Hopper Inducted in National Women's Hall of Fame," By Anne Perusek, *SWE Magazine of the Society of Women Engineers*, November/December 1994.
30. Quoted and pictured in an article titled "Manufacturing a New Engineer," by Anne Erickson, *Science and Engineering Horizons*, 1994/1995 Women's Edition.
31. Quoted in an article titled "Businesswomen call for accommodation," by Jo'El Roth, *The Denver Business Journal*, March 15-21, 1996, page 9C.
32. Referenced in an article titled "Launching the U.S.S. Hopper," *SWE: Magazine of the Society of Women Engineers*, March/April 1996, p. 13.
33. Pictured and referenced in an article titled "SWE Members Attend Launch of U.S.S. Hopper," *SWE: Magazine of the Society of Women Engineers*, March/April 1996, p. 35.
34. Quoted in an article titled "You'll Go a Long Way Ms. Engineer," by Terry Deal, *Computer and Engineering Horizons - Women's Edition*, 1996-1997, pp. 12-17.
35. Quoted in an article titled "Is an MBA for me?" by Margo Hittleman, *SWE Magazine of the Society of Women Engineers*, September/October 1997, pp. 30-34.
36. Quoted in an article titled "Women engineers: Their impacts aren't cosmetic," by Jack Cox, *The Denver Post*, November 23, 1997, page 8E.
37. Quoted in an article titled "CU engineering grad sees name in lights," *Rocky Mountain News*, May 10, 1998, page 30A.
38. Quoted in an article titled "New Director Expands WIEP Efforts," *CU Engineering*, 1998.
39. Quoted in an article titled "On the Margins? Prof says women scientists face obstacles," by Matt Sprengeler, *Colorado Daily*, December 1, 1998, pp. 1-3.
40. Quoted in an article titled "Women in Engineering Program focuses on taking intimidation out of science," by Danielle Jimenez, *Carillon*, January 15, 1999, Diversity Supplement.

41. Featured and pictured in an article titled "Technical Women on Corporate Boards," by Elizabeth A. Bretz and Linda Geppert, *IEEE Spectrum*, February 1999, pp. 50-56.
42. Quoted in an article titled "CU women engineer their own success," by Danielle Seymour, *Carillon*, April 9, 1999, p. 8.
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45. Quoted in an article titled "Workshop harnesses bundle of energy," by Amy Bounds, *Daily Times Call*, August 8, 1999, p. B1.
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49. Quoted in an article titled "Report: Women discriminated against at CU," by Nadia White, *Daily Camera*, October 6, 1999, p. 1A.
50. Quoted in an article titled "The Congressional Commission on the Advancement of Women and Minorities in Science, Engineering and Technology Development," by Anne Perusek, *SWE: Magazine of the Society of Women Engineers*, November/December 1999, p. 26.
51. Quoted and pictured in an article titled "From the Classroom to the Boardroom," by Paula Lipp, *Graduating Engineer and Computer Careers*, February 2000, pp. 18-23.
52. Quoted and pictured in an article titled "Recollections from the SWE Presidents," *SWE: Magazine of the Society of Women Engineers*, January/February 2000, pp. 38-56.
53. Quoted in article titled "The First Lady of Engineering," by Anne Perusek, *SWE: Magazine of the Society of Women Engineers*, January/February 2000, pp. 82-92.
54. Quoted in an article titled "State draws line on dropping surveying degree," by Dave Curtin, *The Denver Post*, April 7, 2000, p. 2B.
55. Quoted in an article titled "Female execs to join Girl Scouts at camp," by Dahlia, *Denver Rocky Mountain News*, May 2, 2000, p. 14D.
56. Pictured and profiled in an article titled "Meet the movers: Jill Tietjen reinvigorates the women's program at UC-B," by Pru Peterson *Diversity/Careers in Engineering and Information Technology*, April/May 2000, pp. 94-100.
57. Quoted in an article titled "Girls attend career camp," *Golden Transcript*, June 26, 2000.
58. Quoted in an article titled "Teens explore careers at Scouts' Camp CEO," *The Villager*, July 6, 2000.
59. Quoted in an article titled "Why so few female engineering students?" by Katie Ford, *The Denver Business Journal*, July 21-27, 2000, pp. 11A and 14A.
60. Highlighted in an article titled "Wauneka becomes a legend," by Jim Maniaci, *Gallup Independent*, August 28, 2000.
61. Quoted in an article titled "Getting women on board good for business," by Mike Cote, *Sunday Camera*, (Boulder, Colorado), September 17, 2000, p. F1.
62. Quoted in an article titled "Women discuss life in the boardroom," by Lyn Berry *The Denver Business Journal*, September 29 – October 5, 2000, pp. 15A – 18A.
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64. Quoted in an article titled "No-slide Rule," by DeeDee Correll, *The Daily Times-Call* (Longmont, CO), October 15, 2000, pp. F1 and F8.
65. Quoted in an article titled "Mentors sought for women engineering program," *Boulder County Business Report*, October 20, 2000.
66. Quoted in an article titled "Biz leaders headed to camp," by Dahlia, *Rocky Mountain News*, February 27, 2001, p. 14D.

