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This volume updates the 1994 edition of *Corporate Finance Criteria*. There are several new chapters, covering our recently introduced Bank Loan Ratings, criteria for "notching" junior obligations, and the role of cyclicality in ratings. Naturally, the ratio medians have been brought up to date.

Standard & Poor's criteria publications represent our endeavor to convey the thought processes and methodologies employed in determining Standard & Poor's ratings. They describe both the quantitative and qualitative aspects of the analysis. We believe that our rating product has the most value if users appreciate all that has gone into producing the letter symbols.

Bear in mind, though, that a rating is, in the end, an opinion. The rating experience is as much an art as it is a science.

Solomon B. Samson
Chairman, Corporate Ratings Criteria Committee

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Utilities

The utilities rating methodology encompasses two basic components: business risk analysis and financial analysis. Evaluation of industry characteristics, the utility's position within that industry, its regulation, and its management provides the context for assessing a firm's financial condition.

Historical analysis is a tool for identifying strengths and weaknesses, and provides a starting point for evaluating financial condition. Business position assessment is the qualitative measure of a utility's fundamental creditworthiness. It focuses on the forces that will shape the utilities' future.

Utilities credit analysis factors

Business risk	Financial risk
• Markets and service area economy	• Earnings protection
• Competitive position	• Capital structure
• Operations	• Cash flow adequacy
• Regulation	• Financial flexibility/liquidity attraction
• Management	
• Fuel, power and water supply	
• Asset concentration	

The credit analysis of utilities is quickly evolving, as utilities are treated less as regulated monopolies and more as entities faced with a host of challengers in a competitive environment. Marketplace dynamics are supplanting the power of regulation, making it critically important to reduce costs and/or market new services in order to thwart competitors' inroads.

Markets and service area economy

Assessing service territory begins with the economic and demographic evaluation of the area in which the utility has its franchise. Strength of long-term demand for the product is examined from a macroeconomic perspective. This enables Standard & Poor's to evaluate the affordability of rates and the staying power of demand.

Standard & Poor's tries to discern any secular consumption trends and, more importantly, the reasons for them. Specific items examined include the size and growth rate of the market, strength of the franchise, historical and projected sales growth, income levels and trends in population, employment, and per capita income. A utility with a healthy economy and customer base—as illustrated by diverse employment opportunities, average or above-average wealth and income statistics, and low unemployment—will have a greater capacity to support its operations.

For electric and gas utilities, distribution by customer class is scrutinized to assess the depth and diversity of the utility's customer mix. For example, heavy industrial concentration is viewed cautiously, since a utility may have significant exposure to cyclical volatility. Alternatively, a large residential component yields a stable and more predictable revenue stream. The largest utility customers are identified to determine their importance to the bottom line and assess the risk of their loss and potential adverse effect on the utility's financial position. Credit concerns arise when individual customers represent more than 5% of revenues. The company or industry may play a significant role in the overall economic base of the service area. Moreover, large customers may turn to cogeneration or alternative power supplies to meet their energy needs, potentially leading to reduced cash flow for the utility (even in cases where a large customer pays discounted rates and is not a profitable account for the utility). Customer concentration is less significant for water and telecommunication utilities.

Competitive position

As competitive pressures have intensified in the utilities industry, Standard & Poor's analysis has deepened to include a more thorough review of competitive position.

Electric utility competition

For electric utilities, competitive factors examined include: percentage of firm wholesale revenues that are most vulnerable to competition; industrial load concentration; exposure of key customers to alternative suppliers; commercial concentrations; rates for various customer classes; rate design and flexibility; production costs, both marginal and fixed; the regional capacity situation; and transmission constraints. A regional focus is evident, but high costs and rates relative to national averages are also of significant concern because of the potential for electricity substitutes over time.

Mounting competition in the electric utility industry derives from excess generating capacity, lower barriers to entering the electric generating business, and marginal costs that are below embedded costs. Standard & Poor's has already witnessed declining prices in wholesale markets, as *de facto* retail competition is already being seen in several parts of the country. Standard & Poor's believes that over the coming years more and more customers will want and demand lower prices. Initial concerns focus on the largest industrial loads, but other customer classes will be increasingly vulnerable. Competition will not necessar-

ily be driven by legislation. Other pressures will arise from global competition and improving technologies, whether it be the declining cost of incremental generation or advances in transmission capacity or substitute energy sources like the fuel cell. It is impossible to say precisely when wide-open retail competition will occur; this will be evolutionary. However, significantly greater competition in retail markets is inevitable.

Gas utility competition

Similarly, gas utilities are analyzed with regard to their competitive standing in the three major areas of demand: residential, commercial, and industrial. Although regulated as holders of monopoly power, natural gas utilities have for some time been actively competing for energy market share with fuel oil, electricity, coal, solar, wood, etc. The long-term staying power of market demand for natural gas cannot be taken for granted. In fact, as the electric utility industry restructures and reduces costs, electric power will become more cost competitive and threaten certain gas markets. In addition, independent gas marketers have made greater inroads behind the city gate and are competing for large gas users. Moreover, the recent trend by state regulators to unbundle utility services is creating opportunities for outsiders to market niche products. Distributors still have the upper hand, but those who do not reduce and control costs, and thus rates, could find competition even more difficult.

Natural gas pipelines are judged to carry a somewhat higher business risk than distribution companies because they face competition in every one of their markets. To the extent a pipeline serves utilities versus industrial end users, its stability is greater. Over the next five years, pipeline competition will heat up since many service contracts with customers are expiring. Most distributor or end-use customers are looking to reduce pipeline costs and are working to improve their load factor to do so. Thus, pipelines will likely find it difficult to recontract all capacity in coming years. Being the pipeline of choice is a function of attractive transportation rates, diversity and quality of services provided, and capacity available in each particular market. In all cases though, periodic discounting of rates to retain customers will occur and put pressure on profitability.

Water utility competition

As the last true utility monopoly, water utilities face very little competition and there is currently no challenge to the continuation of franchise areas. The only exceptions have been cases where investor-owned water companies have been subject to condemnation and municipalization because of poor service or political motivations. In that regard, Standard & Poor's pays close attention to costs and rates in relation to neighboring utilities and national averages. (In contrast, the privatization of public water facilities has begun, albeit at a slower pace than anticipated. This is occurring mostly in the form of operating contracts and public/private partnerships, and not in asset transfers. This trend should continue as cities look for ways to balance their tight budgets.) Also, water utilities are not fully immune to the forces of competition; in a few instances wholesale customers can access more than one supplier.

Telephone competition

The Telecommunications Act of 1996 accelerates the continuing challenge to the local exchange companies' (LECs) century-old monopoly in the local loop. Competitive access providers (CAPs), both facilities-based and resellers, are aggressively pursuing customers, generally targeting metropolitan areas, and promising lower rates and better service.

Most long-distance calls are still originated and terminated on the local telephone company network. To complete such a call, the long-distance provider (including AT&T, MCI, Sprint and a host of smaller interexchange carriers or "IXCs") must pay the local telephone company a steep "access" fee to compensate the local phone company for the use of its local network. CAPs, in contrast, build or lease facilities that directly connect customers to their long-distance carrier, bypassing the local telephone company and avoiding access fees, and thereby can offer lower long-distance rates. But the LECs are not standing still; they are combating the loss of business to CAPs by lowering access fees, thereby reducing the economic incentive for a high usage long-distance customer to use a CAP. LECs are attempting to make up for the loss of revenues from lower access fees by increasing basic local service rates (or at least not lowering them), since basic service is far less subject to competition. LECs are improving operating efficiency and marketing high margin, value-added new services. Additionally, in the wake of the Telecommunications Act, LECs will capture at least some of the inter-LATA long-distance market. As a result of these initiatives, LECs continue to rebuild themselves—from the traditional utility monopoly to leaner, more marketing oriented organizations.

While LECs, and indeed all segments of the telecommunications sector, face increasing competition, there are favorable industry factors that tend to offset heightened business risk and auger for overall ratings stability for most LECs. Importantly, telecommunications is a declining-cost business. With increased deployment of fiber optics, the cost of transport has fallen dramatically and digital switching hardware and software have yielded more capable, trouble-free and cost-efficient networks. As a result, the cost of network maintenance has dropped sharply, as illustrated by the ratio of employees per 10,000 access lines, an oft cited measurement of efficiency. Ratios as low as 25 employees per 10,000 lines are being seen, down from the typical 40 or more employees per 10,000 ratio of only a few years ago.

In addition, networks are far more capable. They are increasingly digitally switched and able to accommodate high-speed communications. The infrastructure needed to accommodate switched broadband services will be built into telephone networks over the next few years. These advanced networks will enable telephone companies to look to a greater variety of high-margin, value-added serv-

ices. In addition to those current services such as call waiting or caller ID, the delivery of hundreds of broadcast and interactive video channels will be possible. While these services offer the potential of new revenue streams, they will simultaneously present a formidable challenge. LECs will be entering the new (to them) arena of multimedia entertainment and will have to develop expertise in marketing and entertainment programming acumen; such skills stand in sharp contrast to LECs' traditional strengths in engineering and customer service.

Operations

Standard & Poor's focuses on the nature of operations from the perspective of cost, reliability, and quality of service. Here, emphasis is placed on those areas that require management attention in terms of time or money and which, if unresolved, may lead to political, regulatory, or competitive problems.

Operations of electric utilities

For electrics, the status of utility plant investment is reviewed with regard to generating plant availability and utilization, and also for compliance with existing and contemplated environmental and other regulatory standards. The record of plant outages, equivalent availability, load factors, heat rates, and capacity factors are examined. Also important is efficiency, as defined by total megawatt hour per employee and customers per employee. Transmission interconnections are evaluated in terms of the number of utilities to which the utility in question has access, the cost structures and available generating capacity of these other utilities, and the price paid for wholesale power.

Because of mounting competition and the substantial escalation in decommissioning estimates, significant weight is given to the operation of nuclear facilities. Nuclear plants are becoming more vulnerable to high production costs that make their rates uneconomic. Significant asset concentration may expose the utility to poor performance, unscheduled outages or premature shutdowns, and large deferrals or regulatory assets that may need to be written off for the utility to remain competitive. Also, nuclear facilities tend to represent significant portions of their operators' generating capability and assets. The loss of a productive nuclear unit from both power supply and rate base can interrupt the revenue stream and create substantial additional costs for repairs and improvements and replacement power. The ability to keep these stations running smoothly and economically directly influences the ability to meet electric demand, the stability of revenues and costs, and, by extension, the ability to maintain adequate creditworthiness. Thus, economic operation, safe operation, and long-term operation are examined in depth. Specifically, emphasis is placed on operation and maintenance costs, busbar costs, fuel costs, refueling outages, forced outages, plant statistics, NRC evaluations, the potential need for repairs, operating licenses, decommissioning estimates and amounts held in external trusts, spent fuel storage capacity, and management's nuclear experience. In essence, favorable nuclear operations offer significant opportunities but, if a nuclear unit runs poorly or not at all, the attendant risks can be great.

Operations of gas utilities

For gas pipeline and distribution companies, the degree of plant utilization, the physical condition of the mains and lines, adequacy of storage to meet seasonal needs, "lost and unaccounted for" gas levels, and per-unit nongas operating and construction costs are important factors. Efficiency statistics such as load factor, operating costs per customer, and operating income per employee are also evaluated in comparison to other utilities and the industry as a whole.

Operations of water utilities

As a group, water utilities are continually upgrading their physical plant to satisfy regulations and to develop additional supply. Over the next decade, water systems will increasingly face the task of maintaining compliance, as drinking water regulations change and infrastructure ages. Given that the Safe Drinking Water Act was authorized in 1974, the first generation of treatment plants built to conform with these rules are almost 20 years old. Additionally, because the focus during this period was on satisfying environmental standards, deferred maintenance of distribution systems has been common, especially in older urban areas. The increasing cost of supplying treated water argues against the high level of unaccounted for water witnessed in the industry. Consequently, Standard & Poor's anticipates capital plans for rebuilding distribution lines and major renewal and replacement efforts aimed at treatment plants.

Operations of telephone companies

For telephone companies, cost-of-service analysis focuses on plant capability and measures of efficiency and quality of service. Plant capability is ascertained by looking at such parameters as percentage of digitally switched lines; fiber optic deployment, in particular in those portions of the plant key to network survival; and the degree of broadband capacity fiber and coaxial deployment and broadband switching capacity. Efficiency measures include operating margins, the ratio of employees per 10,000 access lines, and the extent of network and operations consolidation. Quality of service encompasses examination of quantitative measures, such as trouble reports and repeat service calls, as well as an assessment of qualitative factors, that may include service quality goals mandated by regulators.

Regulation

Regulatory rate-setting actions are reviewed on a case-by-case basis with regard to the potential effect on creditworthiness. Regulators' authorizing high rates of return is of little value unless the returns are earnable. Furthermore, allowing high returns based on noncash items does not benefit bondholders. Also, to be viewed positively, regulatory treatment should allow consistent performance from

period to period, given the importance of financial stability as a rating consideration.

The utility group meets frequently with commission and staff members, both at Standard & Poor's offices and at commission headquarters, demonstrating the importance Standard & Poor's places on the regulatory arena for credit quality evaluation. Input from these meetings and from review of rate orders and their impact weigh heavily in Standard & Poor's analysis.

Standard & Poor's does not "rate" regulatory commissions. State commissions typically regulate a number of diverse industries, and regulatory approaches to different types of companies often differ within a single regulatory jurisdiction. This makes it all but impossible to develop inclusive "ratings" for regulators.

Standard & Poor's evaluation of regulation also encompasses the administrative, judicial, and legislative processes involved in state and federal regulation. These can affect rate-setting activities and other aspects of the business, such as competitive entry, environmental and safety rules, facility siting, and securities sales.

As the utility industry faces an increasingly deregulated environment, alternatives to traditional rate-making are becoming more critical to the ability of utilities to effectively compete, maintain earnings power, and sustain creditor protection. Thus, Standard & Poor's focuses on whether regulators, both state and federal, will help or hinder utilities as they are exposed to greater competition. There is much that regulators can do, from allocating costs to more captive customers to allowing pricing flexibility—and sometimes just stepping out of the way.

Under traditional rate-making, rates and earnings are tied to the amount of invested capital and the cost of capital. This can sometimes reward companies more for justifying costs than for containing them. Moreover, most current regulatory policies do not permit utilities to be flexible when responding to competitive pressures of a deregulated market. Lack of flexible tariffs for electric utilities may lure large customers to wheel cheaper power from other sources.

In general, a regulatory jurisdiction is viewed favorably if it permits earning a return based on the ability to sustain rates at competitive levels. In addition to performance-based rewards or penalties, flexible plans could include market-based rates, price caps, index-based prices, and rates premised on the value of customer service. Such rates more closely mirror the competitive environment that utilities are confronting.

Electric industry regulation

The ability to enter into long-term arrangements at negotiated rates without having to seek regulatory approval for each contract is also important in the electric industry. (While contracting at reduced rates constrains financial performance, it lessens the potential adverse impact in the event of retail wheeling. Since revenue losses associated with this strategy are not likely to be recovered from ratepayers, utilities must control costs well enough to remain competitive if they are to sustain current levels of bondholder protection.)

Natural gas industry regulation

In the gas industry, too, several state commission policies weigh heavily in the evaluation of regulatory support. Examples include stabilization mechanisms to adjust revenues for changes in weather or the economy, rate and service unbundling decisions, revenue and cost allocation between sales and transportation customers, flexible industrial rates, and the general supportiveness of construction costs and gas purchases.

Water industry regulation

In all water utility activities, federal and state environmental regulations continue to play a critical role. The legislative timetable to effect the 1986 amendments to the Safe Drinking Water Act of 1974 was quite aggressive. But environmental standards-setting has actually slowed over the past couple of years due largely to increasing sentiment that the stringent, costly standards have not been justified on the basis of public health. A moratorium on the promulgation of significant new environmental rules is anticipated.

Telecommunications industry regulation

Despite the advances in telecommunications deregulation, analysis of regulation of telephone operators will continue to be a key rating determinant for the foreseeable future. The method of regulation may be either classic rate-based rate of return or some form of price cap mechanism. The most important factor is to assess whether the regulatory framework—no matter which type—provides sufficient financial incentive to encourage the rated company to maintain its quality of service and to upgrade its plant to accommodate new services while facing increasing competition from wireless operators and cable television companies.

Where regulators do still set tariffs based on an authorized return, Standard & Poor's strives to explore with regulators their view of the rate-of-return components that can materially impact reported versus regulatory earnings. Specifically these include the allowable base upon which the authorized return can be earned, allowable expenses, and the authorized return. Since regulatory oversight runs the gamut from strict, adversarial relationships with the regulated operating companies to highly supportive postures, Standard & Poor's probes beyond the apparent regulatory environment to ascertain the actual impact of regulation on the rated company.

Management

Evaluating the management of a utility is of paramount importance to the analytical process since management's abilities and decisions affect all areas of a company's operations. While regulation, the economy, and other outside factors can influence results, it is ultimately the quality of management that determines the success of a company.

With emerging competition, utility management will be more closely scrutinized by Standard & Poor's and will become an increasingly critical component of the credit evaluation. Management strategies can be the key determinant in differentiating utilities and in establishing where companies lie on the business position spectrum. It is imperative that managements be adaptable, aggressive, and proactive if their utilities are to be viable in the future; this is especially important for utilities that are currently uncompetitive.