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68. Quoted in an article titled "Getting It Right," by Margaret Mannix, *Prism*, March 2001, pp. 14-20.
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70. Quoted and pictured in an article titled, "Corporate Leaders go to Girl Scouts' Camp CEO," by Rachelle Trujillo, *Zenith Woman*, Spring 2001, pp. 14-15.
71. Quoted, pictured, and profiled in an article titled "50 Years of Leadership" by Jennifer Tarplee, *SWE: Magazine of the Society of Women Engineers*, March/April 2001, pp. 52-56.
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73. Quoted in an article titled "Leaders of Today and Tomorrow Connect at Girl Scout Camp CEO," by Rachelle Trujillo, *The Urban Spectrum*, April 2001, pp. 24-25.
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79. Quoted in an article titled "Teaching From a Clean Slate," by Caitlin Kelly, *IEEE Spectrum*, September 2001, pp. 59-60.
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83. Quoted in an article titled "Women engineers building school's excellence," by Josephine P. Pipkin, *Inside UVa*, February 22, 2002, pp. 4-5.
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92. Highlighted in an article titled "Women in the National Academy of Engineering," by Peggy Layne, P.E. *SWE: Magazine of the Society of Women Engineers*, Winter 2003, pp. 12-14.
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100 Profiled in "Briefcase: Nonprofits," *Denver Business Journal*, June 20-26, 2003, p. A31.
101 Pictured and highlighted in "On The Move," *Rocky Mountain News*, June 27, 2003, p. 8B.
102 Quoted in an article titled "Geeky Girls: Aims program puts projects in hands, minds of girls," by Carl McCutchen, *Greeley Tribune*, July 19, 2003.
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104 Pictured and highlighted in "womentowatch," by Judy Harris, *Colorado Woman News*, September 2003, p. 24.
105 Pictured and highlighted in "Girl Scouts Council Elects Tietjen as Chairperson of Board," SWE – Rocky Mountain Section News, September/October 2003, p. 7.
106 Quoted, pictured, and profiled in an article titled "Amped Up About Electrical Engineering: These Six Women Engineers Power Ahead," by Elizabeth Carlassare, *Woman Engineer*, Fall 2003, pp. 18-21.
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108 Profiled in article titled "Tietjen Awarded Horizon Award for Outstanding Professional," Society of Women Engineers *Rocky Mountain Section News*, November/December 2003, p. 7.
109 Highlighted in the "People" section of *The Bent of Tau Beta Pi*, Winter 2004, p. 48.
110 Pictured and profiled in a job announcement in the *Daily Journal*, December 29, 2003.
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113 Profiled in "Tau Beta Pi Names Jill S. Tietjen, P.E., as 2004 Distinguished Alumna," *Society of Women Engineers Rocky Mountain Section News*, September/October 2004, pp. 3-4.
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Conference Papers (Technical)

1. "Power by Wire — Expectations and Realities," Proceedings of the Sixth Annual Coal Market Strategies Conference — Dynamics of Utility Coal Use, 2:1-21, Denver, CO, November 1-3, 1988. (Awarded one of 10 best papers for 1988 for Stone & Webster employees.)
2. "Wheeling — Issues and Challenges," Proceedings of the 1989 Electric Utility Business Environment Conference and Exhibition, 101-115, Denver, CO, sponsored by Electric Utilities Consultants, Inc. and RCG/Hagler Bailly, Inc., March 28-30, 1989.
3. "Air Quality Concerns: Impacts on Utility Plans for Life Extension of Coal-Fired Power Plants," Proceedings of the Seventh Annual Coal Market Strategies Conference — Utility Coal Use, Acid Rain, and Other Uncertainties, 3:1-16, Denver, CO, sponsored by Edison Electric Institute Western Coal Council, October 26, 1989. (Awarded one of 10 best papers for 1989 for Stone & Webster employees.)
4. "Transmission Pricing Policies and Access," Proceedings of the 1990 Electric Utility Business Environment Conference and Exhibition, 49-55, Denver, CO, sponsored by Electric Utilities Consultants, Inc. and RCG/Hagler Bailly, Inc., March 7-9, 1990.
5. "Analyzing Utility System Losses." Presented at the T&D World Expo '90, March 1990.
6. "Future Electric Generation: Clean Air At What Cost?" Proceedings of the Fifteenth Annual Conference — Issues in Gas, Electricity, and Telecommunications, 5, July 18-20, 1990. (Awarded one of 10 best papers for 1990 for Stone & Webster employees.)
7. "Transmission Access: Who Pays and How?" Proceedings of the Transmission & Wheeling Conference, 61-70, Denver, CO, sponsored by Electric Utilities Consultants, Inc. and Stone & Webster Management Consultants, Inc., November 8-9, 1990.
8. "Open Access." 1990. Power-Gen '90. November.
9. "Plant Life Management Option Selection Decision Methodology" (with David S. Galpin and Roger L. Johnson). 1990. Power-Gen '90. December.
10. "Why Inter-Area Electric Transmission?" (with Fred E. Depenbrock), Proceedings of the American Power Conference, Volume 53-I, 588-591, Chicago, IL, sponsored by the Illinois Institute of Technology, April 1991.
11. "Decision Methodology for Plant Life Management Option Selection" (with David S. Galpin and Roger L. Johnson), Proceedings of the American Power Conference, Volume 53-I, 485-491, Chicago, IL, sponsored by the Illinois Institute of Technology, April 1991. (Awarded one of 10 best papers for 1991 for Stone & Webster employees.)
12. "Transmission Access: Technical and Political Implications" (with Glenn A. Davidson), Proceedings of the 2nd Annual Transmission & Wheeling Conference, 127-134, Denver, CO, sponsored by Electric Utilities Consultants, Inc. and Stone & Webster Management Consultants, Inc., November 21-22, 1991.
13. "New Transmission Lines: Do We Really Need Them?" (with Glenn A. Davidson). Presented at the Strategic Utility Planning Conference, June 25-26, 1992. (Awarded one of 10 best papers for 1992 for Stone & Webster employees.)

14. "Licensing a Coal-Fired Power Plant in the 1990s — A Utility's Success Story" (with Tom Ohlmacher, Douglas M. Logan, Ludwig Funke, and Scott Carpenter). 1993. Power-Gen '93.
15. "Uncertainty Analysis Without Tears" (with Douglas M. Logan). Proceedings of EPRI's Ninth Electric Utility Forecasting Symposium, September 8-10, 1993.
16. "Modeling Renewable Energy Resources in Utility Planning Models" (with Douglas M. Logan, Alan Taylor, and Peter Lilienthal), Proceedings of the National Regulatory Conference on Renewable Energy, 315-329, Savannah, GA, sponsored by the National Association of Regulatory Utility Commissioners, October 3-6, 1993.
17. "Load Forecasting: Ensuring a Solid Foundation for Integrated Resource Planning" (with Douglas M. Logan and Chris Neil), Proceedings of the Electric Systems Planning and Operations Conference, 1-10, Denver, CO, sponsored by Electric Utilities Consultants, Inc., November 11-13, 1993.
18. "Where and Why Coal Will Remain the Big Player," Proceedings of the Natural Gas and Electric Power Industries Conference, Washington, D.C., sponsored by The Institute of Gas Technology, November 11-13, 1996.
19. "Transmission 101: Understanding the Grid," Coal Market Strategies 2001 – Fueling the Nation's Energy Needs: Bridging the Barriers to Future Coal-fired Power," San Antonio, Texas, October 15-17,. 2001.
20. "Integrated Resource Planning in the 21st Century" (with Jacqueline C. Sargent), Rocky Mountain Electrical League 2005 Spring Conference, Albuquerque, NM, May 16, 2005.

Conference Papers (Nontechnical)

1. "Interviewing Skills: Putting Yourself in the Driver's Seat," Proceedings of the Society of Women Engineers' National Convention and Student Conference — Strength Through Diversity: Women & Technology, 313-326, Oakland, CA, June 26-July 2, 1989.
2. "Living A Better Life" (with Alexis C. Swoboda), Proceedings of the Society of Women Engineers' National Convention and Student Conference — Building Tomorrow on Yesterday's Blueprints, 272-278, New York, NY, June 25-July 1, 1990.
3. "Mathematics, Minerals and Molecules" (with Alexis C. Swoboda), Proceedings of the Society of Women Engineers' National Convention and Student Conference — Building Tomorrow on Yesterday's Blueprints, 308-316, New York, NY, June 25-July 1, 1990.
4. "Living A Better Life" (with Alexis C. Swoboda), Conference Record of MIDCON/90, Dallas, TX, sponsored by IEEE and ERA, September 11-13, 1990.
5. "Mathematics, Minerals and Molecules" (with Alexis C. Swoboda), Conference Record of MIDCON/90, Dallas, TX, sponsored by IEEE and ERA, September 11-13, 1990.
6. "Women in Engineering and Science: The Limited Past, A Limitless Future" (with Alexis C. Swoboda), Proceedings of the Society of Women Engineers' National Convention and Student Conference — Engineering Our Future: Enhancing the Quality of Life, San Diego, CA, June 24 29, 1991.
7. "Mathematics, Minerals and Molecules" (with Alexis C. Swoboda), Proceedings of the Ninth International Conference of Women Engineers and Scientists, University of Warwick, United Kingdom, July 14-20, 1991.
8. "Space: Women Challenge the Final Frontier" (with Cynthia Hesse), Proceedings of the Society of Women Engineers' National Convention and Student Conference — Space Challenges: Earth and Beyond, J:4-8, Orlando, FL, June 22-27, 1992.
9. "Women in Motion: Pioneers in Transportation" (with Alexis C. Swoboda), Proceedings of the Society of Women Engineers' National Convention and Student Conference — Gear Up 2000, Women in Motion, 312-316, Chicago, IL, June 21-27, 1993.
10. "Women Who Made a Difference: Technological Bridges" (with Alexis C. Swoboda), Proceedings of the Society of Women Engineers' National Convention and Student Conference — Engineering: A Bridge Into the 21st Century, 69-74, Pittsburgh, PA, June 22-26, 1994.

11. "Facilitated Discussion: An Interactive Discussion on Affirmative Action (with Kristy A. Schloss)," Proceedings of the Women in Engineering Programs Advocates Network Conference — Capitalizing on Today's Challenges, 263-267, Denver, CO, June 1-4, 1996.
12. "Steps to Leadership Success," Proceedings of the Women in Engineering Programs Advocates Network Conference — Capitalizing on Today's Challenges, 9-14, Denver, CO, June 1-4, 1996.
13. "Women Engineers Bridging The Gender Gap (with Betty Reynolds, Ph.D.)," Proceedings of the 1999 International Symposium on Technology and Society – Women and Technology: Historical, Societal, and Professional Perspectives," 206-210, New Brunswick, New Jersey, July 29-31, 1999.
14. "Designing Engineering and Science Education for the 21st Century (with Suzanne Franks, Ph.D., Richard Gallagher, Ph.D., Jeff Wright, Ph.D., and Jane Z. Daniels, Ph.D.)," Proceedings of the Women in Engineering Programs & Advocates Network Conference – Second Stage Transformations: Creating a New Vision in the.21st Century, 93-98, Washington, DC, June 25-27, 2000.
15. "Integrated Utilities Engineering-Management M.S. Program (with F.S. Barnes, E.F. Fuchs, J. Silverstein, H-Y Ko, T. Lookabaugh, T. Brown, D.C. Sicker)," IEEE Power Engineering Society 2004 General Meeting, Denver, CO, June 7, 2004.
16. "Integrated Utilities Engineering Management M.S. Program (with F.S. Barnes, E.F. Fuchs, J. Silverstein, H-Y Ko, T. Lookabaugh, T. Brown, D.C. Sicker)," 37th Annual Frontiers of Power Conference, Stillwater, OK, October 25-26, 2004.