The assessment of management is accomplished through meetings, conversations, and reviews of company plans. It is based on such factors as tenure, industry experience, grasp of industry issues, knowledge of customers and their needs, knowledge of competitors, accounting and financing practices, and commitment to credit quality. Management's ability and willingness to develop workable strategies to address their systems' needs, to deal with the competitive pressures of free market, to execute reasonable and effective long-term plans, and to be proactive in leading their utilities into the future are assessed. Management quality is also indicated by thoughtful balancing of public and private priorities, a record of credibility, and effective communication with the public, regulatory bodies, and the financial community. Boards of directors will receive ever more attention with respect to their role in setting appropriate management incentives.

With competition the watchword, Standard & Poor's also focuses on management's efforts to enhance financial condition. Management can bolster bondholder protection by taking any number of discretionary actions, such as selling common equity, lowering the common dividend payout, and paying down debt. Also important for the electric industry will be creativity in entering into strategic alliances and working partnerships that improve efficiency, such as central dispatching for a number of utilities or locking up at-risk customers through long-term contracts or expanded flexible pricing agreements. Proactive management teams will also seek alternatives to traditional rate-base, rate-of-return rate-making, move to adopt higher depreciation rates for generating facilities, segment customers by individual market preferences, and attempt to create superior service organizations.

In general, management's ability to respond to mounting competition and changes in the utility industry in a swift and appropriate manner will be necessary to maintain credit health.

Fuel, power, and water supply

Assessment of present and prospective fuel and power supply is critical to every electric utility analysis, while gauging the long-term natural gas supply position for gas pipeline and distribution companies and the water resources of a water utility is equally important. There is no similar analytical category for telephone utilities.

Electric utilities

For electric utilities emphasis is placed on generating reserve margins, fuel mix, fuel contract terms, demand-side management techniques, and purchased power arrangements. The adequacy of generating margins is examined nationally, regionally, and for each individual company. However, the reserve margin picture is muddied by the imprecise nature of peak-load growth forecasting, and also supply uncertainty relating to such things as Canadian capacity availability and potential plant shutdowns due to age, new NRC rules, acid rain remedies, fuel shortages, problems associated with nontraditional technologies, and so forth. Even apparently ample reserves may not be what they seem. Moreover, the quality of capacity is just as important as the size of reserves. Companies' reserve requirements differ, depending upon individual operating characteristics.

Fuel diversity provides flexibility in a changing environment. Supply disruptions and price hikes can raise rates and ignite political and regulatory pressures that ultimately lead to erosion in financial performance. Thus, the ability to alter generating sources and take advantage of lower cost fuels is viewed favorably.

Dependence on any single fuel means exposure to that fuel's problems: electric utilities that rely on oil or gas face the potential for shortages and rapid price increases; utilities that own nuclear generating facilities face escalating costs for decommissioning; and coal-fired capacity entails environmental problems stemming from concerns over acid rain and the "greenhouse effect."

Buying power from neighboring utilities, qualifying facility projects, or independent power producers may be the best choice for a utility that faces increasing electricity demand. There has been a growing reliance on purchased power arrangements as an alternative to new plant construction. This can be an important advantage, since the purchasing utility avoids potential construction cost overruns as well as risking substantial capital. Also, utilities can avoid the financial risks typical of a multiyear construction program that are caused by regulatory lag and prudence reviews. Furthermore, purchased power may enhance supply flexibility, fuel resource diversity, and maximize load factors. Utilities that plan to meet demand projections with a portfolio of supply-side options also may be better able to adapt to future growth uncertainties. Notwithstanding the benefits of purchasing, such a strategy has risks associated with it. By entering into a firm long-term purchased power contract that contains a fixed-cost component, utilities can incur substantial market, operating, regulatory, and financial risks. Moreover, regulatory treatment of purchased power removes any upside potential that might help offset the risks. Utilities are not compensated through incentive rate-making; rather, purchased power is recovered dollar-for-dollar as an operating expense.

To analyze the financial impact of purchased power, Standard & Poor's first calculates the net present value of future annual capacity payments (discounted at 10%). This represents a potential debt equivalent—the off-balance-sheet obligation that a utility incurs when it enters into a long-term purchased power contract. However, Standard

& Poor's adds to the utility's balance sheet only a portion of this amount, recognizing that such a contractual arrangement is not entirely the equivalent of debt. What percentage is added is a function of Standard & Poor's qualitative analysis of the specific contract and the extent to which market, operating, and regulatory risks are borne by the utility (the risk factor). For unconditional, take-or-pay contracts, the risk factor range is from 40%-80%, with the average hovering around 60% A lower risk factor is typically assigned for system purchases from coal-fired utilities and a higher risk factor is usually designated for unit-specific nuclear purchases. The range for take-and-pay performance obligations is between 10%-50%.

Gas utilities

For gas distribution utilities, long-term supply adequacy obviously is critical, but the supply role has become even more important in credit analysis since the Federal Energy Regulatory Commission's Order 636 eliminated the interstate pipeline merchant business. This thrust gas supply responsibilities squarely on local gas distributors. Standard & Poor's has always believed distributor management has the expertise and wherewithal to perform the job well, but the risks are significant since gas costs are such a large percentage of total utility costs. In that regard, it is important for utilities to get preapprovals of supply plans by state regulators or at least keep the staff and commissioners well informed. To minimize risks, a well-run program would diversify gas sources among different producers or marketers, different gas basins in the U.S. and Canada, and different pipeline routes. Also, purchase contracts should be firm, with minimal take-or-pay provisions, and have prices tied to an industry index. A modest percentage of fixed-price gas is not unreasonable. Contracts, whether of gas purchases or pipeline capacity, should be intermediate term. Staggering contract expirations (preferably annually) provides an opportunity to be an active market player. A modest degree of reliance on spot purchases provides flexibility, as does the use of market-based storage. Gas storage and on-property gas resources such as liquefied natural gas or propane air are effective peak-day and peak-season supply management tools.

Since pipeline companies no longer buy and sell natural gas and are just common carriers, connections with varied reserve basins and many wells within those basins are of great importance. Diversity of sources helps offset the risks arising from the natural production declines eventually experienced by all reserve basins and individual wells. Moreover, such diversity can enhance a pipeline's attractiveness as a transporter of natural gas to distributors and end users seeking to buy the most economical gas available for their needs.

Water utilities

Nearly all water systems throughout the U.S. have ample long-term water supplies. Yet to gain comfort, Standard & Poor's assesses the production capability of treatment plants and the ability to pump water from underground aquifers in relation to the usage demands from consumers. Having adequate treated water storage facilities has become important in recent years and has helped many systems meet demands during peak summer periods. Of interest is whether the resources are owned by the utility or purchased from other utilities or local authorities. Owning properties with water rights provides more supply security. This is especially so in states like California where water allocations are being reduced, particularly since recent droughts and environmental issues have created alarm. Since the primary cost for water companies is treatment, it makes little difference whether raw water is owned or bought. In fact, compliance with federal and state water regulations is very high, and the overall cost to deliver treated water to consumers remains relatively affordable.

Asset concentration in the electric utility industry

In the electric industry, Standard & Poor's follows the operations of major generating facilities to assess if they are well managed or troubled. Significant dependence on one generating facility or a large financial investment in a single asset suggests high risk. The size or magnitude of a particular asset relative to total generation, net plant in service, and common equity is evaluated. Where substantial asset concentration exists, the financial profile of a company may experience wide swings depending on the asset's performance. Heavy asset concentration is most prevalent among utilities with costly nuclear units.

Earnings protection

In this category, pretax cash income coverage of all interest charges is the primary ratio. For this calculation, allowance for funds used during construction (AFUDC) is removed from income and interest expense. AFUDC and other such noncash items do not provide any protection for bondholders. To identify total interest expense, the analyst reclassifies certain operating expenses. The interest component of various off-balance-sheet obligations, such as leases and some purchased-power contracts, is included in interest expense. This provides the most direct indication of a utility's ability to service its debt burden.

While considerable emphasis in assessing credit protection is placed on coverage ratios, this measure does not provide the entire earnings protection picture. Also important are a company's earned returns on both equity and capital, measures that highlight a firm's earnings performance. Consideration is given to the interaction of embedded costs, financial leverage, and pretax return on capital.

Capital structure

Analyzing debt leverage goes beyond the balance sheet and covers quasi-debt items and elements of hidden financial leverage. Noncapitalized leases (including sale/lease-back obligations), debt guarantees, receivables financing, and purchased-power contracts are all considered debt equivalents and are reflected as debt in calculating capital

structure ratios. By making debt level adjustments, the analyst can compare the degree of leverage used by each utility company.

Furthermore, assets are examined to identify undervalued or overvalued items. Assets of questionable value are discounted to more accurately evaluate asset protection.

Some firms use short-term debt as a permanent piece of their capital structure. Short-term debt also is considered part of permanent capital when it is used as a bridge to permanent financing. Seasonal, self-liquidating debt is excluded from the permanent debt amount, but this situation is rare—with the exception of certain gas utilities. Given the long life of almost all utility assets, short-term debt may expose these companies to interest-rate volatility, remarketing risk, bank line backup risk, and regulatory exposure that cannot be readily offset. The lower cost of shorter-term obligations (assuming a positively sloped yield curve) is a positive factor that partially mitigates the risk of interest-rate variability. As a rule of thumb, a level of short-term debt that exceeds 10% of total capital is cause for concern.

Similarly, if floating-rate debt and preferred stock constitute over one-third of total debt plus preferred stock, this level is viewed as unusually high and may be cause for concern. It might also indicate that management is aggressive in its financial policies.

A layer of preferred stock in the capital structure is usually viewed as equity—since dividends are discretionary and the subordinated claim on assets provides a cushion for providers of debt capital. A preferred component of up to 10% is typically viewed as a permanent wedge in the capital structure of utilities. However, as rate-of-return regulation is phased out, preferred stock may be viewed by utilities—as many industrial firms would—as a temporary option for companies that are not current taxpayers that do not benefit from the tax deductibility of interest. Even now, floating-rate preferred and money market perpetual preferred are problematic; a rise in the rate due to deteriorating credit quality tends to induce a company to take out such preferred stock with debt. Structures that convey tax deductibility to preferred stock have become very popular and do generally afford such financings with equity treatment.

Cash flow adequacy

Cash flow adequacy relates to a company's ability to generate funds internally relative to its needs. It is a basic component of credit analysis because it takes cash to pay expenses, fund capital spending, pay dividends, and make interest and principal payments. Since both common and preferred dividend payments are important to maintain capital market access, Standard & Poor's looks at cash flow measures both before and after dividends are paid.

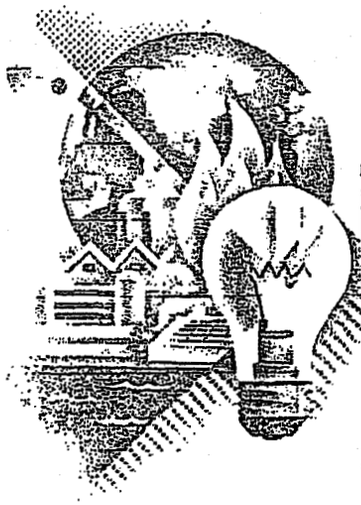
To determine cash flow adequacy, several quantitative relationships are examined. Emphasis is placed on cash flow relative to debt, debt service requirements, and capital spending. Cash flow adequacy is evaluated with respect to a firm's ability to meet all fixed charges, including capacity payments under purchased-power contracts. Despite the conditional nature of some contracts, the purchaser is obligated to pay a minimum capacity charge. The ratio used is funds from operations plus interest and capacity payments divided by interest plus capacity payments.

Financial flexibility/capital attraction

Financing flexibility incorporates a utility's financing needs, plans, and alternatives, as well as its flexibility to accomplish its financing program under stress without damaging creditworthiness. External funding capability complements internal cash flow. Especially since utilities are so capital intensive, a firm's ability to tap capital markets on an ongoing basis must be considered. Debt capacity reflects all the earlier elements: earnings protection, debt leverage, and cash flow adequacy. Market access at reasonable rates is restricted if a reasonable capital structure is not maintained and the company's financial prospects dim. The analyst also reviews indenture restrictions and the impact of additional debt on covenant tests.

Standard & Poor's assesses a company's capacity and willingness to issue common equity. This is affected by various factors, including the market-to-book ratio, dividend policy, and any regulatory restrictions regarding the composition of the capital structure.

June 7, 2004
Vol 13, No. 21



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STANDARD
&POOR'S

New Business Profile Scores Assigned for U.S. Utility and Power Companies; Financial Guidelines Revised

Standard & Poor's Ratings Services has assigned new business profile scores to U S utility and power companies to better reflect the relative business risk among companies in the sector. Standard & Poor's also has revised its published risk-adjusted financial guidelines The new business scores and financial guidelines do not represent a change to Standard & Poor's ratings criteria or methodology, and no ratings changes are anticipated from the new business profile scores or revised financial guidelines

New Business Profile Scores and Revised Financial Guidelines

Standard & Poor's has always monitored changes in the industry and altered its business risk assessments accordingly This is the first time since the 10-point business profile scale for U.S investor-owned utilities was implemented that a comprehensive assessment of the benefits and the application of the methodology has been made The principal purpose was to determine if the methodology continues to provide meaningful differentiation of business risk The review indicated that while business profile scoring continues to provide analytical benefits, the complete range of the 10-point scale was not being utilized to the fullest extent

Standard & Poor's has also revised the key financial guidelines that it uses as an integral part of evaluating the credit quality of U.S. utility and power companies These guidelines were last updated in June 1999. The financial guidelines for three principal ratios (funds from operations (FFO) interest coverage, FFO to total debt, and total debt to total capital) have been broadened so as to be more flexible Pretax interest cov-

Chart 1

Distribution of Business Profile Scores

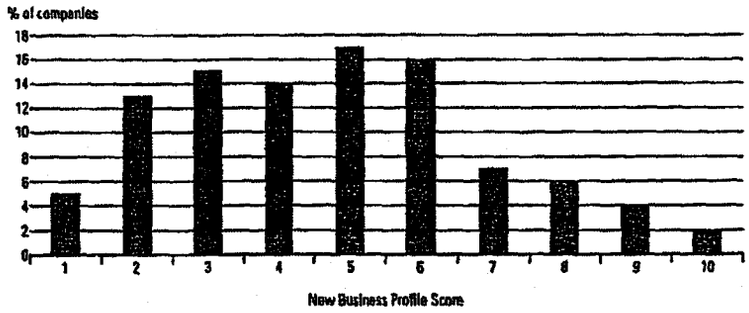
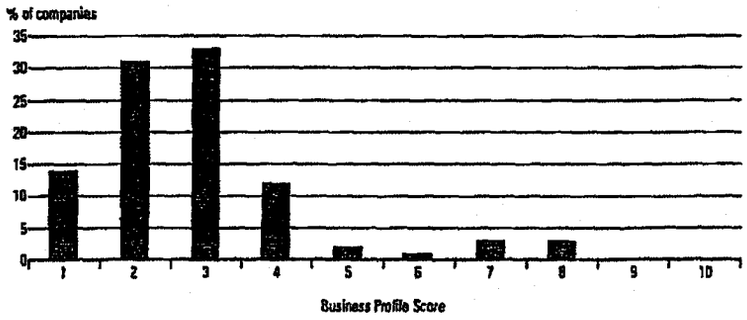


Chart 2

Transmission and Distribution—Water, Gas, and Electric



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erage as a key credit ratio was eliminated.

Finally, Standard & Poor's has segmented the utility and power industry into sub-sectors based on the dominant corporate strategy that a company is pursuing. Standard & Poor's has published a new U.S. utility and power company ranking list that reflects these sub-sectors.

There are numerous benefits to the reassessment. Fuller utilization of the entire 10-point scale provides a superior relative ranking of qualitative business risk. A revision of the financial guidelines supports the goal of not causing rating changes from the recalibration of the business profiles. Classification of companies by sub-sectors will ensure greater comparability and consistency in ratings. The use of industry segmentation will also allow more in-depth statistical analysis of ratings distributions and rating changes.

The reassessment does not represent a change to Standard & Poor's criteria or methodology for determining ratings for utility and power companies. Each business profile score should be considered as the assignment of a new score; these scores do not represent improvement or deterioration in our assessment of an individual company's business risk relative to the previously assigned score. The financial guidelines continue to be risk-adjusted based on historical utility and industrial medians. Segmentation into industry sub-sectors does not imply that specific company characteristics will not weigh heavily into the assignment of a company's business profile score.

Results

Previously, 83% of U.S. utility and power business profile scores fell between '3' and '6', which clearly does not reflect the risk differentiation that exists in the utility and power industry today. Since the 10-point scale was introduced, the industry has transformed into a much less homogenous industry, where the divergence of business risk—particularly regarding management, strategy, and degree of competitive market exposure—has created a much wider spectrum of risk profiles. Yet over the same period, business profile scores actually converged more tightly around a median score of '4'. The new business pro-

Chart 3
Transmission Only—Electric, Gas, and Other

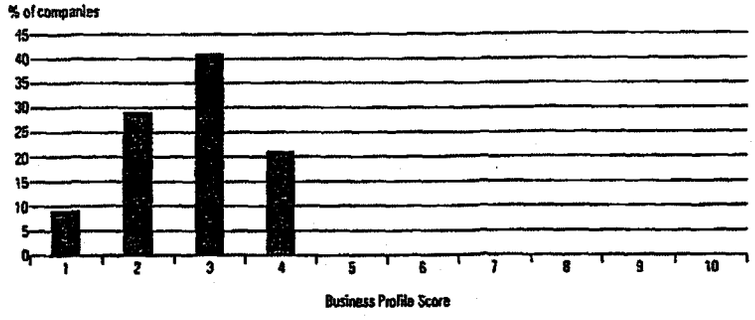
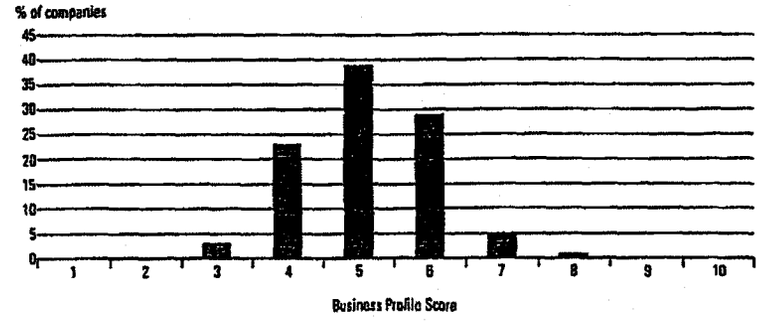


Chart 4
Integrated Electric, Gas, and Combination Utilities



file scores, as of June 2, are shown in Chart 1. The overall median business profile score is now '5'.

Table 1 contains the revised financial guidelines. It is important to emphasize that these metrics are only guidelines associated with expectations for various rating levels. Although credit ratio analysis is an important part of the ratings process, these three statistics are by no means the only critical financial measures that Standard & Poor's uses in its analytical process. We also analyze a wide array of financial ratios that do not have published guidelines for each rating category.

Again, ratings analysis is not driven solely by these financial ratios, nor has it ever been. In fact, the new financial guidelines that Standard & Poor's is incorporating for the specified rating categories reinforce the analytical framework whereby other factors can outweigh the achievement of otherwise acceptable financial ratios. These factors include:

- Effectiveness of liability and liquidity management;
- Analysis of internal funding sources;
- Return on invested capital;
- The execution record of stated business strategies;
- Accuracy of projected performance versus actual results, as well as the trend;
- Assessment of management's financial policies and attitude toward credit; and
- Corporate governance practices.

Charts 2 through 6 show business profile scores broken out by industry sub-sector. The five industry sub-sectors are:

- Transmission and distribution—Water, gas, and electric;
- Transmission only—Electric, gas, and other;
- Integrated electric, gas, and combination utilities;
- Diversified energy and diversified nonenergy; and
- Energy merchant/power developer/trading and marketing companies.

The average business profile scores for transmission and distribution companies and transmission-only companies are lower on the scale than the previous averages, while the average business profile scores for integrated utilities, diversified energy, and energy merchants and developers are higher.

Chart 5

Diversified Energy and Diversified Non-Energy

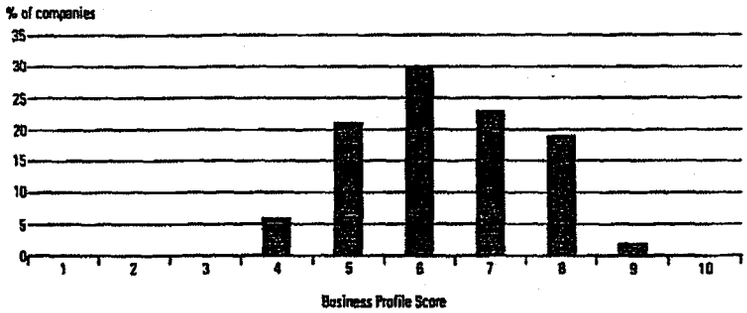
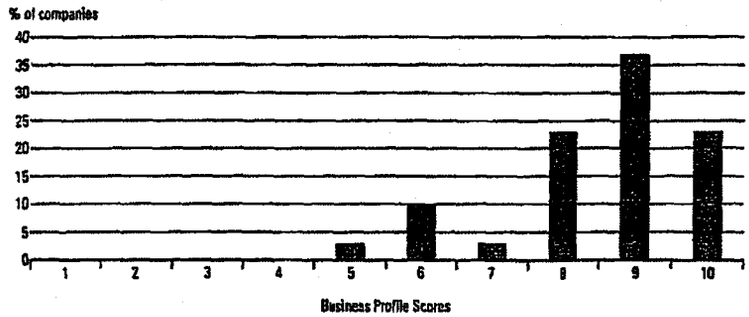


Chart 6

Energy Merchant/Developers/Trading and Marketing



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See pages 16 to 19 for the company ranking list of business profile scores segmented by industry sub-sector and ranked in order of credit rating, outlook, business profile score, and relative strength

Business Profile Score Methodology

Standard & Poor's methodology of determining corporate utility business risk is anchored in the assessment of certain specific characteristics that define the sector. We assign business profile scores to each of the rated companies in the utility and power sector on a 10-point scale, where '1' represents the lowest risk and '10' the highest risk. Business profile scores are assigned to all rated utility and power companies, whether they are holding companies, subsidiaries, or stand-alone corporations. For operating subsidiaries and stand-alone companies, the score is a bottom-up assessment. Scores for families of companies are a composite of the operating subsidiaries' scores. The actual credit rating of a company is analyzed, in part, by comparing the business profile score with the risk-adjusted financial guidelines.

For most companies, business profile scores are assessed using five categories; specifically, regulation, markets, operations, competitiveness, and management. The emphasis placed on each category may be influenced by the

Table 1

Revised Financial Guidelines

Funds from operations/interest coverage (x)

Business Profile	AA		A		BBB		BB	
1	3	2.5	2.5	1.5	1.5	1		
2	4	3	3	2	2	1		
3	4.5	3.5	3.5	2.5	2.5	1.5	1.5	1
4	5	4.2	4.2	3.5	3.5	2.5	2.5	1.5
5	5.5	4.5	4.5	3.8	3.8	2.8	2.8	1.8
6	6	5.2	5.2	4.2	4.2	3	3	2
7	8	6.5	6.5	4.5	4.5	3.2	3.2	2.2
8	10	7.5	7.5	5.5	5.5	3.5	3.5	2.5
9			10	7	7	4	4	2.8
10			11	8	8	5	5	3

Funds from operation/total debt (%)

Business Profile	AA		A		BBB		BB	
1	20	15	15	10	10	5		
2	25	20	20	12	12	8		
3	30	25	25	15	15	10	10	5
4	35	28	28	20	20	12	12	8
5	40	30	30	22	22	15	15	10
6	45	35	35	28	28	18	18	12
7	55	45	45	30	30	20	20	15
8	70	55	55	40	40	25	25	15
9			65	45	45	30	30	20
10			70	55	55	40	40	25

Total debt/total capital (%)

Business Profile	AA		A		BBB		BB	
1	48	55	55	60	60	70		
2	45	52	52	58	58	68		
3	42	50	50	55	55	65	65	70
4	38	45	45	52	52	62	62	68
5	35	42	42	50	50	60	60	65
6	32	40	40	48	48	58	58	62
7	30	38	38	45	45	55	55	60
8	25	35	35	42	42	52	52	58
9			32	40	40	50	50	55
10			25	35	35	48	48	52

dominant strategy of the company or other factors. For example, for a regulated transmission and distribution company, regulation may account for 30% to 40% of the business profile score because regulation can be the single-most important credit driver for this type of company. Conversely, competition, which may not exist for a transmission and distribution company, would provide a much lower proportion (e.g., 5% to 15%) of the business profile score.

For certain types of companies, such as power generators, power developers, oil and gas exploration and production companies, or nonenergy-related holdings, where these five components may not be appropriate, Standard & Poor's will use other, more appropriate methodologies. Some of these companies are assigned business profile scores that are useful only for relative ranking purposes.

As noted above, the business profile score for a parent or holding company is a composite of the business profile scores of its individual subsidiary companies. Again, Standard & Poor's does not apply rigid guidelines for determining the proportion or weighting that each subsidiary represents in the overall business profile score. Instead, it is determined based on a number of factors. Standard & Poor's will analyze each subsidiary's contribution to FFO, forecast capital expenditures, liquidity requirements, and other parameters, including the extent to which one subsidiary has higher growth. The weighting is determined case-by-case ■

Ronald M. Barone
New York (1) 212-438-7662
Richard W. Cortright, Jr.
New York (1) 212-438-7665
Suzanne G. Smith
New York (1) 212-438-2106
John W. Whitlock
New York (1) 212-438-7678
Andrew Watt
New York (1) 212-438-7868
Arthur F. Simonson
New York (1) 212-438-2094

SOUTHWEST GAS CORP
CAPITALIZATION AND FINANCIAL STATISTICS (1)
1999 - 2003, INCLUSIVE

	2003	2002	2001	2000	1999	5 YEAR AVERAGE
			(MILLIONS OF DOLLARS)			
CAPITALIZATION STATISTICS						
AMOUNT OF CAPITAL EMPLOYED						
TOTAL PERMANENT CAPITAL	$1,858,068	$1,757,020	$1,725,192	$1,498,023	$1,432,647	
SHORT-TERM DEBT	$52,000	$53,000	$93,000	$131,000	$61,000	
TOTAL CAPITAL EMPLOYED	$1,910,068	$1,810,020	$1,818,192	$1,629,023	$1,493,647	
INDICATED AVERAGE CAPITAL COST RATES (2)						
TOTAL DEBT	6.90 %	7.27 %	7.72 %	7.78 %	7.78 %	
PREFERRED STOCK	13.93	9.13	9.13	9.13	9.13	
CAPITAL STRUCTURE RATIOS						
BASED ON TOTAL PERMANENT CAPITAL:						
LONG-TERM DEBT	66.07 %	62.66 %	63.99 %	60.38 %	60.53 %	62.72 %
PREFERRED STOCK	0.00	3.41	3.48	4.01	4.19	3.02
COMMON EQUITY	33.93	33.93	32.53	35.61	35.28	34.26
TOTAL	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
BASED ON TOTAL CAPITAL:						
TOTAL DEBT, INCLUDING SHORT-TERM	66.99 %	63.75 %	65.83 %	63.57 %	62.14 %	64.46 %
PREFERRED STOCK	0.00	3.31	3.30	3.68	4.02	2.86
COMMON EQUITY	33.01	32.94	30.87	32.75	33.84	32.68
TOTAL	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
FINANCIAL STATISTICS						
FINANCIAL RATIOS - MARKET BASED						
EARNINGS / PRICE RATIO	5.31 %	6.12 %	5.36 %	6.12 %	5.13 %	5.61 %
MARKET / AVERAGE BOOK RATIO	118.21	123.51	126.94	120.34	165.97	126.99
DIVIDEND YIELD	3.87	3.77	3.79	4.11	3.29	3.77
DIVIDEND PAYOUT RATIO	81.22	70.59	83.60	78.77	74.72	77.78
RATE OF RETURN ON AVERAGE BOOK COMMON EQUITY	5.60 %	6.65 %	5.79 %	6.32 %	6.89 %	6.25 %
FUNDS FROM OPERATIONS / INTEREST COVERAGE (3)	3.6 x	2.7 x	3.0 x	3.9 x	2.7 x	3.2 x
FUNDS FROM OPERATIONS / TOTAL DEBT (4)	16.6 %	12.5 %	14.2 %	21.6 %	12.7 %	15.6 %
TOTAL DEBT / TOTAL CAPITAL	66.99 %	63.75 %	65.83 %	63.57 %	62.14 %	64.46 %

See sheet 2 for notes

Southwest Gas Corporation
Capitalization and Financial Statistics
1998-2003, Inclusive

Notes:

(1) All capitalization and financial statistics are based upon financial statements as originally reported in each year.

(2) Computed by relating actual long-term debt interest or preferred stock dividends booked to average of beginning and ending long-term debt or preferred stock reported to be outstanding.

(3) Coverages - excluding all AFUDC represent the number of times available earnings, excluding all AFUDC, cover fixed charges.

Source of Information: Standard & Poor's Compustat Services, Inc., PC Plus Database
Annual Reports to Shareholders

Southwest Gas Corporation
Capital Structure Based upon Total Permanet Capital
(Excluding Short-Term Debt) for Southwest Gas Corporation
for the Years 1999 through 2003

	2003	2002	2001	2000	1999	5 YEAR AVERAGE
Southwest Gas Corporation						
Long-Term Debt	66.07 %	66.07 %	67.47 %	64.39 %	64.72 %	65.74 %
Preferred Stock	0.00	0.00	0.00	0.00	0.00	0.00
Common Equity	33.93	33.93	32.53	35.61	35.28	34.26
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %

Source of Information: Standard & Poor's Compustat Services, Inc., PC Plus / Research Insight Data Base

Southwest Gas Corporation
Capital Structure Based upon Total Capital (including
(Including Short-Term Debt) for Southwest Gas Corporation
for the Years 1999 through 2003

	2003	2002	2001	2000	1999	5 YEAR AVERAGE
Southwest Gas Corporation						
Long-Term Debt	64.27 %	64.13 %	64.02 %	59.21 %	62.08 %	62.74 %
Short-Term Debt	2.72	2.93	5.11	8.04	4.08	4.58
Preferred Stock	0.00	0.00	0.00	0.00	0.00	0.00
Common Equity	33.01	32.94	30.87	32.75	33.84	32.68
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %

Source of Information: Standard & Poor's Compustat Services, Inc., PC Plus / Research Insight Data Base

PROXY GROUP OF FIVE GAS DISTRIBUTION COMPANIES
CAPITALIZATION AND FINANCIAL STATISTICS (1)
1999 - 2003, INCLUSIVE

	2003	2002	2001	2000	1999	
			(MILLIONS OF DOLLARS)			
CAPITALIZATION STATISTICS						
AMOUNT OF CAPITAL EMPLOYED						
TOTAL PERMANENT CAPITAL	$1,121.24	$1,059.66	$1,035.33	$930.79	$946.81	
SHORT-TERM DEBT	$305.09	$163.98	$152.14	$148.09	$103.87	
TOTAL CAPITAL EMPLOYED	$1,426.34	$1,223.64	$1,187.47	$1,078.88	$1,050.68	
INDICATED AVERAGE CAPITAL COST RATES (2)						
TOTAL DEBT	5.83 %	6.65 %	7.19 %	7.17 %	7.01 %	
PREFERRED STOCK	7.04	7.30	5.90	3.95	6.04	
						5 YEAR AVERAGE
CAPITAL STRUCTURE RATIOS						
BASED ON TOTAL PERMANENT CAPITAL:						
LONG-TERM DEBT	48.67 %	50.71 %	48.94 %	47.51 %	47.12 %	48.59 %
PREFERRED STOCK	0.00	0.24	0.85	0.68	1.42	0.68
COMMON EQUITY	51.33	49.05	50.21	51.61	51.46	50.73
TOTAL	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
BASED ON TOTAL CAPITAL:						
TOTAL DEBT, INCLUDING SHORT-TERM	58.53 %	55.77 %	55.24 %	53.33 %	51.57 %	54.89 %
PREFERRED STOCK	0.00	0.22	0.75	0.81	1.32	0.62
COMMON EQUITY	41.47	44.01	44.01	45.86	47.11	44.49
TOTAL	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
FINANCIAL STATISTICS						
FINANCIAL RATIOS - MARKET BASED						
EARNINGS / PRICE RATIO	6.60 %	6.84 %	7.26 %	6.76 %	6.78 %	6.85 %
MARKET / AVERAGE BOOK RATIO	181.89	178.43	188.86	167.60	183.25	179.91
DIVIDEND YIELD	4.85	4.99	4.80	5.41	4.93	5.00
DIVIDEND PAYOUT RATIO	77.69	76.26	68.52	91.52	73.08	77.01
RATE OF RETURN ON AVERAGE BOOK COMMON EQUITY	12.13 %	12.29 %	13.55 %	10.66 %	12.34 %	12.19 %
FUNDS FROM OPERATIONS / INTEREST COVERAGE (3)	5.88 X	5.32 X	3.50 X	4.18 X	4.50 X	4.68 X
FUNDS FROM OPERATIONS / TOTAL DEBT (4)	23.34 %	26.16 %	16.70 %	21.90 %	23.10 %	22.24 %
TOTAL DEBT / TOTAL CAPITAL	58.53 %	55.77 %	55.24 %	53.33 %	51.57 %	54.89 %

See Sheet 2 for notes.

Proxy Group of Five Gas Distribution Companies
Capitalization and Financial Statistics
1999-2003, Inclusive

Notes:

(1) All capitalization and financial statistics for the group are the arithmetic average of the achieved results for each individual company in the group, and are based upon financial statements as originally reported in each year.

(2) Computed by relating actual long-term debt interest or preferred stock dividends booked to average of beginning and ending long-term debt or preferred stock reported to be outstanding.

(3) Funds from operations (sum of net income, depreciation, amortization, net deferred income tax and investment tax credits, less total AFUDC) plus interest charges divided by interest charges.

(4) Funds from operations (as defined in Note 3) as a percentage of total debt.