Technical Presentations

1. "The Mechanical Performance of Polyglycolic Acid Sutures." Presented to the Virginia Academy of Science, May 1975.
2. "Mechanical Performance of Surgical Sutures." Presented at the American Society of Mechanical Engineers Regional Student Conference, March 1976. (Awarded second place.)
3. "How to Evaluate Utility Staff Resource Plans" (with Martin W. Gustafson). Presented to the California Municipal Utilities Association, February 1987.
4. "Geothermal Project Development and Management Market Analysis," (with Leslie A. Buttorff), presented to the Geothermal Resources Council as part of a short course, Sparks, NV, October 9-10, 1987.
5. "Transmission Access and Wheeling." Presented at the Rocky Mountain Electrical League Spring Conference, May 1990.
6. "Engineering and Rate Making Fundamentals," Power Transmission: Access, Pricing and Regulation, San Francisco, CA, presented to Infocast, Inc., September 23, 1991.
7. "Coal Issues and Electric Fuel Management." Stone & Webster Management Consultants' annual Utility Management Development Program, Annual lecture, 1986-1992.
8. "Natural Gas and Coal: Competition or Cooperation?" Presented at Denver Coal Club. February 11, 1993.
9. "Where are We and How Did We Get There?" 32nd Annual Paul D. Scholz Symposium on Technology and Its Role in Society, University of Iowa, Iowa City, Iowa, April 5, 2001.
10. "What is Happening in California?" Englewood (Colorado) Lions Club, Englewood, CO, June 19, 2001.
11. "Powering Our Future," Boulder Rotary Club, Boulder, CO, January 4, 2002.
12. "Electrical Power in 2004 and Beyond, Sharkey, Howes & Javer, Inc., Denver, CO, May 12, 2004.
13. "Blackouts, Wind Turbines and Coal: Where is the Power in Your Future?" IEEE and SWE, Clemson University, Clemson, SC, October 6, 2004.

Nontechnical Presentations

<u>"Steps to Leadership Success" or "Steps to Personal Success":</u>

1. Keynote address, Society of Women Engineers' Region J regional conference, Portland, Oregon, October 7, 1995.
2. Society of Women Engineers' Region I student conference, University of Missouri - Columbia, February 3, 1996.

3. Society of Women Engineers' Region I student conference, University of Colorado - Boulder, February 22, 1997.
4. Society of Women Engineers National Convention and Student Conference — The Road to Southwestern Enchantment, Albuquerque, New Mexico, June 25, 1997.
5. Mechanical Engineering Technology class, Metro State College, Denver, Colorado, October 10, 1997.
6. Society of Women Engineer's Region I student conference, University of Tulsa, Tulsa, Oklahoma, February 21, 1998.
7. Society of Women Engineers National Convention and Student Conference — Diversity: Look How Far We've Come, Houston, Texas, June 18, 1998.
8. Pike's Peak Section, Society of Women Engineers, Awards Banquet, Colorado Springs, Colorado, July 18, 1998.
9. Metropolitan State College Mechanical Engineering Technology Project Management Class, Denver, Colorado, September 25, 1998.
10. Virginia Tech Society of Women Engineers, Blacksburg, Virginia, October 1, 1998.
11. University of Wyoming Society of Women Engineers, Laramie, Wyoming, January 27, 1999.
12. Technical Careers Institute, Society of Women Engineers, New York, New York, April 21, 1999.
13. Keynote Speaker, Transformations Graduation Ceremony, Higher Education and Advanced Technology Center, Denver, CO, August 18, 1999.
14. Gill Leadership Conference: Making Dilbert's World Diverse, Boulder, Colorado, April 8, 2000.
15. National Council of Examiners for Engineering and Surveying, Western Zone Meeting, Grand Junction, Colorado, May 20, 2000.
16. Society of Women Engineers National Conference – Beyond 2000: Exploring Perspectives, Washington, DC, June 29, 2000.
17. Society of Women Engineers, Santa Clara Valley Section, Keynote Address, Palo Alto, California, October 18, 2000.
18. Society of Women Engineers, Region J Conference – The Global Workplace in the New Millennium, Keynote Address, Boise, Idaho, October 21, 2000.
19. Duke University, Society of Women Engineers, Durham, NC, November 1, 2000.
20. Girl Scouts – Mile Hi Council, Denver, CO, January 24, 2001.
21. American Indian Science and Engineering Society Region III Conference, Denver, CO, April 6, 2001.
22. Keynote Speaker, Girls in the Middle Conference, La Junta, CO, April 7, 2001.
23. Keynote Speaker, Girl Scouts – Mile Hi Council Silver & Gold Celebration, Denver, CO, April 30, 2001.
24. Keynote Speaker, Society of Women Engineers, Sierra Foothills Section Tenth Anniversary Banquet, Folsom, California, May 12, 2001.
25. Public Seminar, Mississippi State University, Starkville, Mississippi, February 18, 2002.
26. Mini-Conference, Society of Women Engineers, Rocky Mountain Section, Golden, Colorado, April 20, 2002.
27. Women in Cable & Telecommunications, Take your child to work day, Englewood, Colorado, April 25, 2002.
28. Black & Veatch Corporation, Aurora, Colorado, August 22, 2002.
29. Institute of Electrical and Electronics Engineers Spring 2003 Annual Conference, University of Denver, Denver, Colorado, March 1, 2003.
30. Telecommunications Seminar – TLEN 5600, University of Colorado at Boulder, Boulder, Colorado, March 15, 2005.