Selection Criteria:

The basis of selection was to include those gas distribution companies: 1) which are assigned an SIC Code of 4924 (Natural Gas Distribution) by the Securities and Exchange Commission (SEC) ; 2) which have common stock actively traded; 3) which had more than 80% of their 2003 operating revenues derived from gas operations; 4) which are included in Value Line Investment Survey (Standard Edition) and ThomsonFN First Call; 5) which have not cut or omitted their cash common stock dividends during the five calendar years ending 2003 or through the time of the preparation of Mr. Hanley's accompanying direct testimony; 6) which, at the time of the preparation of Mr. Hanley's direct testimony, were not expected to be acquired by or merged into another company; and 7) which are included in S&P's Compustat PC Plus Research Insight Data Base.

The following five companies met the above criteria:

AGL Resources, Inc.
Cascade Natural Gas Corp.
NICOR, Inc.
Northwest Natural Gas Co.
Piedmont Natural Gas Co., Inc.

Source of Information: Standard & Poor's Compustat Services, Inc., PC Plus Research Insight Database
Company Annual Forms 10-K

Southwest Gas Corporation
Weather Normalization Adjustment (WNA) Clauses for
Southwest Gas Corporation and the
Proxy Group of Five Gas Distribution Companies

	Weather Normalization Clause
Southwest Gas Corporation	(1)
Proxy Group of Five Value Line Gas Distribution Companies	
AGL Resources Inc.	Yes (2)
Cascade Natural Gas Corporation	No
NICOR Inc.	(3)
Northwest Natural Gas Company	Yes (4)
Piedmont Natural Gas Co., Inc.	Yes

Notes:
(1) Southwest Gas Corporation operates as itself in Arizona, California and Nevada. In order to mitigate margin volatility due to weather variations, the company was authorized to implement a margin tracker in California. There are no risk reducing products or mechanisms in Arizona or Nevada.
(2) AGL Resources' operating gas distribution subsidiaries have WNAs in Tennessee and Virginia. Its WNA in Georgia was discontinued in 1998.
(3) NICOR Inc., has a risk-reducing weather stabilization insurance products in place. However, the company is not recovering the insurance premiums in rates.
(4) Northwest Natural Gas Company operates, which operates in the states of Oregon and Washington as NW Natural, has a WNA in Oregon, but not in Washington.

Source of Information: Company Annual Reports to Shareholders and / or Forms 10-K
Company Provided Information
Regulatory Research Associates

Southwest Gas Corporation
Capital Structure Based upon Total Permanent Capital (excluding Short-Term Debt) for
the Proxy Group of Five Gas Distribution Companies
for the Years 1999 through 2003

	2003	2002	2001	2000	1999	5 YEAR AVERAGE
AGL Resources Inc.						
Long-Term Debt	52.22 %	59.06 %	62.31 %	52.43 %	52.61 %	55.73 %
Preferred Stock	0.00	0.00	0.00	0.00	0.00	0.00
Common Equity	47.78	40.94	37.69	47.57	47.39	44.27
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
Cascade Natural Gas Corporation						
Long-Term Debt	59.44 %	59.09 %	50.68 %	51.18 %	50.90 %	54.26 %
Preferred Stock	0.00	0.00	0.00	0.03	2.52	0.51
Common Equity	40.56	40.91	49.32	48.79	46.58	45.23
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
NICOR Inc.						
Long-Term Debt	39.70 %	40.38 %	38.59 %	39.80 %	39.13 %	39.52 %
Preferred Stock	0.00	0.35	0.53	0.53	0.48	0.38
Common Equity	60.30	59.27	60.88	59.67	60.39	60.10
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
Northwest Natural Gas Company						
Long-Term Debt	49.70 %	48.67 %	45.45 %	46.34 %	46.62 %	47.36 %
Preferred Stock	0.00	0.87	3.70	3.84	4.09	2.50
Common Equity	50.30	50.46	50.85	49.82	49.29	50.14
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
Piedmont Natural Gas Co., Inc.						
Long-Term Debt	42.30 %	46.33 %	47.70 %	47.80 %	46.36 %	46.10 %
Preferred Stock	0.00	0.00	0.00	0.00	0.00	0.00
Common Equity	57.70	53.67	52.30	52.20	53.64	53.90
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
Proxy Group of Five Gas Distribution Companies						
Long-Term Debt	48.67 %	50.71 %	48.94 %	47.51 %	47.12 %	48.59 %
Preferred Stock	0.00	0.24	0.85	0.88	1.42	0.68
Common Equity	51.33	49.05	50.21	51.61	51.46	50.73
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %

Source of Information: Standard & Poor's Compustat Services, Inc., PC Plus / Research Insight Data Base

Southwest Gas Corporation
Capital Structure Based upon Total Capital (including Short-Term Debt) for
the Proxy Group of Five Gas Distribution Companies
for the Years 1999 through 2003

	2003	2002	2001	2000	1999	5 YEAR AVERAGE
AGL Resources Inc.						
Long-Term Debt	45.22 %	48.25 %	53.24 %	47.31 %	52.55 %	49.31 %
Short-Term Debt	13.41	18.30	14.55	9.76	0.11	11.23
Preferred Stock	0.00	0.00	0.00	0.00	0.00	0.00
Common Equity	41.37	33.45	32.21	42.93	47.34	39.46
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
Cascade Natural Gas Corporation						
Long-Term Debt	58.63 %	59.09 %	43.61 %	50.87 %	50.90 %	52.62 %
Short-Term Debt	1 35	0.00	13.95	0.61	0.00	3.18
Preferred Stock	0.00	0.00	0.00	0.03	2.52	0.51
Common Equity	40.02	40.91	42.44	48.49	46.58	43.69
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
NICOR Inc.						
Long-Term Debt	27.21 %	32.14 %	31.14 %	28.99 %	30.96 %	30.09 %
Short-Term Debt	31.48	20.40	19.32	27.15	20.88	23.85
Preferred Stock	0.00	0.28	0.42	0.39	0.38	0.29
Common Equity	41.31	47.18	49.12	43.47	47.78	45.77
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
Northwest Natural Gas Company						
Long-Term Debt	45.83 %	45.36 %	40.66 %	43.64 %	42.08 %	43.51 %
Short-Term Debt	7.80	6.80	10.53	5.84	9.75	8.14
Preferred Stock	0.00	0.81	3.31	3.61	3.69	2.28
Common Equity	46.37	47.03	45.50	46.91	44.48	46.06
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
Piedmont Natural Gas Co., Inc.						
Long-Term Debt	28.05 %	44.45 %	46.31 %	43.52 %	42 66 %	41.00 %
Short-Term Debt	33.69	4.06	2 90	8.96	7.98	11 52
Preferred Stock	0.00	0.00	0.00	0.00	0.00	0.00
Common Equity	38.26	51.49	50.79	47.52	49.36	47.48
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
Proxy Group of Five Gas Distribution Companies						
Long-Term Debt	40.98 %	45.85 %	42 99 %	42.87 %	43.83 %	43.30 %
Short-Term Debt	17.55	9.92	12.25	10.46	7.74	11.58
Preferred Stock	0.00	0.22	0.75	0.81	1.32	0.62
Common Equity	41.47	44.01	44.01	45.86	47.11	44.49
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %

Source of Information: Standard & Poor's Compustat Services, Inc., PC Plus / Research Insight Data Base

PROXY GROUP OF ELEVEN VALUE LINE GAS DISTRIBUTION COMPANIES
CAPITALIZATION AND FINANCIAL STATISTICS (1)
1999 - 2003, INCLUSIVE

	2003	2002	2001	2000	1999	
			(MILLIONS OF DOLLARS)			
CAPITALIZATION STATISTICS						
AMOUNT OF CAPITAL EMPLOYED						
TOTAL PERMANENT CAPITAL	$1,912.94	$1,723.77	$1,652.93	$1,473.20	$1,255.28	
SHORT-TERM DEBT	$247.63	$232.32	$247.91	$289.89	$131.12	
TOTAL CAPITAL EMPLOYED	$2,160.57	$1,956.09	$1,900.85	$1,762.89	$1,386.39	
INDICATED AVERAGE CAPITAL COST RATES (2)						
TOTAL DEBT	5.67 %	6.11 %	6.92 %	6.81 %	6.83 %	
PREFERRED STOCK	4.48	5.17	4.80	4.42	5.46	
						5 YEAR AVERAGE
CAPITAL STRUCTURE RATIOS						
BASED ON TOTAL PERMANENT CAPITAL:						
LONG-TERM DEBT	48.77 %	50.79 %	50.66 %	47.54 %	45.39 %	48.63 %
PREFERRED STOCK	0.76	0.67	0.94	0.93	1.91	1.04
COMMON EQUITY	50.47	48.54	48.40	51.53	52.70	50.33
TOTAL	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
BASED ON TOTAL CAPITAL:						
TOTAL DEBT, INCLUDING SHORT-TERM	56.44 %	56.99 %	57.22 %	55.90 %	51.50 %	55.61 %
PREFERRED STOCK	0.71	0.60	0.83	0.82	1.79	0.95
COMMON EQUITY	42.85	42.41	41.95	43.28	46.71	43.44
TOTAL	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
FINANCIAL STATISTICS						
FINANCIAL RATIOS - MARKET BASED						
EARNINGS / PRICE RATIO	7.37 %	6.73 %	6.89 %	7.02 %	6.84 %	6.97 %
MARKET / AVERAGE BOOK RATIO	174.17	166.73	182.41	162.56	167.98	170.77
DIVIDEND YIELD	4.70	5.09	4.66	5.30	5.14	4.98
DIVIDEND PAYOUT RATIO	67.17	61.32	69.24	81.46	76.87	75.21
RATE OF RETURN ON AVERAGE BOOK COMMON EQUITY	12.81 %	11.35 %	12.56 %	11.13 %	11.48 %	11.88 %
FUNDS FROM OPERATIONS / INTEREST COVERAGE (3)	5.79 X	4.73 X	3.65 X	4.27 X	4.54 X	4.60 X
FUNDS FROM OPERATIONS / TOTAL DEBT (4)	25.27 %	21.99 %	17.30 %	20.44 %	23.09 %	21.62 %
TOTAL DEBT / TOTAL CAPITAL	56.44 %	56.99 %	57.22 %	55.90 %	51.50 %	55.61 %

See Page 2 for notes.

Proxy Group of Eleven Value Line Gas Distribution Companies
Capitalization and Financial Statistics
1999-2003, Inclusive

Notes:

(1) All capitalization and financial statistics for the group are the arithmetic average of the achieved results for each individual company in the group, and are based upon financial statements as originally reported in each year.

(2) Computed by relating actual long-term debt interest or preferred stock dividends booked to average of beginning and ending long-term debt or preferred stock reported to be outstanding.

(3) Funds from operations (sum of net income, depreciation, amortization, net deferred income tax and investment tax credits, less total AFUDC) plus interest charges divided by interest charges.

(4) Funds from operations (as defined in Note 3) as a percentage of total debt.

Selection Criteria:

The basis of selection was to include those gas distribution companies: 1) which are included in Value Line Investment Survey (Standard Edition) – Natural Gas (Distribution) Industry; 2) which have not cut or omitted their common stock dividend during the five calendar years ending 2003 and up to the time of the preparation of Mr. Hanley's direct testimony, thus eliminating NUI Corp. and SEMCO Energy Inc. Southern Union Co. was eliminated because it does not pay cash dividends; 3) which, at the time of the preparation of Mr. Hanley's direct testimony, were not expected to be acquired by or merged into another company; 4) which derived at least 60% of 2003 revenues from gas operations; and 5) which are included in Standard & Poor's Compustat PC Plus Research Insight Data Base.

Although Atmos Energy Corporation, New Jersey Resources Corp. and UGI Corp. are included in Value Line Investment Survey's (Standard Edition) – Natural Gas (Distribution) Industry, they have been excluded from the proxy group because each company had less than 60% of 2003 operating revenues derived from gas operations.

The following eleven companies met the above criteria:

AGL Resources, Inc.
Energen Corp.
Laclede Group, Inc.
Northwest Natural Gas Co.
Piedmont Natural Gas Co., Inc.
WGL Holdings, Inc.
Cascade Natural Gas Corp.
KeySpan Corp.
NICOR, Inc.
Peoples Energy Corp.
South Jersey Industries, Inc.

Source of Information: Standard & Poor's Compustat Services, Inc., PC Plus Research Insight Database
Company Annual Forms 10-K

Southwest Gas Corporation
Weather Normalization Adjustment (WNA) Clauses for
Southwest Gas Corporation and the
Proxy Group of Eleven Value Line Gas Distribution Companies

	Weather Normalization Clause
Southwest Gas Corporation	(1)
Proxy Group of Eleven Value Line Gas Distribution Companies	
AGL Resources Inc.	Yes (2)
Cascade Natural Gas Corporation	No
Energen Corporation	Yes
KeySpan Corp.	Yes (3)
Laclede Group, Inc.	(4)
NICOR Inc.	(5)
Northwest Natural Gas Company	Yes (6)
Peoples Energy Corporation	(5)
Piedmont Natural Gas Co., Inc.	Yes
South Jersey Industries, Inc.	Yes
WGL Holdings Inc.	(5)

Notes:
(1) Southwest Gas Corporation operates as itself in Arizona, California and Nevada. In order to mitigate margin volatility due to weather variations, the company was authorized to implement a margin tracker in California. There are no risk reducing products or mechanisms in Arizona or Nevada.
(2) AGL Resources' operating gas distribution subsidiaries have WNAs in Tennessee and Virginia. Its WNA in Georgia was discontinued in 1998.
(3) KeySpan Corp.'s operating gas distribution subsidiaries have a WNA in New York, and none in New Hampshire and Massachusetts.
(4) Laclede Group does not have a WNA. However, as part of the 2002 rate case settlement, the Utility initiated, effective November 9, 2002, an innovative weather mitigation rate design that lessens the impact of weather volatility on Laclede Gas customers during cold winters and is expected to stabilize the utility's earnings for the future.
(5) NICOR Inc., Peoples Energy Corp. and WGL Holdings Inc. have risk-reducing weather stabilization insurance products in place. However, the companies are not recovering the insurance premiums in rates.
(6) Northwest Natural Gas Company operates, which operates in the states of Oregon and Washington as NW Natural, has WNA in Oregon, but not in Washington.

Source of Information: Company Annual Reports to Shareholders and / or Forms 10-K
Company Provided Information
Regulatory Research Associates

Southwest Gas Corporation
Capital Structure Based upon Total Permanent Capital (excluding Short-Term Debt) for
the Proxy Group of Eleven Value Line Gas Distribution Companies
for the Years 1999 through 2003

	2003	2002	2001	2000	1999	5 YEAR AVERAGE
AGL Resources Inc.						
Long-Term Debt	52.22 %	59.06 %	62.31 %	52.43 %	52.61 %	55.73 %
Preferred Stock	0.00	0.00	0.00	0.00	0.00	0.00
Common Equity	47.78	40.94	37.69	47.57	47.39	44.27
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
Cascade Natural Gas Corporation						
Long-Term Debt	59.44 %	59.09 %	50.68 %	51.18 %	50.90 %	54.26 %
Preferred Stock	0.00	0.00	0.00	0.03	2.52	0.51
Common Equity	40.56	40.91	49.32	48.79	46.58	45.23
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
Energen Corporation						
Long-Term Debt	44.60 %	47.91 %	53.81 %	48.17 %	50.83 %	49.06 %
Preferred Stock	0.00	0.00	0.00	0.00	0.00	0.00
Common Equity	55.40	52.09	46.19	51.83	49.17	50.94
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
KeySpan Corp.						
Long-Term Debt	56.88 %	61.63 %	59.74 %	58.59 %	34.17 %	54.20 %
Preferred Stock	6.01	3.70	3.51	2.87	10.70	5.36
Common Equity	37.11	34.67	36.75	38.54	55.13	40.44
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
Laclede Group, Inc.						
Long-Term Debt	50.35 %	49.78 %	49.54 %	45.15 %	41.82 %	47.33 %
Preferred Stock	0.21	0.22	0.29	0.34	0.39	0.29
Common Equity	49.44	50.00	50.17	54.51	57.79	52.38
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
NICOR Inc.						
Long-Term Debt	39.70 %	40.38 %	38.59 %	39.80 %	39.13 %	39.52 %
Preferred Stock	0.00	0.35	0.53	0.53	0.48	0.38
Common Equity	60.30	59.27	60.88	59.67	60.39	60.10
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
Northwest Natural Gas Company						
Long-Term Debt	49.70 %	48.67 %	45.45 %	46.34 %	46.62 %	47.36 %
Preferred Stock	0.00	0.87	3.70	3.84	4.09	2.50
Common Equity	50.30	50.46	50.85	49.82	49.29	50.14
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
Peoples Energy Corporation						
Long-Term Debt	46.75 %	44.40 %	48.03 %	35.07 %	40.43 %	42.94 %
Preferred Stock	0.00	0.00	0.00	0.00	0.00	0.00
Common Equity	53.25	55.60	51.97	64.93	59.57	57.06
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
Piedmont Natural Gas Co., Inc.						
Long-Term Debt	42.30 %	46.33 %	47.70 %	47.80 %	46.36 %	46.10 %
Preferred Stock	0.00	0.00	0.00	0.00	0.00	0.00
Common Equity	57.70	53.67	52.30	52.20	53.64	53.90
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
South Jersey Industries, Inc.						
Long-Term Debt	51.17 %	54.23 %	57.80 %	55.30 %	54.84 %	54.67 %
Preferred Stock	0.28	0.32	0.32	0.40	0.49	0.36
Common Equity	48.55	45.45	41.88	44.30	44.67	44.97
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %

Southwest Gas Corporation
Capital Structure Based upon Total Permanent Capital (excluding Short-Term Debt) for
the Proxy Group of Eleven Value Line Gas Distribution Companies
for the Years 1999 through 2003

	2003	2002	2001	2000	1999	5 YEAR AVERAGE
WGL Holdings, Inc.						
Long-Term Debt	43.40 %	47.20 %	43.66 %	43.14 %	41.60 %	43.80 %
Preferred Stock	1.88	1.87	1.94	2.17	2.33	2.04
Common Equity	54.72	50.93	54.40	54.69	56.07	54.16
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
Proxy Group of Eleven Value Line Gas Distribution Companies						
Long-Term Debt	50.21 %	52.06 %	52.06 %	48.95 %	47.00 %	50.06 %
Preferred Stock	0.70	0.61	0.86	0.85	1.75	0.95
Common Equity	49.09	47.33	47.08	50.20	51.25	48.99
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %

Source of Information: Standard & Poor's Compustat Services, Inc.. PC Plus / Research Insight Data Base

Southwest Gas Corporation
Capital Structure Based upon Total Capital (including Short-Term Debt) for
the Proxy Group of Eleven Value Line Gas Distribution Companies
for the Years 1999 through 2003

	2003	2002	2001	2000	1999	5 YEAR AVERAGE
AGL Resources Inc.						
Long-Term Debt	45.22 %	48.25 %	53.24 %	47.31 %	52.55 %	49.31 %
Short-Term Debt	13.41	18.30	14.55	9.76	0.11	11.23
Preferred Stock	0.00	0.00	0.00	0.00	0.00	0.00
Common Equity	41.37	33.45	32.21	42.93	47.34	39.46
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
Cascade Natural Gas Corporation						
Long-Term Debt	58.63 %	59.09 %	43.61 %	50.87 %	50.90 %	52.62 %
Short-Term Debt	1.35	0.00	13.95	0.61	0.00	3.18
Preferred Stock	0.00	0.00	0.00	0.03	2.52	0.51
Common Equity	40.02	40.91	42.44	48.49	46.58	43.69
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
Energen Corporation						
Long-Term Debt	44.22 %	43.51 %	53.45 %	39.58 %	37.26 %	43.60 %
Short-Term Debt	0.86	9.17	0.67	17.84	26.71	11.05
Preferred Stock	0.00	0.00	0.00	0.00	0.00	0.00
Common Equity	54.92	47.32	45.88	42.58	36.03	45.35
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
KeySpan Corp.						
Long-Term Debt	54.23 %	55.64 %	52.71 %	49.74 %	32.78 %	49.02 %
Short-Term Debt	4.66	9.73	11.76	15.11	4.06	9.06
Preferred Stock	5.73	3.34	3.10	2.43	10.27	4.97
Common Equity	35.38	31.29	32.43	32.72	52.89	36.94
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
Laclede Group, Inc.						
Long-Term Debt	37.01 %	38.81 %	41.15 %	36.28 %	35.64 %	37.78 %
Short-Term Debt	26.51	22.05	16.93	19.65	14.78	19.98
Preferred Stock	0.15	0.17	0.24	0.27	0.33	0.23
Common Equity	36.33	38.97	41.68	43.80	49.25	42.01
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
NICOR Inc.						
Long-Term Debt	27.21 %	32.14 %	31.14 %	28.99 %	30.96 %	30.09 %
Short-Term Debt	31.48	20.40	19.32	27.15	20.68	23.85
Preferred Stock	0.00	0.28	0.42	0.39	0.38	0.29
Common Equity	41.31	47.18	49.12	43.47	47.78	45.77
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
Northwest Natural Gas Company						
Long-Term Debt	45.63 %	45.36 %	40.66 %	43.64 %	42.08 %	43.51 %
Short-Term Debt	7.80	6.80	10.53	5.84	9.75	8.14
Preferred Stock	0.00	0.81	3.31	3.61	3.69	2.28
Common Equity	46.37	47.03	45.50	46.91	44.48	46.06
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
Peoples Energy Corporation						
Long-Term Debt	41.35 %	37.05 %	36.18 %	23.78 %	36.75 %	35.02 %
Short-Term Debt	11.55	16.56	24.67	32.19	9.09	18.81
Preferred Stock	0.00	0.00	0.00	0.00	0.00	0.00
Common Equity	47.10	46.39	39.15	44.03	54.16	46.17
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
Piedmont Natural Gas Co., Inc.						
Long-Term Debt	28.05 %	44.45 %	46.31 %	43.52 %	42.66 %	41.00 %
Short-Term Debt	33.69	4.06	2.90	8.96	7.98	11.52
Preferred Stock	0.00	0.00	0.00	0.00	0.00	0.00
Common Equity	38.26	51.49	50.79	47.52	49.36	47.48
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %

Southwest Gas Corporation
Capital Structure Based upon Total Capital (including Short-Term Debt) for
the Proxy Group of Eleven Value Line Gas Distribution Companies
for the Years 1999 through 2003

	2003	2002	2001	2000	1999	5 YEAR AVERAGE
South Jersey Industries, Inc.						
Long-Term Debt	43.23 %	41.14 %	44.81 %	43.68 %	42.54 %	43.08 %
Short-Term Debt	15.53	24.14	22.46	21.02	22.43	21.12
Preferred Stock	0.23	0.24	0.25	0.31	0.38	0.28
Common Equity	41.01	34.48	32.48	34.99	34.65	35.52
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
WGL Holdings, Inc.						
Long-Term Debt	39.04 %	44.51 %	39.96 %	38.38 %	38.07 %	39.99 %
Short-Term Debt	10.03	5.69	8.47	11.04	8.48	8.74
Preferred Stock	1.70	1.77	1.78	1.93	2.13	1.86
Common Equity	49.23	48.03	49.79	48.65	51.32	49.40
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
Proxy Group of Eleven Value Line Gas Distribution Companies						
Long-Term Debt	42.18 %	44.54 %	43.93 %	40.52 %	40.20 %	42.27 %
Short-Term Debt	14.26	12.45	13.29	15.38	11.30	13.34
Preferred Stock	0.71	0.60	0.83	0.82	1.79	0.95
Common Equity	42.85	42.41	41.95	43.28	46.71	43.44
Total Capital	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %

Source of Information: Standard & Poor's Compustat Services, Inc., PC Plus / Research Insight Data Base

Southwest Gas Corporation
Hypothetical Example of the Inadequacy of
A DCF Return Rate Related to Book Value
When Market Value is Greater / Less than Book Value

Line No.		1 Market Value	2 Book Value with Market to Book Ratio of 180%	3 Book Value with Market to Book Ratio of 80%
1.	Per Share	$ 24.000	$ 13.33	$ 30.00
2.	DCF Cost Rate (1)	10.00%	10.00%	10.00%
3.	Return in Dollars	$ 2.400	$ 1.333	$ 3.000
4	Dividends (2)	$ 0.960	$ 0.960	$ 0.960
5.	Growth in Dollars	$ 1.440	$ 0.373	$ 2.040
6.	Return on Market Value	10.00%	5.55% (3)	12.50% (4)
7.	Rate of Growth on Market Value	6.00% (5)	1.55% (6)	8.50% (7)

Notes:
(1) Comprised of 4.0% dividend yield and 6.0%% growth.
(2) $24.00 * 4.0% yield = $0.960.
(3) $1.333 / $24.00 market value = 5.55%.
(4) $3.000 / $24.00 market value = 12.50%.
(5) Expected rate of growth per market based DCF model.
(6) Actual rate of growth when DCF cost rate is applied to book value ($1.333 possible earnings - $0.960 dividends = $0.373 for growth / $24.00 market value = 1.55%).
(7) Actual rate of growth when DCF cost rate is applied to book value ($3.000 possible earnings - $0.960 dividends = $2.040 for growth / $24.00 market value = 8.50%).

Southwest Gas Corporation
Indicated Common Equity Cost Rate through the use of the Discounted Cash Flow Model for Southwest Gas Corporation, the Proxy Group of Five Gas Distribution Companies and the Proxy Group of Eleven Value Line Gas Distribution Companies

	1 Dividend Yield (1)	2 Dividend Growth Component (2)	3 Adjusted Dividend Yield (3)	4 Growth Rate (4)	5 Indicated DCF Return Rate (5)	6 Recommended DCF Return Rate (6)
Southwest Gas Corporation	3.47 %	0.12 %	3.59 %	7.10 %	10.69 %	10.69 %
Proxy Group of Five Gas Distribution Companies						
AGL Resources, Inc.	3.81 %	0.09 %	3.90	4.90 %	8.80 %	-- %
Cascade Natural Gas Corp.	4.61	0.13	4.74	5.50	10.24	10.24
NICOR, Inc.	5.16	0.07	5.23	2.63	7.86	--
Northwest Natural Gas Co.	4.18	0.10	4.28	4.88	9.16	--
Piedmont Natural Gas Co., Inc.	3.95	0.12	4.07	6.09	10.16	10.16
Average	4.34 %	0.10 %	4.44 %	4.80 %		10.20 %
Proxy Group of Eleven Value Line Gas Distribution Companies						
AGL Resources, Inc.	3.81 %	0.09 %	3.90	4.90 %	8.80 %	-- %
Cascade Natural Gas Corp.	4.61	0.13	4.74	5.50	10.24	10.24
Energen Corp.	1.55	0.05	1.60	7.00	8.60	--
KeySpan Corp.	4.76	0.14	4.90	5.77	10.67	10.67
Laclede Group, Inc.	4.75	0.11	4.86	4.75	9.61	--
NICOR, Inc.	5.16	0.07	5.23	2.63	7.86	--
Northwest Natural Gas Co.	4.18	0.10	4.28	4.88	9.16	--
Peoples Energy Corp.	5.18	0.07	5.25	2.67	7.92	--
Piedmont Natural Gas Co., Inc.	3.95	0.12	4.07	6.09	10.16	10.16
South Jersey Industries, Inc.	3.46	0.10	3.56	5.75	9.31	--
WGL Holdings Inc.	4.55	0.10	4.65	4.24	8.89	--
Average	4.18 %	0.10 %	4.28 %	4.93 %		10.36 %

Notes:
(1) From Sheet 1 of Exhibit__ (FJH-8).
(2) This reflects a growth rate component equal to one-half the average projected five-year growth rate in EPS (from Sheet 1 of Exhibit ___ (FJH 10) x Line No. 1 to reflect the periodic payment of dividends (Gordon Model) as opposed to the continuous payment. Thus, for AGL Resources, Inc., 3.81% x (1/2 x 4.90%) = 0.09%.
(3) Column 1 + Column 2.
(4) From Sheet 1 of Exhibit ___(FJH-10).
(5) Column 3 + Column 4.
(6) Includes only those indicated common equity cost rates which are greater than 9.9% (the lowest rate awarded to a gas distribution utility between January 1, 2003 and June 30, 2004, from Sheet 15 of this Exhibit) as fully explained in Mr. Hanley's accompanying direct testimony.

Southwest Gas Corporation
Derivation of Dividend Yield for Use in the
Discounted Cash Flow Model

	Dividend Yield			
	Spot	Average Based Upon Average High / Low Market Prices (2)		Average Dividend
	(10/01/04) (1)	Sep. 2004 (3)	Aug. 2004	Yield (4)
Southwest Gas Corporation	3.42 %	3.47 %	3.51 %	3.47 %
Proxy Group of Five Gas Distribution Companies				
AGL Resources, Inc.	3.75 %	3.77 %	3.91 %	3.81 %
Cascade Natural Gas Corp.	4.50	4.61	4.73	4.61
NICOR, Inc.	4.97	5.09	5.42	5.16
Northwest Natural Gas Co.	4.04	4.14	4.35	4.18
Piedmont Natural Gas Co., Inc.	3.87	3.91	4.08	3.95
Average	4.23 %	4.30 %	4.50 %	4.34 %
Proxy Group of Eleven Value Line Gas Distribution Companies				
AGL Resources, Inc.	3.75 %	3.77 %	3.91 %	3.81 %
Cascade Natural Gas Corp.	4.50	4.61	4.73	4.61
Energen Corp.	1.46	1.55	1.64	1.55
KeySpan Corp.	4.50	4.59	5.19	4.76
Laclede Group, Inc.	4.63	4.73	4.90	4.75
NICOR, Inc.	4.97	5.09	5.42	5.16
Northwest Natural Gas Co.	4.04	4.14	4.35	4.18
Peoples Energy Corp.	5.08	5.08	5.39	5.18
Piedmont Natural Gas Co., Inc.	3.87	3.91	4.08	3.95
South Jersey Industries, Inc.	3.37	3.48	3.54	3.46
WGL Holdings Inc.	4.49	4.53	4.62	4.55
Average	4.06 %	4.13 %	4.34 %	4.18 %

Notes:
(1) The spot dividend yield is the current annualized dividend per share divided by the spot market price on 10/01/04.
(2) The average 3-month dividend yield was computed by relating the indicated annualized dividend rate and market price on the last trading day of each of the three months ended August 31, 2004.
(3) September dividend yield is calculated by using the market average price from yahoo financial
(4) Equal weight has been given to the spot, August 2004 and September 2004 dividend yield.

Source of Information: Standard & Poor's Compustat Services, Inc., PC Plus Research Insight Data Base
finance.yahoo.com

Southwest Gas Corporation
Current Institutional Holdings (1) and Individual Holdings (2) for the Proxy Group of Five Gas Distribution Companies and the Proxy Group of Eleven Value Line Gas Distribution Companies

	1 September 2004 Percentage of Institutional Holdings	2 September 2004 Percentage of Individual Holdings (1)
Southwest Gas Corporation	58.2 %	41.8 %
Proxy Group of Five Gas Distribution Companies		
AGL Resources, Inc.	53.1 %	46.9 %
Cascade Natural Gas Corp.	39.5	60.5
NICOR, Inc.	59.0	41.0
Peoples Energy Corp.	46.7	53.3
Piedmont Natural Gas Co., Inc.	37.9	62.1
Average	47.2 %	52.8 %
Proxy Group of Eleven Value Line Gas Distribution Companies		
AGL Resources, Inc.	53.1 %	46.9 %
Cascade Natural Gas Corp.	39.5	60.5
Energen Corp.	66.7	33.3
KeySpan Corp.	48.8	51.2
Laclede Group, Inc.	29.4	70.6
NICOR, Inc.	59.0	41.0
Northwest Natural Gas Co.	46.7	53.3
Peoples Energy Corp.	55.3	44.7
Piedmont Natural Gas Co., Inc.	37.9	62.1
South Jersey Industries, Inc.	42.3	57.7
WGL Holdings Inc.	48.2	51.8
Average	47.9 %	52.1 %

(1) (1 - column 1).

Source of Information: yahoo.investor.reuters.com

Southwest Gas Corporation
Development of Projected Growth for Use in the Discounted Cash Flow Model

	1	2		3
	Value Line Projected 2007-'09 Growth Rate in EPS (1)	Thomson FN / First Call Projected Five-Year Growth Rate in EPS		Average Projected Five-Year Growth Rate in EPS (2)
Southwest Gas Corporation	10.50 %	3.70 %	[3]	7.10 %
Proxy Group of Five Gas Distribution Companies				
AGL Resources, Inc.	5.00 %	4.80 %	[5]	4.90 %
Cascade Natural Gas Corp.	6.00	5.00	[2]	5.50
NICOR, Inc.	NMF	2.63	[4]	2.63
Northwest Natural Gas Co.	5.50	4.25	[2]	4.88
Piedmont Natural Gas Co., Inc.	7.50	4.68	[5]	6.09
Average	6.00 %	4.27 %		4.80 %
Proxy Group of Eleven Value Line Gas Distribution Companies				
AGL Resources, Inc	5.00 %	4.80 %	[5]	4.90 %
Cascade Natural Gas Corp.	6.00	5.00	[2]	5.50
Energen Corp.	NMF	7.00	[3]	7.00
KeySpan Corp.	6.50	5.04	[6]	5.77
Laclede Group, Inc.	4.50	5.00	[1]	4.75
NICOR, Inc.	NMF	2.63	[4]	2.63
Northwest Natural Gas Co.	5.50	4.25	[2]	4.88
Peoples Energy Corp.	1.00	4.33	[3]	2.67
Piedmont Natural Gas Co., Inc.	7.50	4.68	[5]	6.09
South Jersey Industries, Inc.	6.50	5.00	[1]	5.75
WGL Holdings Inc.	5.00	3.48	[5]	4.24
Average	5.28 %	4.66 %		4.93 %

NMF = No Meaningful Figure

Notes: (1) From sheet 2 through 13 of this Schedule.
(2) Average of Columns 1 and 2.

Source of Information: Value Line Investment Survey, (Standard Edition), September 17, 2004
ThomsonFN First Call Earnings, ec.thomsonfn.com, updated October 2, 2004

SOUTHWEST GAS NYSE-SWX

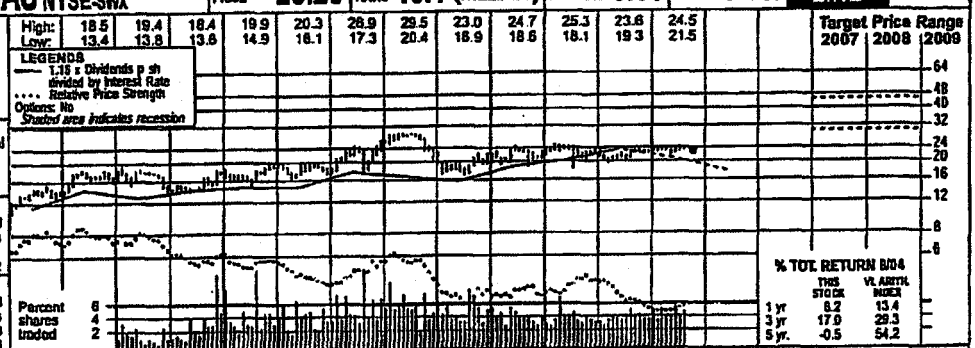
RECENT PRICE 23.23 | P/E RATIO 15.1 (Trailing: 16.2 Median: 20.0) | RELATIVE P/E RATIO 0.88 | DIV'D YLD 3.5% | VALUE LINE

TIMELINESS 3 Raised 5/14/04
SAFETY 3 Lowered 1/4/91
TECHNICAL 3 Lowered 3/5/04
BETA .80 (1.00 = Market)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
High:	18.5	19.4	18.4	19.9	20.3	26.9	29.5	23.0	24.7	25.3	23.6	24.5
Low:	13.4	13.8	13.6	14.9	16.1	17.3	20.4	16.9	18.6	18.1	19.3	21.5

Target Price Range 2007 | 2008 | 2009

LEGENDS
— 1.16 x Dividends p sh divided by Interest Rate
.... Relative Price Strength
Options: No
Shaded area indicates recession



2007-09 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	45	(+95%)	20%
Low	30	(+30%)	10%

Insider Decisions

	O	N	D	J	F	M	A	M	J
to Buy	0	0	0	0	0	0	0	0	0
Options	1	2	1	1	1	1	1	0	1
to Sell	1	2	2	1	1	1	3	0	2

Institutional Decisions

	3Q2003	4Q2003	1Q2004
to Buy	58	57	74
to Sell	46	47	33
Hld's(000)	18819	18953	19688

Percent shares traded 6 4 2

% TOT. RETURN 8/04

	THIS STOCK	VL ARITH. INDEX
1 yr	8.2	13.4
3 yr	17.0	29.3
5 yr.	-0.5	54.2

1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	© VALUE LINE PUB., INC.	07-09
27.41	26.71	25.90	24.99	25.93	25.68	28.15	23.03	24.09	26.73	30.17	30.24	32.61	42.98	39.68	35.96	38.30	42.00	Revenues per sh A	46.75
3.91	4.10	3.96	1.53	3.34	3.24	5.09	2.65	3.00	3.85	4.48	4.45	4.57	4.79	5.07	5.11	5.65	6.10	"Cash Flow" per sh	6.90
2.13	2.15	1.81	d.76	.81	.63	1.22	.10	.25	.77	1.65	1.27	1.21	1.15	1.16	1.13	1.50	1.70	Earnings per sh A B	2.15
1.34	1.39	1.40	.88	.70	.74	.80	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	.82	Div'ds Decl'd per sh C■	.82
6.33	5.67	5.06	3.76	5.02	5.43	6.64	6.79	8.19	8.19	6.40	7.41	7.04	8.17	8.50	7.03	6.65	6.80	Cap'l Spending per sh	7.05
15.51	17.30	17.63	15.88	15.99	15.96	16.36	14.55	14.20	14.09	15.67	16.31	16.82	17.27	17.91	18.42	19.30	20.70	Book Value per sh	23.25
18.76	19.32	20.04	20.80	20.60	21.00	21.28	24.47	26.73	27.39	30.41	30.99	31.71	32.49	33.29	34.23	35.25	35.25	Common Shs Outst'g D	37.00
9.7	8.5	8.7	--	16.6	26.5	14.0	NMF	NMF	24.1	13.2	21.1	16.0	19.0	19.9	19.2	Bold figures are Value Line estimates		Avg Ann'l P/E Ratio	17.0
.81	.64	.65	--	1.01	1.57	.92	NMF	NMF	1.39	.69	1.20	1.04	.97	1.09	1.11			Relative P/E Ratio	1.15
6.5%	7.5%	8.9%	7.0%	5.2%	4.4%	4.7%	5.4%	4.7%	4.4%	3.8%	3.1%	4.2%	3.8%	3.6%	3.8%			Avg Ann'l Div'd Yield	2.3%
						599.3	563.5	644.1	732.0	917.3	935.9	1034.1	1396.7	1320.9	1231.0	1350	1480	Revenues ($mill) A	1730
						26.3	2.7	6.6	20.8	47.5	39.3	38.3	37.2	38.6	38.5	55.0	60.0	Net Profit ($mill)	80.0
						38.7%	24.0%	37.1%	29.2%	43.4%	35.5%	26.2%	34.5%	32.8%	30.5%	33.0%	33.0%	Income Tax Rate	33.0%
						4.4%	.5%	1.0%	2.8%	5.2%	4.2%	3.7%	2.7%	2.9%	3.1%	3.9%	4.1%	Net Profit Margin	4.6%
						66.0%	66.2%	60.2%	63.6%	60.2%	60.3%	60.2%	56.2%	62.5%	66.0%	64.5%	58.0%	Long-Term Debt Ratio	52.5%
						33.7%	34.8%	34.4%	31.5%	35.3%	35.5%	35.8%	39.6%	34.1%	34.0%	35.5%	42.0%	Common Equity Ratio	47.5%
						1035.8	1024.0	1104.8	1224.7	1349.3	1424.7	1469.9	1417.6	1748.3	1851.6	1905	1730	Total Capital ($mill) A	1810
						1034.8	1137.8	1278.5	1360.3	1459.4	1581.1	1688.1	1825.6	1979.5	2175.7	2350	2100	Net Plant ($mill)	3100
						4.9%	2.7%	2.8%	3.9%	5.8%	4.8%	4.5%	5.1%	4.3%	4.2%	5.0%	5.5%	Return on Total Cap'l	8.5%
						7.5%	7%	1.5%	4.7%	8.9%	7.0%	6.5%	6.0%	5.9%	6.1%	8.0%	8.0%	Return on Shr. Equity	8.5%
						7.4%	.7%	1.7%	5.4%	10.0%	7.8%	7.2%	6.6%	6.5%	6.1%	8.0%	8.0%	Return on Com Equity	9.5%
						2.6%	NMF	NMF	NMF	5.0%	2.8%	2.4%	1.9%	1.9%	1.7%	4.0%	4.5%	Retained to Com Eq	6.0%
						66%	NMF	NMF	107%	50%	64%	67%	71%	70%	72%	53%	48%	All Div'ds to Net Prof	38%

CAPITAL STRUCTURE as of 6/30/04

Total Debt $1289.7 mill. Due in 5 Yrs $505.0 mill.
LT Debt $1225.8 mill. LT Interest $77.0 mill.
(Total interest coverage: 1.9x)

Pension Assets-12/03 $242.2 mill.
Oblig. $319.4 mill.

Pfd Stock None

Common Stock 35,293,916 shs.
(as of 8/2/04)

MARKET CAP: $825 million (Small Cap)

CURRENT POSITION ($MILL.)	2002	2003	6/30/04
Cash Assets	15.5	17.2	10.8
Other	212.0	263.9	229.5
Current Assets	227.5	281.1	240.3
Accts Payable	82.9	110.1	61.0
Debt Due	53.0	58.4	63.9
Other	150.4	141.9	147.5
Current Liab.	286.3	310.4	272.4
Fix. Chg. Cov.	182%	166%	183%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '01-'03 to '07-'09
Revenues	4.5%	8.0%	3.5%
"Cash Flow"	6.5%	5.5%	6.0%
Earnings	17.5%	5.0%	10.5%
Dividends	0.5%	--	1.5%
Book Value	1.0%	4.0%	4.0%

Cal-endar	QUARTERLY REVENUES ($ mil.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2001	487.5	279.0	246.1	384.1	1396.7
2002	499.5	261.1	223.9	336.4	1320.9
2003	403.3	255.8	220.2	351.7	1231.0
2004	473.4	278.7	240	357.9	1350
2005	495	305	285	395	1480

Cal-endar	EARNINGS PER SHARE B E Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2001	1.05	d.35	d.51	.96	1.15
2002	1.14	d.35	d.49	.86	1.16
2003	.76	d.12	d.51	1.00	1.13
2004	1.18	d.24	d.50	1.06	1.50
2005	1.22	d.14	d.48	1.10	1.70

Cal-endar	QUARTERLY DIVIDENDS PAID C■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2000	.205	.205	.205	.205	.82
2001	.205	.205	.205	.205	.82
2002	.205	.205	.205	.205	.82
2003	.205	.205	.205	.205	.82
2004	.205	.205	.205		

BUSINESS: Southwest Gas Corporation is a regulated gas distributor serving approx. 1.8 million customers in sections of Arizona, Nevada, and California. '03 margin mix: resid. and small commercial, 83%; large commercial and industrial, 4%; transportation, 13%. Annual volume: 2.2 billion therms. Principal suppliers: El Paso Natural Gas Co. and Northwest Pipeline Corp. Acquired gas utility assets from Arizona Public Service in 1984. Sold PriMerit Bank (acq. in '86) in 7/96. Has about 2,550 employees, 22,990 shareholders. Officers & Directors own 1.8% of common (6/04 Proxy). Chairman: Thomas Y. Hartley. CEO: Jeffrey W. Shaw. Incorporated: CA. Address: 5241 Spring Mountain Rd., P.O. Box 98510, Las Vegas, NV 89193-8510. Telephone: 702-876-7237. Internet: www.swgas.com.

Southwest Gas' share loss for the second quarter was worse than we anticipated. The company extended its loss by 12 cents a share over last year. SWX's operating expenses increased 9%, due largely to the need to support strong customer growth in its service territories. With 74,000 new customers over the past 12 months, Southwest Gas ranks among the nation's fastest-growing natural gas companies, maintaining its approximate 5% annual growth rate. Too, temperatures in April and May were warmer than normal and higher than the levels seen earlier this year. All told, we have lowered our 2004 earnings estimate by a dime to reflect the second-quarter shortfall. For now, our 2005 estimate remains unchanged at $1.70 a share, representing a more than 10% increase over 2004.

Rate relief in Nevada should provide a much-needed boost to the company's finances. State regulators raised Southwest's rates in Southern Nevada by about $7 million. Regulators estimated that Southwest Gas rates would increase by about 2.5% overall in Southern Nevada and about 7% in Northern Nevada. Southwest had filed the general rate increase to allow for higher operational costs, investments in facilities and profits. We believe the commission's expressed concern regarding the utility's debt ratings, which are one notch above "junk" status. Should the debt ratings fall below investment grade, the company's financing costs would very likely increase.

The company purchased certain natural gas distribution properties from Avista Corp for $15 million. Pending regulatory approval, SWX will integrate the properties, which serve more 18,000 South Lake Tahoe customers, into its northern Nevada operations.

Southwest Gas stock doesn't stand out right now. As an income vehicle, the stock is unappealing, since dividend payments have not changed in over eight years. However, as the company continues to improve operating efficiencies, we look for a steady upward trend in earnings over the coming quarters. The yield is decent as it stands, but, for the time being, we think investors can find better choices in the LDC group.

Edward Plank *September 17, 2004*

(A) Incl. income for PriMerit Bank on the equity basis through 1994.
(B) Based on avg. shares outstand. thru. '96, then diluted. Excl. nonrec. gains (losses): '93, 8¢; '97, 16¢; '02, (10¢). Incl. asset writedown: '86, 9¢; '93, 44¢. Excl. loss from disc. ops.: '95, 75¢. Next egs. report due mid-October.
(C) Dividends historically paid early March, June, September, December.
■ Div'd reinvest. plan avail. (D) In millions.
(E) Quarters may not sum due to change in shares outstanding.

Company's Financial Strength	B
Stock's Price Stability	95
Price Growth Persistence	60
Earnings Predictability	50

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AGL RESOURCES NYSE-ATG

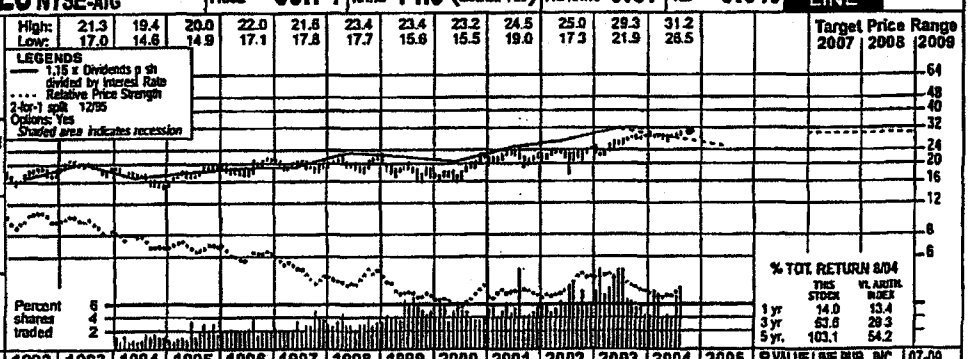
RECENT PRICE 30.74 | P/E RATIO 14.9 (Trailing: 14.4 Median: 14.9) | RELATIVE P/E RATIO 0.87 | DIV'D YLD 3.8% | VALUE LINE

TIMELINESS 4 Raised 8/6/04
SAFETY 2 New 7/27/90
TECHNICAL 3 Lowered 9/17/04
BETA .80 (1.00 = Market)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
High:	21.3	19.4	20.0	22.0	21.8	23.4	23.4	23.2	24.5	25.0	29.3	31.2
Low:	17.0	14.6	14.9	17.1	17.8	17.7	15.9	15.5	19.0	17.3	21.9	26.5

Target Price Range 2007 | 2008 | 2009

LEGENDS
— 1.15 x Dividends p sh divided by Interest Rate
.... Relative Price Strength
2-for-1 split 12/95
Options: Yes
Shaded area indicates recession



2007-09 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	40	(+30%)	10%
Low	30	(Nil)	3%

Insider Decisions

	O	N	D	J	F	M	A	M	J
to Buy	0	1	0	0	0	0	0	0	0
Options	0	0	2	0	0	0	0	0	0
to Sell	0	0	0	0	0	0	0	0	0

Institutional Decisions

	3Q2003	4Q2003	1Q2004
to Buy	72	101	84
to Sell	97	67	75
Hld's(000)	34745	34511	35012

Percent shares traded 6 4 2

% TOT. RETURN 8/04

	THIS STOCK	VL ARITH. INDEX
1 yr	14.0	13.4
3 yr	63.6	29.3
5 yr.	103.1	54.2

1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	© VALUE LINE PUB., INC.	07-09
22.97	21.63	22.58	20.26	20.43	22.73	23.59	19.32	21.91	22.75	23.36	18.71	11.25	19.04	15.32	15.26	23.00	31.90	Revenues per sh A	36.90
1.90	1.93	2.04	2.07	2.31	2.25	2.24	2.33	2.49	2.42	2.65	2.29	2.86	3.31	3.39	3.47	3.65	3.85	"Cash Flow" per sh	4.20
1.13	.95	1.01	1.04	1.13	1.08	1.17	1.33	1.37	1.37	1.41	.91	1.29	1.50	1.82	2.08	2.10	2.20	Earnings per sh A B	2.40
.88	.94	.98	1.02	1.03	1.04	1.04	1.04	1.06	1.08	1.08	1.08	1.08	1.08	1.08	1.11	1.15	1.16	Div'ds Decl'd per sh C■	1.16
2.86	2.65	2.73	2.95	2.74	2.49	2.37	2.17	2.37	2.59	2.05	2.51	2.92	2.83	3.30	2.46	2.45	2.45	Cap'l Spending per sh	2.55
8.72	8.83	8.97	9.42	9.70	9.90	10.19	10.12	10.56	10.99	11.42	11.59	11.50	12.19	12.52	14.66	15.50	16.55	Book Value per sh	20.10
42.47	43.40	44.32	47.57	48.69	49.72	50.85	55.02	55.70	56.60	57.30	57.10	54.00	55.10	56.70	64.50	65.00	65.00	Common Shs Outst'g D	65.00
11.1	13.7	14.2	15.3	15.5	17.9	15.1	12.6	13.8	14.7	13.9	21.4	13.6	14.6	12.5	12.5	Bold figures are Value Line estimates		Avg Ann'l P/E Ratio	15.0
.92	1.04	1.05	.98	.94	1.06	.99	.84	.86	.85	.72	1.22	.88	.75	.68	.72			Relative P/E Ratio	1.00
7.1%	7.2%	6.8%	6.4%	5.9%	5.4%	5.9%	6.2%	5.6%	5.4%	5.5%	5.5%	6.2%	4.9%	4.7%	4.3%			Avg Ann'l Div'd Yield	3.3%

CAPITAL STRUCTURE as of 6/30/04
Total Debt 1123.0 mill. Due in 5 Yrs 383.0 mill.
LT Debt $962.0 mill. LT Interest $60.0 mill.