<u>"What I Wish I Had Known When I Graduated From College":</u>

1. Society of Women Engineers Region I Student Conference, Wichita State University, Wichita, Kansas, October 1, 1988.
2. University of Virginia Society of Women Engineers, Charlottesville, Virginia, April 1989.
3. University of Colorado at Boulder Society of Women Engineers, Boulder, Colorado, September 20, 1989.
4. Vanderbilt University Society of Women Engineers, Nashville, Tennessee February 20, 1992.
5. University of Colorado at Boulder Society of Women Engineers, Boulder, Colorado, March 14, 1992.

6. Keynote Address, Society of Women Engineers' 1991-1992 Awards Banquet, Cornell University, Ithaca, New York, April 22, 1992.
7. Keynote Address, Oklahoma State University Evening With Industry, Stillwater, Oklahoma, September 26, 1994.
8. University of Wyoming Society of Women Engineers, Cheyenne, Wyoming, January 28, 1997.
9. University of Colorado – Boulder Society of Women Engineers, September 10, 1997.
10. University of Virginia Society of Women Engineers, Charlottesville, Virginia, October 27, 1997.
11. Georgia Tech Society of Women Engineers, Atlanta, Georgia, November 4, 1997.
12. University of Denver Society of Women Engineers, Denver, Colorado, November 10, 1997.
13. American Society of Mechanical Engineers, University of Colorado - Boulder, March 5, 1998.
14. Colorado State University, Society of Women Engineers, Fort Collins, Colorado, September 29, 1998.
15. University of Colorado at Boulder, Society of Women Engineers, Boulder, Colorado, October 27, 1998.
16. University of Virginia, Society of Women Engineers, Charlottesville, VA, January 28, 1999.
17. Kansas State University, Society of Women Engineers, Manhattan, KS, October 13, 1999.
18. Georgia Tech, Society of Women Engineers, Atlanta, GA, November 9, 1999.
19. University of Virginia, Society of Women Engineers, Charlottesville, VA, January 27, 2000.
20. University of Colorado at Boulder, American Institute of Chemical Engineers, Boulder, Colorado, February 15, 2000.
21. University of Wyoming, Society of Women Engineers, Cheyenne, Wyoming, November 7, 2000.
22. University of Virginia, Society of Women Engineers, Charlottesville, Virginia, January 25, 2001.

"Taking Humor Seriously":

1. Black & Veatch Corporation, Aurora, Colorado, August 22,2002.
2. Colorado School of Mines, Society of Women Engineers, Golden, CO, February 2, 2005.

"Volunteering: Cornerstone to Career Success":

1. Keynote Speaker, National Engineers Week Luncheon, Annual Joint Luncheon, Kansas City, MO, February 22, 2001.
2. Keynote Speaker, Society of Women Engineers, Pacific Northwest Section, Seattle, Washington, May 15, 2001.
3. Keynote Speaker, Institute of Electrical and Electronics Engineers Spring 2003 Annual Conference, University of Denver, Denver, Colorado, March 1, 2003.
4. Society of Women Engineers Mini-Conference, Rocky Mountain Section, University of Denver, Denver, Colorado, April 19, 2003.

"Networking Or How May I Help You?":

1. Keynote Speaker, Society of Women Engineers, Region G Conference, University of Akron, Akron, OH, November 3, 2001.
2. Graduate Student and Fellow Seminar, Mississippi State University, Starkville, Mississippi, February 18, 2002.
3. Society of Women Engineers Mini-Conference, Rocky Mountain Section, University of Denver, Denver, Colorado, April 19, 2003.
4. Telecommunications Seminar – TLEN 5600, University of Colorado at Boulder, Boulder, Colorado, March 15, 2005.

"Breaking the Mold: Women Engineers and Scientists":

1. Keynote Speaker, Teen Women in Science and Technology Career Fair, Kansas State University – Salina, Salina, Kansas, January 8, 2002.
2. Keynote Speaker, Society of Women Engineers National Engineers' Week Banquet, Mississippi State University, Starkville, Mississippi, February 18, 2002.
3. Keynote Speaker, Society of Women Engineers, 2003 Exploring Engineering and Technology, Denver, Colorado, February 24, 2003.

4. Keynote Speaker, Women's Leadership Symposium and Luncheon: Women and Technology, University of Colorado – Colorado Springs, Colorado Springs, Colorado, February 26, 2003.
5. Women in Information Technology – Northern Colorado, Agilent, Fort Collins, Colorado, March 9, 2004.
6. Forum Speaker, IEEE Women in Engineering, Denver, Colorado, June 6, 2004.
7. Keynote Speaker, Women's History Month - SWE, IEEE, Tau Beta Pi, University of Florida, Gainesville, Florida, March 22, 2005.