(Total interest coverage: 2.9x)
Leases, Uncapitalized Annual rentals $11.8 mill
Pension Assets-12/03 $258.9 mill. Oblig. $314.6 mill.
Pfd Stock None
Common Stock 64,946,102 shs. as of 7/23/04
MARKET CAP: $2.0 billion (Mid Cap)

1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005		07-09
1199.9	1063.0	1220.2	1287.6	1338.6	1058.6	607.4	1049.3	868.9	983.7	1885	2075	Revenues ($mill) A	2400
63.2	74.3	75.6	76.6	80.6	52.1	71.1	82.3	103.0	132.4	135	145	Net Profit ($mill)	155
35.2%	36.9%	38.6%	37.9%	32.5%	33.1%	34.3%	40.7%	36.0%	35.9%	36.0%	38.0%	Income Tax Rate	36.0%
5.3%	7.0%	6.2%	5.9%	6.0%	4.9%	11.7%	7.8%	11.9%	13.5%	7.3%	6.9%	Net Profit Margin	6.5%
49.0%	47.4%	46.2%	48.7%	47.5%	45.3%	45.9%	61.3%	58.3%	50.3%	49.0%	49.0%	Long-Term Debt Ratio	50.0%
45.8%	47.6%	48.9%	45.9%	47.1%	49.2%	48.3%	38.7%	41.7%	49.7%	51.0%	51.0%	Common Equity Ratio	50.0%
1131.5	1170.3	1201.3	1356.4	1368.4	1345.8	1286.2	1736.3	1704.3	1901.4	1955	2100	Total Capital ($mill)	2605
1297.4	1350.3	1415.4	1496.6	1534.0	1598.9	1637.5	2058.9	2194.2	2352.4	2500	2700	Net Plant ($mill)	3000
7.5%	8.2%	8.0%	7.3%	7.6%	5.7%	7.4%	6.5%	6.1%	8.9%	7.0%	7.0%	Return on Total Cap'l	8.0%
11.0%	12.1%	11.7%	11.0%	11.1%	7.1%	10.2%	12.3%	14.5%	14.0%	13.5%	13.5%	Return on Shr. Equity	12.0%
11.3%	12.5%	12.1%	11.3%	12.3%	7.9%	11.5%	12.3%	14.5%	14.0%	13.5%	13.5%	Return on Com Equity	12.0%
3.0%	4.6%	3.8%	3.2%	4.4%	NMF	3.2%	4.2%	7.0%	6.6%	6.0%	6.5%	Retained to Com Eq	6.0%
75%	66%	71%	74%	64%	101%	72%	65%	52%	53%	55%	52%	All Div'ds to Net Prof	49%

CURRENT POSITION ($MILL.)	2002	2003	6/30/04
Cash Assets	8.4	16.5	54.0
Other	578.0	730.8	796.0
Current Assets	586.4	747.3	850.0
Accts Payable	91.1	73.7	535.0
Debt Due	418.6	77.0	161.0
Other	506.1	903.7	320.0
Current Liab.	1015.8	1054.4	1016.0
Fix. Chg. Cov.	242%	172%	225%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '01-'03 to '07-'09
Revenues	-2.5%	-8.0%	14.5%
"Cash Flow"	4.5%	6.0%	3.5%
Earnings	5.0%	5.5%	5.0%
Dividends	0.5%	0.5%	1.0%
Book Value	3.0%	3.5%	7.5%

Fiscal Year Ends	QUARTERLY REVENUES ($ mill.) A Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2001	294.8	350.6	175.7	228.2	1049.3
	Mar.31	Jun.30	Sep.30	Dec.31	
2002	269.3	159.2	190.7	249.7	868.9
2003	352.5	185.6	166.3	278.3	983.7
2004	651	294	350	580	1885
2005	590	485	445	555	2075

Fiscal Year Ends	EARNINGS PER SHARE A B Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2001	.41	.83	.17	.09	1.50
	Mar.31	Jun.30	Sep.30	Dec.31	
2002	.89	.21	.17	.55	1.82
2003	.98	.29	.27	.54	2.08
2004	1.00	.33	.25	.52	2.10
2005	.96	.38	.29	.57	2.20

Cal-endar	QUARTERLY DIVIDENDS PAID C■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2000	.27	.27	.27	.27	1.08
2001	.27	.27	.27	.27	1.08
2002	.27	.27	.27	.27	1.08
2003	.27	.28	.28	.28	1.11
2004	.28	.29	.29		

BUSINESS: AGL Resources, Inc. is a public utility holding company. Its distribution subsidiaries are Atlanta Gas Light, Chattanooga Gas, and Virginia Natural Gas. The utilities have around 2 million customers in Georgia, primarily Atlanta, Virginia, and in southern Tennessee. Also engaged in nonregulated natural gas marketing and other, allied services. Also wholesales and retails propane. Nonregulated subsidiaries: Georgia Natural Gas Services markets natural gas at retail. Acquired Virginia Natural Gas, 10/00. Sold Utilipro, 3/01. Officers/directors own 1.2% of outstanding common shares (3/04 Proxy). President & CEO: Paula Rospot. Incorporated: Georgia. Address: 303 Peachtree St., N.E., Atlanta, GA 30308. Telephone: 404-584-9470. Internet: www.aglresources.com.

AGL Resources signed a definitive agreement to purchase NUI. The deal, subject to regulatory approval, calls for AGL to pay $220 million in cash and assume $471 million of the troubled utility's debt. NUI ran into difficulties following an overly aggressive move into nonregulated activities, which flopped and then spiraled into accounting irregularities and executive resignations. Subsequently, NUI shed most of its unregulated operations in the past year, retaining its gas utilities and gas storage and pipeline businesses. The acquisition will strengthen AGL's utilities footprint on the East Cost from Florida to New Jersey, and increase its service base by 20% to nearly 2.2 million customers. AGL hopes to close on the deal by November, and expects it to be accretive to earnings within the first year.

The company's thirst for expansion has extended beyond the NUI acquisition. It recently agreed to buy a natural gas storage facility from a subsidiary of American Electric Power for $86 million, plus another $9 million of marketable gas currently in inventory. The facility, located in Louisiana, consists of two salt dome gas storage caverns with 9.2 billion cubic feet of capacity. AGL made the move in order to provide additional access to natural gas for its regulated utilities. The deal is expected to close by October 1st.

Earnings for full-year 2004 should come in slightly ahead of last year's figure. Last quarter, AGL reported EPS of $0.33, compared to $0.29 a year earlier. The bottom line benefited from improvement in the company's utility operations, as a result of an increase in the average number of connected customers. Profits from AGL's nonregulated operations were down in the aggregate, however, as reduced volatility in gas prices lowered margins. We are holding our share-net estimate for 2004 unchanged at $2.10, but raising our 2005 estimate by a nickel, to $2.20, to account for the acquisitions.

This issue is a good-quality income stock. Its Price Stability (100) is excellent, and the stock provides a decent dividend yield. AGL's growth initiatives provide for decent capital gains potential for a utility, though the stock is already trading at company-record highs.

Michael P. Maloney *September 17, 2004*

(A) Fiscal year ends December 31st. Ended September 30th prior to 2002. (B) Diluted earnings per share. Next earnings report due late October. Excl. nonrecurring gains (losses): '88, $0.15; '95, d$0.83; '99, $0.39; '00, $0.13; '01, $0.13; '03, d$0.07. (C) Dividends historically paid early March, June, Sept, and Dec. ■ Div'd reinvest. plan available. (D) In millions, adjusted for stock split.

Company's Financial Strength	B++
Stock's Price Stability	100
Price Growth Persistence	45
Earnings Predictability	65

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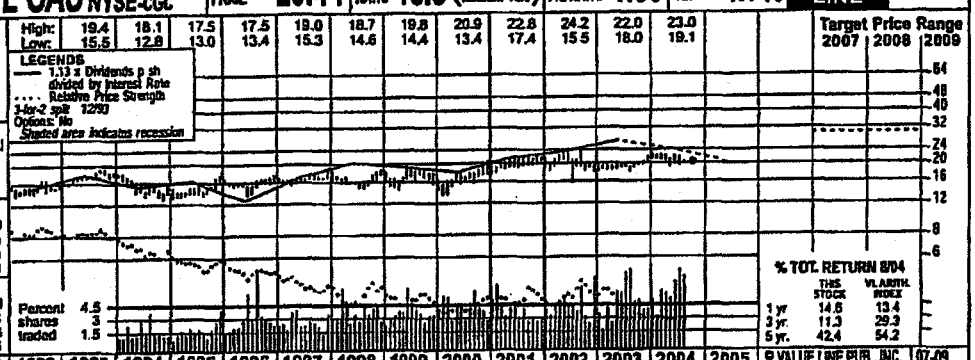
CASCADE NAT'L GAS NYSE-CGC

RECENT PRICE 20.44 | P/E RATIO 18.3 (Trailing: 17.2 Median: 18.0) | RELATIVE P/E RATIO 1.06 | DIV'D YLD 4.7% | VALUE LINE

TIMELINESS 4 Raised 9/3/04
SAFETY 3 New 7/27/98
TECHNICAL 3 Lowered 7/2/04
BETA .75 (1.00 = Market)

High:	19.4	18.1	17.5	17.5	19.0	18.7	19.8	20.9	22.8	24.2	22.0	23.0
Low:	15.5	12.8	13.0	13.4	15.3	14.6	14.4	13.4	17.4	15.5	18.0	19.1

Target Price Range 2007 | 2008 | 2009



2007-09 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	30	(+45%)	14%
Low	20	(Nil)	5%

Insider Decisions

	O	N	D	J	F	M	A	M	J
to Buy	1	0	2	0	0	0	0	0	0
Options	0	0	0	0	0	0	0	0	0
to Sell	0	0	0	0	0	0	0	0	0

Institutional Decisions

	3Q2003	4Q2003	1Q2004
to Buy	36	45	44
to Sell	36	22	25
Hld's(000)	4810	4234	4396

% TOT. RETURN 8/04

	THIS STOCK	VL ARITH. INDEX
1 yr.	14.6	13.4
3 yr.	11.3	29.3
5 yr.	42.4	54.2

1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	© VALUE LINE PUB., INC.	07-09
24.51	26.87	24.45	23.27	20.03	21.88	21.59	19.98	11.84	17.85	17.17	18.89	21.90	30.40	29.06	27.20	28.15	29.45	Revenues per sh A	39.60
1.97	2.47	2.36	2.29	1.66	2.04	1.71	2.07	1.22	1.92	2.06	2.40	2.60	2.72	2.48	2.25	2.60	2.80	"Cash Flow" per sh	4.70
.84	1.29	1.26	1.14	.53	1.05	.60	.80	.39	.93	.84	1.24	1.39	1.47	1.13	.87	1.15	1.25	Earnings per sh AB	1.65
.85	.85	.87	.90	.93	.94	.96	.96	.72	.96	.96	.96	.96	.96	.96	.96	.96	.96	Div'ds Decl'd per sh C■	.98
1.62	1.99	2.50	2.97	4.64	3.85	3.06	4.12	2.42	2.68	2.32	1.81	1.65	2.16	1.91	2.56	3.40	3.65	Cap'l Spending per sh	4.60
7.46	7.96	8.33	8.63	9.09	9.96	9.81	9.76	10.09	10.16	10.07	10.36	10.79	11.01	10.34	10.11	11.35	11.25	Book Value per sh D	13.75
6.43	6.49	6.56	6.63	7.61	8.57	8.91	9.14	10.79	10.97	11.05	11.05	11.05	11.05	11.05	11.13	11.20	11.20	Common Shs Outst'g E	12.00
11.7	8.6	8.9	12.2	23.7	16.6	25.7	18.2	40.0	17.6	19.4	13.7	11.7	13.4	18.2	22.0	Bold figures are	Value Line	Avg Ann'l P/E Ratio	15.0
.97	.65	.66	.78	1.44	.98	1.69	1.22	2.51	1.01	1.01	.78	.76	.69	.99	1.25	estimates		Relative P/E Ratio	1.00
8.7%	7.7%	7.8%	6.4%	6.2%	5.4%	6.2%	6.6%	4.6%	5.9%	5.9%	5.7%	5.9%	4.9%	4.7%	5.0%			Avg Ann'l Div'd Yield	3.9%
						192.4	182.7	127.7	195.8	189.7	208.6	241.9	335.8	321.0	302.8	315	330	Revenues ($mill) A	475
						5.8	7.7	4.2	10.6	9.8	14.2	15.4	16.2	12.5	9.7	13.0	14.0	Net Profit ($mill)	20.0
						37.8%	36.8%	34.8%	37.1%	37.4%	36.5%	37.1%	35.0%	34.9%	34.2%	35.0%	35.0%	Income Tax Rate	35.0%
						3.0%	4.2%	3.3%	5.4%	5.2%	6.8%	6.4%	4.8%	3.9%	3.2%	4.1%	4.2%	Net Profit Margin	4.2%
						51.3%	51.4%	45.8%	50.6%	48.4%	50.9%	51.2%	50.7%	59.1%	55.9%	52.0%	55.0%	Long-Term Debt Ratio	56.0%
						44.8%	45.0%	50.0%	46.5%	48.7%	46.6%	48.8%	49.3%	40.9%	44.1%	48.0%	45.0%	Common Equity Ratio	44.0%
						194.9	198.5	217.8	239.4	228.5	245.6	244.2	246.6	279.1	255.5	265	280	Total Capital ($mill)	375
						213.0	239.1	255.7	265.2	278.6	282.3	284.8	294.2	299.8	312.3	335	345	Net Plant ($mill)	430
						4.9%	5.9%	3.4%	6.2%	6.1%	7.5%	8.1%	8.5%	6.4%	6.0%	6.5%	6.5%	Return on Total Cap'l	7.0%
						6.1%	8.0%	3.6%	9.0%	8.3%	11.7%	12.9%	13.3%	10.9%	8.6%	10.0%	11.0%	Return on Shr. Equity	12.0%
						5.9%	8.1%	3.5%	9.1%	8.3%	12.0%	12.9%	13.3%	10.9%	8.6%	10.0%	11.0%	Return on Com Equity	12.0%
						NMF	NMF	NMF	.7%	NMF	2.7%	4.0%	4.5%	1.7%	NMF	2.0%	2.5%	Retained to Com Eq	5.0%
						NMF	106%	NMF	93%	108%	78%	69%	65%	85%	110%	83%	77%	All Div'ds to Net Prof	59%

CAPITAL STRUCTURE as of 6/30/04

Total Debt $165.9 mill. Due in 5 Yrs $45.0 mill.
LT Debt $133.9 mill. LT Interest $10.0 mill
(LT interest earned: 2.2x; total interest coverage: 2.2x)

Pension Assets-9/03 $45.7 mill. Oblig. $63.4 mill.

Pfd Stock None

Common Stock 11,245,757 shs.
as of 7/30/04
MARKET CAP: $225 million (Small Cap)

CURRENT POSITION A ($MILL.)	2002	2003	6/30/04
Cash Assets	3.7	7.5	.8
Other	35.6	33.1	39.9
Current Assets	39.3	40.6	40.5
Accts Payable	12.6	10.5	14.6
Debt Due	--	25.6	32.0
Other	23.1	19.7	19.2
Current Liab.	35.7	56.0	65.8
Fix. Chg. Cov.	235%	213%	210%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '01-'03 to '07-'09
Revenues	3.0%	13.0%	5.5%
"Cash Flow"	2.0%	7.5%	11.0%
Earnings	2.0%	10.0%	6.0%
Dividends	0.5%	2.0%	.5%
Book Value	1.5%	0.5%	4.5%

Fiscal Year Ends	QUARTERLY REVENUES ($ mill.) A Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2001	105.0	124.7	64.1	42.0	335.8
2002	102.8	122.3	56.8	39.1	321.0
2003	100.5	109.3	53.8	39.2	302.8
2004	104.9	119.4	52.1	38.6	315
2005	105	125	60.0	40.0	330

Fiscal Year Ends	EARNINGS PER SHARE A B Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2001	.76	.81	.05	d.15	1.47
2002	.56	.86	d.06	d.23	1.13
2003	.60	.67	d.18	d.22	.87
2004	.71	.76	d.06	d.26	1.15
2005	.62	.82	d.05	d.14	1.25

Cal-endar	QUARTERLY DIVIDENDS PAID C■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2000	.24	.24	.24	.24	.96
2001	.24	.24	.24	.24	.96
2002	.24	.24	.24	.24	.96
2003	.24	.24	.24	.24	.96
2004	.24	.24	.24		

BUSINESS: Cascade Natural Gas Corporation distributes natural gas to over 210,000 customers in Washington and Oregon. In 2003, total throughput was 116.2 billion cu. ft. Core customers: residential, commercial, firm industrial, interruptible (64% of oper. margin, 19% of gas deliveries); non-core: industrial, transportation service (36%, 81%). Serves pulp & paper, plywood, chem. fertilizer, oil refining, & food process. inds. Main connecting pipeline: Northwest Pipeline Corp. '03 deprec. rate: 2.8%. Est'd plant age: 12 yrs. Has around 435 employees. Officers and directors own 1.6% of com. (12/03 proxy). President and Chief Executive Officer: W. Brian Matsuyama. Inc.: WA. Address: 222 Fairview Ave. North, Seattle, WA 98109. Tel.: 206-624-3900. Internet: www.cngc.com.

We have brought down our fiscal 2004 (ends September 30th) earnings target for Cascade Natural Gas. This can be attributed partly to lower-than-expected demand from the residential and commercial segments, reflecting warmer temperatures. (Partially offsetting this has been the addition of new customers, amounting to more than 8,000 thus far this year.) To further complicate matters, persistently high natural gas prices have dampened consumption from electric generation customers, despite the fact that dry weather has caused a reduction of hydroelectric resources. That said, we now believe that share net will be around $1.15 this year, which is still respectable. Our fiscal 2005 estimate has been reduced to $1.25 a share, based on our assumption that high natural gas prices will continue, although a new gas procurement strategy for the core customers ought to help.