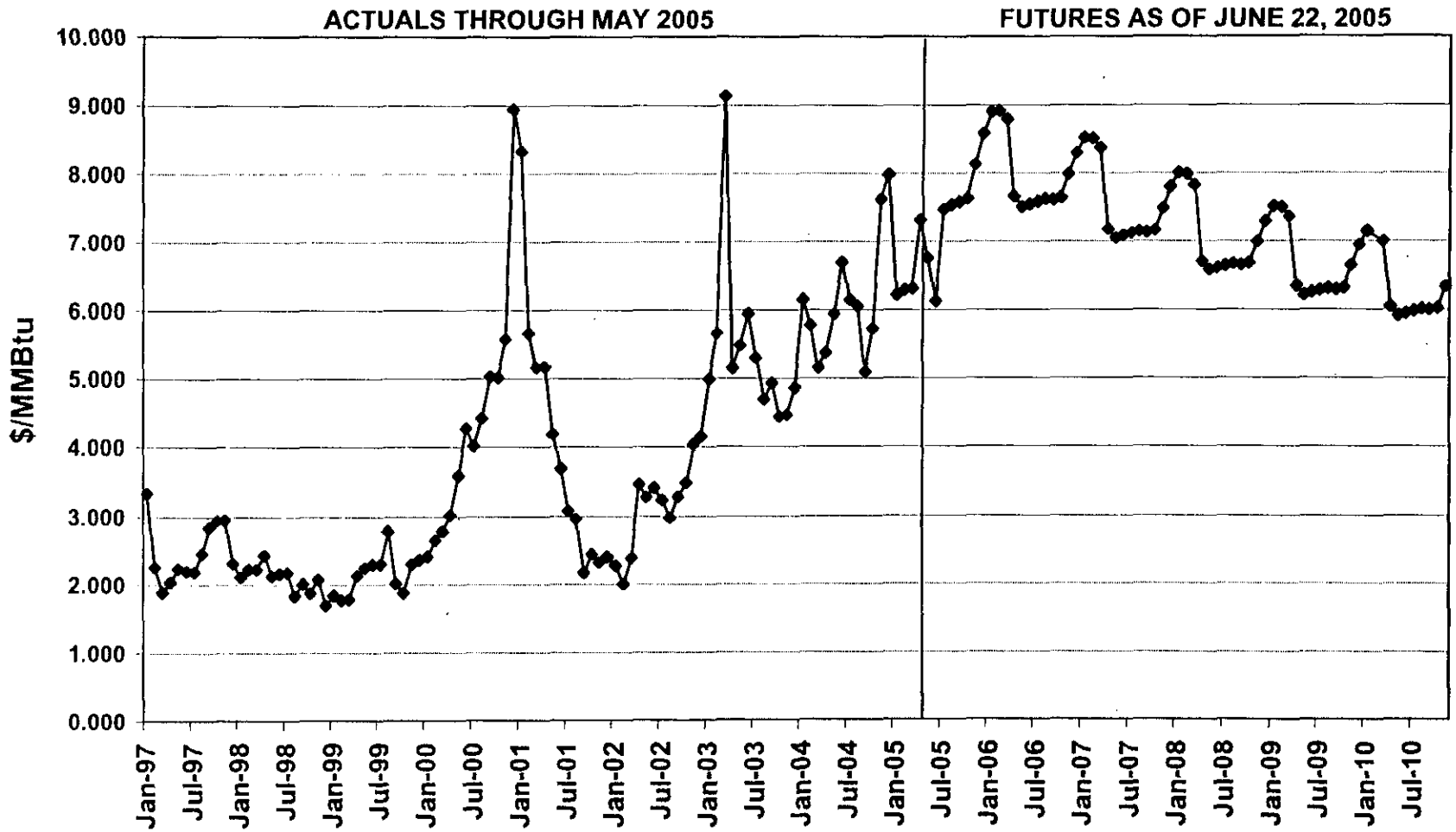
1. "SWE in your future." Presented at the Society of Women Engineers' Region H Student Conference, October 20, 1990.
2. "Engineers of Tomorrow: Breaking the Mold." Presented at the American Society of Mechanical Engineers Regional Conference, August 23, 1991.
3. Moderator of Panel: "Competition in the Utility Industry: Evolving Still" Utility Women's Conference, Atlantic City, NJ, September 12, 1991.
4. "Engineers of Tomorrow: Breaking the Mold." Presented at Power Supply USA, November 4-5, 1991.
5. "Enhancing Your Career Through SWE: Why the Need for SWE," Presented at the Sierra Foothills Section Chartering Banquet, Roseville, CA, November 16, 1991.
6. "Is an Engineering Career in Your Future?" Presented as the Keynote Address for "Women In Engineering . . . A Winning Combination," University of Pittsburgh, November 22, 1991.
7. "The Changing Face of the Engineer." Presented at the New York Academy of Sciences, Engineering Section, March 11, 1992.
8. "Developing Tomorrow's Technical Workforce." Presented at the Rocky Mountain Regional Tech Prep Conference, March 26, 1992.
9. "The Changing Face of the Engineer: Breaking the Mold." Presented at Oklahoma State University, July 23, 1992.
10. "Developing Tomorrow's Technical Workforce." Presented at the Association for Women Geoscientists, September 12, 1992.
11. "SWE - What's In It For Me?" Presented at the University of Wyoming, September 17, 1992.
12. "Historical Women in Engineering and Science: Unknown But Not Forgotten." Presented at U.S. West Advanced Technologies, March 1993.
13. "Tomorrow's Technical Workforce: Breaking the Mold." Presented to the American Business Women's Association, August 14, 1993.
14. Panel Participant, "Women and Minorities in Water Resources - Practitioner's Perspective," ASCE 21st Annual Conference, Water Resources Planning and Management Division, May 23, 1994.
15. "My Experiences as a Woman Engineer," Presented to the University of Denver, The Making of An Engineer Program, June 28, 1994.
16. "My Experiences as a Woman Engineer," Presented at the University of Denver, October 19, 1994.
17. "Engineering Women: Amending History." Presented at U.S. West, March 1995.
18. Moderator and Panel Participant: "Snappy Responses to Obnoxious Comments," Society of Women Engineers National Convention and Student Conference — Engineering - Revolutionizing our Lives, Boston, MA, July 1, 1995.
19. "SWE and You," Presented at the University of Wyoming, September 1995.
20. Fellows Panel Participant: "Rabble Rousers," Presented at the Society of Women Engineers Region I Conference, Denver, Colorado, October 21, 1995.
21. "My Experiences as a Woman Engineer," Presented to the University of Denver, January 24, 1996.
22. "Engineering Women: Amending History." Presented at U.S. West Advanced Technologies, March 22, 1996.
23. "Tomorrow's Technical Workforce: Breaking the Mold," Presented to Alpha Omega Epsilon, August 16, 1996.
24. Moderator and Panel Participant: "What Do I Want To Be When I Grow Up?" Society of Women Engineers National Convention and Student Conference — The Road to Southwestern Enchantment, Albuquerque, New Mexico, June 26, 1997.

25. "Responsibilities of Professional Engineers," Presented to the Civil Engineering Senior Seminar, University of Colorado - Boulder, October 8, 1997.
26. "My Career Experiences," Presented to first year project classes, University of Colorado - Boulder, February 25 and February 27, 1998.
27. "Historical Women in Science and Engineering," U.S. West Advanced Technologies, March 16, 1998.
28. Panel Member, "High-Tech Women: Daring To Be Different," Women's Forum of Colorado, March 23, 1998.
29. Panel Participant: "Volunteerism: How Can It Help Your Career?" Society of Women Engineers National Convention and Student Conference — Diversity; Look How Far We've Come, Houston, Texas, June 19, 1998.
30. "My Career Path," Civil Engineering Senior Seminar, University of Colorado at Boulder, Boulder, Colorado, September 9, 1998.
31. "SWE: What's In It For me?" Keynote Speaker, Colorado School of Mines, Society of Women Engineers' Evening With Industry, Golden, Colorado, September 14, 1998.
32. Moderator and Panel Member, "Points of View Across the Ages," Women's Forum of Colorado, November 17, 1998.
33. "My Career Experiences," Presented to first year engineering students, University of Colorado - Boulder, November 17, 1998.
34. "The Rocky Mountain Electrical League," Proceedings of the Megawatt Daily Conference – Powering the Rockies and the Southwest, Denver, CO, May 5-6, 1999.
35. Panel Member, "Professional Engineering Registration in Colorado," Society of Petroleum Evaluation Engineers, Denver, CO, July 14, 1999.
36. Panel Member, "Science in the Third Millennium: Who, what and for whom?" University of Colorado at Boulder, Boulder, CO, September 16, 1999.
37. Panel Member, "How Many Careers in a Lifetime?" Society of Women Engineers National Conference – Beyond 2000: Exploring Perspectives, Washington, DC, June 29, 2000.
38. Panel Member, "President's Leadership Institute," Society of Women Engineers National Conference – Beyond 2000: Exploring Perspectives, Washington, DC, July 1, 2000.
39. Panel Member, "Getting Women on Corporate and Other Powerful Boards," Boulder Business and Professional Women, Boulder, CO, September 21, 2000.
40. "My Career Experiences," Introduction to Engineering Class, University of Colorado at Boulder, Boulder, CO, October 10, 2000.
41. Plenary Panel Member, "Power and Expertise," Writing the Past, Claiming the Future: Women and Gender in Science, Medicine, and Technology, Saint Louis University, Saint Louis, Missouri, October 13, 2000.
42. "My Educational and Career Experiences," with Kristy Schloss, Students Underrepresented in Math, Engineering, Technology, and Science, Front Range Community College, Westminster, CO, November 28, 2000.
43. Career Day Speaker with Kristy Schloss, CH2M Hill's National Engineer's Week Event, Denver Museum of Nature and Science, Denver, CO, March 20, 2001.
44. Keynote Speaker, "The Power of Mentoring," MentorNet Partners Forum, Palo Alto, CA, March 30, 2001.
45. Panel Member, "Model Law Task Force & Colorado State Board of Registration," Professional Engineers of Colorado Annual Convention, Breckenridge, CO, June 9, 2001.
46. "Women as Leaders in Science and Technology: Promoting Competence and Confidence," with Kristy Schloss, Prentice Hall National Symposium on Education, Denver, CO, June 14, 2001.
47. "Historical Women in Engineering and Science," United Parcel Service, Westminster, CO, September 5, 2001.
48. Featured Speaker, "Networking," IEEE Women in Engineering Committee, Power Engineering Society Winter Conference, New York, NY, January 29, 2002.
49. Commencement Speaker, Kansas State University at Salina, Salina, Kansas, May 11, 2002.
50. "Women and their Entry into the Professions," Eclectics, Denver, CO, May 17, 2002.

51. Closing Keynote Speaker, "Women in Technology: Imagining the Future," High Tech: Low Numbers – Imagine Women in Technology Conference, Denver, Colorado, August 14, 2002.
52. "Ethics and Professionalism," Civil Engineering Senior Seminar, University of Colorado at Boulder, Boulder, Colorado, September 25, 2002.
53. Panel Member, Women in Technology Panel, sponsored by Rollie Heath for Governor, Broomfield, Colorado, September 26, 2002.
54. Panel Member, CareeReality Educator Workshop, DeVry University, Broomfield, Colorado, March 4, 2003.
55. "Women in Academia: Past, Present, and Future," Graduate Teacher Program Special Workshop Series, University of Colorado at Boulder, Boulder, Colorado, April 14, 2003.
56. "Using the FE Examination as an Outcomes Assessment Tool," with David L. Whitman and John Steadman, ASEE Annual Meeting, Nashville, TN, June 23, 2003.
57. Keynote Speaker, UCCS SWE Day, Society of Women Engineers, Colorado Springs, Colorado, September 13, 2003.
58. Keynote Speaker, Academic Forum & Roundtable, 2003 Society of Women Engineers National Conference, Birmingham, AL, October 10, 2003.
59. Keynote Speaker, ChevronTexaco Lectures Series Luncheon, Colorado School of Mines, Golden, CO, October 15, 2003.
60. Panel Member, Sunset Review Process, Professional Engineers of Colorado, Denver, Colorado, November 12, 2003.
61. "Two Viewpoints on Ethics and the Environment," (with Connie H. King), Colorado Water Congress – Workshop on Legal Ethics in Water and Environmental Law, Denver, Colorado, November 12, 2003.
62. Panel Member, CareeReality Educator Workshop, DeVry University, Colorado Springs, Colorado, January 30, 2004.
63. Keynote Speaker (with Vi Brown), Society of Women Engineers Sonora Region Conference, Phoenix, Arizona, March 5, 2004.
64. "Qualifying for PE Licensure," (with Angie Kinnaird), American Society of Civil Engineers Younger Members, Denver, Colorado, March 23, 2004.
65. Dinner Speaker, University of Colorado at Boulder College of Engineering Scholarship Dinner, Boulder, CO, September 24, 2004.
66. Awards Banquet Remarks on Receipt of Distinguished Alumna Award, Tau Beta Pi Initiation and Awards Banquet, Orlando, Florida, October 9, 2004.
67. Panel Member, "Giving Back: What It Means to SWE," Society of Women Engineers National Conference, Milwaukee, Wisconsin, October 15, 2004.
68. "Fundamentals of Engineering Exam," (with Mike Shannon), Society of Women Engineers National Conference, Milwaukee, Wisconsin, October 16, 2004.
69. "Challenges for Women in the Engineering Field," University of Virginia Women's Center's Fall 2004 Artists, Scholars and Leaders series entitled "Virginia 2020: Women, Innovation, and Public Service," Charlottesville, Virginia, November 17, 2004.
70. Keynote Speaker, Parent Workshop Speaker, Teacher Workshop Speaker, Introduce a Girl to Engineering Workshop, Society of Women Engineers – Space Coast Section, Cape Canaveral, Florida, January 22, 2005.
71. "Presentation Skills and Networking," Junior Achievement Business Week, Denver, Colorado, June 16, 2005.

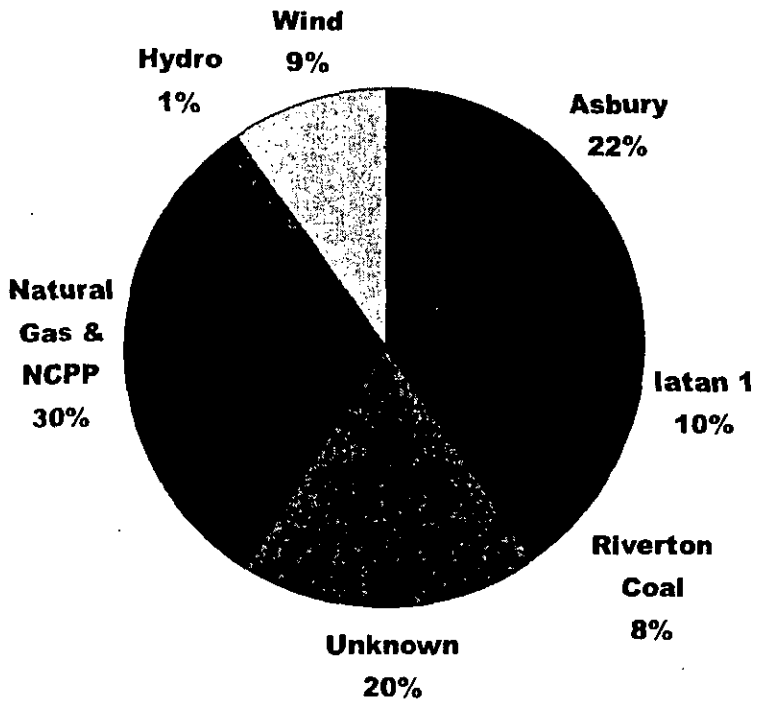
Schedule JST-3

Natural Gas Market Since 1997



Approximate Resource Mix Post 2010

With the Jeffrey Purchase Expiration



Potential Resource Mix with a new PPA and Iatan 2