Present difficulties aside, the company looks positioned to generate healthier results later in the decade. Generally favorable economic conditions in the Pacific Northwest enabled annual account hookups to grow at a steady rate in the past, and we expect this trend to persist. And it should be noted that a substantial number of newly constructed homes in that region contain appliances that utilize gas, such as water heaters. Furthermore, a considerable portion of new business may well come from conversions, given natural gas' environmental advantages and assuming that prices for this fuel source are at competitive levels relative to oil. These factors could enable the bottom line to advance around 10% annually, on average, over the 2007-2009 time period.

The shares of Cascade Natural Gas, ranked 4 (Below Average) for Timeliness, offer a good dividend yield. But additional increases in the payout aren't likely soon, owing partly to the company's use of cash flows to accommodate an expanding customer base. Another factor to be considered is the sensitivity of earnings to fluctuations in service-area temperatures, arising from the absence of weather-normalization adjustment mechanisms. (Our presentation assumes normal temperatures, though.)

Frederick L. Harris, III September 17, 2004

(A) Cal. yr. thru. 12/95. Changed to 9/30 fiscal yr. in '96. (B) Primary egs. thru. '97, then diluted. Excl. nonrec. gains (losses): '81, 19¢; '93, 3¢; '96, (11¢); '98, (2¢); '99, (1¢); '01, 9¢; '02, (16¢); '03, (5¢). Next egs. rpt. due late Oct. (C) Dividends historically paid in the middle of Feb., May, Aug., Nov. ■Div'd reinvest. plan avail. (D) Incl. deferred charges. In '03: $17.5 mill., $1.58/sh. (E) In mill., adj. for stk. split.

Company's Financial Strength	B+
Stock's Price Stability	90
Price Growth Persistence	50
Earnings Predictability	70

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ENERGEN CORP. NYSE-EGN

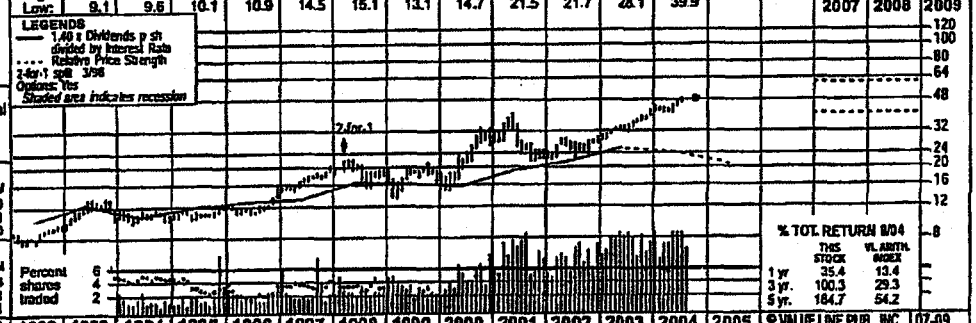
RECENT PRICE 48.68 | P/E RATIO 14.1 (Trailing: 15.4 Median: 13.0) | RELATIVE P/E RATIO 0.82 | DIV'D YLD 1.6% | VALUE LINE

TIMELINESS 3 Lowered 12/5/03
SAFETY 3 Lowered 9/17/04
TECHNICAL 3 Lowered 3/26/04
BETA .70 (1.00 = Market)

High:	13.4	11.9	12.6	15.8	20.8	22.5	21.3	33.8	40.3	30.0	42.0	49.4	
Low:	9.1	9.6	10.1	10.9	14.5	15.1	13.1	14.7	21.5	21.7	28.1	39.9	

Target Price Range 2007 | 2008 | 2009

LEGENDS
— 1.40 x Dividends p sh divided by Interest Rate
.... Relative Price Strength
2-for-1 split 3/98
Options: Yes
Shaded area indicates recession



2007-09 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	60	(+25%)	7%
Low	40	(-20%)	-3%

Insider Decisions

	O	N	D	J	F	M	A	M	J
to Buy	0	0	0	0	0	1	0	0	0
Options	0	0	4	1	1	1	1	1	1
to Sell	0	2	5	0	1	1	0	1	0

Institutional Decisions

	3Q2003	4Q2003	1Q2004
to Buy	92	86	94
to Sell	80	71	71
Hld's(000)	22044	23179	23641

% TOT. RETURN 9/04

	THIS STOCK	VL ARITH. INDEX
1 yr.	35.4	13.4
3 yr.	100.3	29.3
5 yr.	184.7	54.2

1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	© VALUE LINE PUB., INC.	07-09
22.75	15.92	16.45	16.11	16.30	17.30	17.27	14.72	17.89	15.57	17.17	16.69	18.45	25.22	19.49	23.25	25.35	27.20	Revenues per sh A	32.80
2.12	1.73	1.83	1.89	2.06	2.10	2.28	2.24	2.81	3.08	4.00	4.30	4.73	5.01	4.89	6.27	7.05	8.20	"Cash Flow" per sh	10.80
.84	.60	.68	.71	.77	.89	1.01	.89	.98	1.16	1.23	1.32	1.62	2.23	1.99	3.09	3.35	3.85	Earnings per sh B	4.05
.39	.42	.46	.48	.51	.53	.55	.57	.59	.61	.63	.65	.67	.69	.71	.73	.76	.79	Div'ds Decl'd per sh C■	.90
2.68	3.07	2.12	2.32	1.11	2.12	2.09	3.16	7.54	9.84	5.96	4.03	4.42	6.13	4.76	6.06	7.95	8.60	Cap'l Spending per sh	12.75
5.59	5.84	6.10	6.04	6.38	6.60	7.65	7.97	8.44	10.46	11.25	12.13	13.31	15.45	16.77	19.30	18.45	20.45	Book Value per sh D	24.05
15.95	19.39	19.75	20.21	20.37	20.64	21.84	21.82	22.33	28.80	29.28	29.80	30.11	31.12	34.75	36.22	37.50	39.00	Common Shs Outst'g E	45.00
8.3	16.1	13.3	12.6	11.0	12.4	11.1	12.3	12.0	13.4	15.6	13.5	10.8	13.6	13.0	11.1	Bold figures are		Avg Ann'l P/E Ratio	12.5
.69	1.22	.99	.80	.67	.73	.73	.82	.75	.77	.81	.77	.70	.70	.71	.64	Value Line		Relative P/E Ratio	.85
6.6%	4.4%	5.1%	5.4%	6.0%	4.8%	4.9%	5.2%	5.0%	3.9%	3.3%	3.6%	3.4%	2.3%	2.8%	2.1%	estimates		Avg Ann'l Div'd Yield	1.8%

CAPITAL STRUCTURE as of 6/30/04
Total Debt $532.9 mill. Due in 5 Yrs $105.0 mill.
LT Debt $522.9 mill. LT Interest $30.0 mill.
(Total interest coverage: 5.1x)

Leases, Uncapitalized Annual rentals $5.6 mill.

Pension Assets-6/03 $110.8 mill. Oblig. $139.9 mill.

Pfd Stock None

Common Stock 36,383,542 shs as of 6/3/04

MARKET CAP: $1.8 billion (Mid Cap)

1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005		07-09
377.1	321.2	399.4	448.2	502.6	497.5	558.6	785.0	677.2	842.2	950	1060	Revenues ($mill) A	1475
21.8	19.3	21.5	29.0	36.3	39.6	55.2	69.1	64.9	110.3	125	150	Net Profit ($mill)	185
22.7%	16.0%	19.0%	8.6%	--	3%	11.4%	19.0%	22.5%	36.8%	37.0%	37.0%	Income Tax Rate	37.0%
5.8%	6.0%	5.4%	6.5%	7.2%	8.0%	9.9%	8.8%	9.6%	13.1%	13.2%	14.2%	Net Profit Margin	12.5%
41.5%	43.1%	60.9%	46.1%	53.1%	50.7%	46.9%	53.1%	46.8%	44.2%	48.0%	45.0%	Long-Term Debt Ratio	43.0%
58.5%	56.9%	49.1%	51.9%	46.9%	49.3%	53.1%	46.9%	53.2%	55.8%	52.0%	55.0%	Common Equity Ratio	57.0%
285.3	305.5	384.0	580.7	702.0	733.3	754.8	1024.9	1095.8	1251.9	1330	1450	Total Capital ($mill)	1900
287.2	327.3	444.9	667.0	756.3	861.1	907.8	998.3	1256.8	1433.5	1550	1650	Net Plant ($mill)	2100
9.5%	8.3%	7.1%	6.4%	6.8%	7.4%	9.3%	8.7%	7.3%	10.2%	11.0%	11.5%	Return on Total Cap'l	11.0%
13.1%	11.1%	11.4%	9.6%	11.0%	11.0%	13.8%	14.4%	11.1%	15.8%	18.0%	19.0%	Return on Shr. Equity	17.0%
13.1%	11.1%	11.4%	9.6%	11.0%	11.0%	13.8%	14.4%	11.1%	15.8%	18.0%	19.0%	Return on Com Equity	17.0%
6.0%	4.0%	4.5%	4.5%	5.5%	5.7%	8.5%	10.0%	7.0%	12.1%	14.0%	15.0%	Retained to Com Eq	13.5%
54%	64%	60%	53%	50%	48%	36%	31%	37%	24%	23%	21%	All Div'ds to Net Prof	22%

CURRENT POSITION ($MILL.)	2002	2003	6/30/04
Cash Assets	4.8	2.1	63.0
Other	212.0	288.0	242.0
Current Assets	216.8	290.1	305.0
Accts Payable	104.0	135.3	142.2
Debt Due	136.0	21.0	10.0
Other	135.9	171.4	165.9
Current Liab.	375.9	327.7	318.1
Fix. Chg. Cov.	311%	520%	500%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '01-'03 to '07-'09
Revenues	3.0%	6.0%	NMF
"Cash Flow"	10.5%	10.5%	NMF
Earnings	12.0%	17.0%	NMF
Dividends	3.5%	3.0%	NMF
Book Value	10.5%	11.5%	NMF

Fiscal Year Ends	QUARTERLY REVENUES ($ mill.) A Mar.31	Jun.30	Sep.30	Dec.31	Full Fiscal Year
2001	--	--	--	--	--
2002	243.3	139.6	117.0	177.4	677.2
2003	309.7	184.0	146.1	202.4	842.2
2004	351.4	188.2	175	235.4	950
2005	380	230	200	250	1060

Fiscal Year Ends	EARNINGS PER SHARE A B Mar.31	Jun.30	Sep.30	Dec.31	Full Fiscal Year
2001	--	--	--	--	--
2002	1.17	.31	d.03	.54	1.99
2003	1.52	.69	.32	.58	3.09
2004	1.55	.61	.34	.75	3.35
2005	1.75	.78	.52	.80	3.85

Cal-endar	QUARTERLY DIVIDENDS PAID C■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2000	.165	.165	.17	.17	.67
2001	.17	.17	.175	.175	.69
2002	.175	.175	.18	.18	.71
2003	.18	.18	.185	.185	.73
2004	.185	.185	.193		

BUSINESS: Energen Corporation is a holding company. Alabama Gas Corporation (Alagasco), a subsidiary, sells to around 465,000 customers in central and northern Alabama, including Birmingham and Montgomery. 2003 utility revenues: residential, 65.6%; commercial and industrial, 25.8%; transportation and other, 8.5%. 2003 *deliveries: 95.4 MMcf. Energy Resources Corporation, a subsidiary,* engages primarily in exploration and production of natural gas. 2003 proved reserves: gas, 886.3 MMcf; oil, 52.5 MBbl; NGL, 27.2 MBbl. Has around 1,500 employees. Chairman, President & Chief Executive Officer: Wm. Michael Warren, Jr. Incorporated: Alabama. Address: 2101 Sixth Avenue North, Birmingham, Alabama 35203-2784. Telephone: 205-326-2700. Internet: www.energen.com.

We believe that Energen's bottom line will advance at a moderate rate this year. But that would be quite respectable, given last year's exceptional performance. Energen Resources, the E&P subsidiary, is enjoying persistently high commodity prices, particularly for its unhedged production (around 14% of estimated natural gas volumes and 17% of projected oil output for the rest of this year). Results here are also being aided by the acquisition of certain properties in the San Juan Basin (discussed below). But given that the transaction was completed during the third quarter, the full benefits will not be realized until 2005. Meanwhile, Alagasco, the Alabama-based natural gas distributor, is performing better than last year, as it is earning within an allowed range of return on a higher level of equity. On a consolidated basis, share earnings ought to rise to around $3.35 in 2004. Assuming a continuation of favorable trends, the bottom line stands to reach $3.85 a share next year.

Management purchased a number of coalbed methane properties in the San Juan Basin from a private firm for approximately $273 million (financed with cash on hand and lines of credit). This strategy strengthens Energen's position in a core area, and offers healthy expansion opportunities with the addition of an estimated 240 billion cubic feet equivalent of proved natural gas and natural gas liquids reserves. What's more, these mostly natural gas fields are long-lived, operated by the company (enabling it to control the timing and magnitude of capital spending), and about half of them are developed.

The price of these shares continues to climb, reflecting investor optimism surrounding the commodity markets. But long-term total-return potential is unspectacular, given that the equity is already trading within our Target Price Range and assuming that the dividend continues to grow at a modest rate. And it is important to note that Energen's growing reliance on oil and natural gas increases the potential for higher share-price volatility. In view of this, we have lowered these shares' Safety rank one notch, to 3 (Average).

Frederick L. Harris, III September 17, 2004

(A) Fiscal year end 9/30 thru '01. 12/31 after. Three-month stub end 12/31/01: Sales, $147.3 mill. EPS, 28¢ (excl. nonrec. charge of 17¢). (B) Primary egs thru '96, then diluted. Excl. nonrec. items: '92, 5¢; '94, 9¢; '99, 6¢; '00, d7¢; '01, d4¢; '02, 10¢. Excl. disc. ops.: '89, d14¢; '02, 1¢; '03, 1¢. Qtrs. for '03 don't equal total due to anti-dilution. Next egs. rpt. late Oct. (C) Dividends historically paid in early March, June, Sept., Dec. ■ Div'd reinvest. plan avail. (D) Incl. intang. assets. In '03: $57.9 mill., $1.60/sh. (E) In mill., adjusted for stock split.

Company's Financial Strength	B++
Stock's Price Stability	75
Price Growth Persistence	100
Earnings Predictability	65

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KEYSPAN CORP. NYSE-KSE

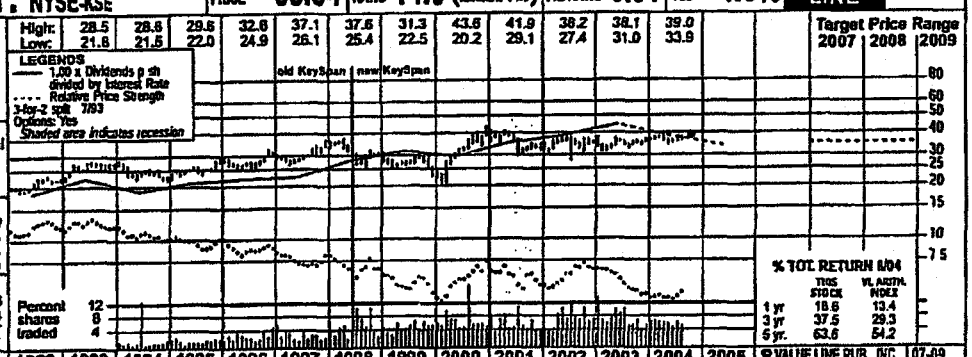
RECENT PRICE 38.84 | P/E RATIO 14.0 (Trailing: 13.2 Median: 14.0) | RELATIVE P/E RATIO 0.81 | DIV'D YLD 4.6% | VALUE LINE

TIMELINESS 3 Raised 8/13/04
SAFETY 2 Lowered 3/26/99
TECHNICAL 2 Raised 8/27/04
BETA .75 (1.00 = Market)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
High:	28.5	28.6	29.6	32.6	37.1	37.6	31.3	43.6	41.9	38.2	38.1	39.0
Low:	21.6	21.5	22.0	24.9	26.1	25.4	22.5	20.2	29.1	27.4	31.0	33.9

Target Price Range 2007 | 2008 | 2009

LEGENDS
— 1.00 x Dividends p sh divided by Interest Rate
.... Relative Price Strength
3-for-2 split 7/93
Options: Yes
Shaded area indicates recession



2007-09 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	50	(+30%)	10%
Low	35	(-10%)	2%

Insider Decisions

	O	N	D	J	F	M	A	M	J
to Buy	0	0	0	0	0	0	0	0	0
Options	0	0	1	3	2	4	0	0	0
to Sell	0	0	1	3	2	4	0	0	0

Institutional Decisions

	3Q2003	4Q2003	1Q2004
to Buy	164	172	164
to Sell	121	113	107
Hld's(000)	77907	78367	80527

% TOT. RETURN 8/04

	THIS STOCK	VL ARITH. INDEX
1 yr	18.6	13.4
3 yr	37.5	29.3
5 yr.	63.6	54.2

1986	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	© VALUE LINE PUB., INC.	07-09
25.51	26.71	26.84	23.43	24.74	25.99	28.13	24.93	28.72	29.12	13.20	22.07	37.56	47.57	41.92	43.31	43.40	48.60	Revenues per sh	55.40
2.55	2.64	2.62	2.38	3.03	3.04	3.29	3.35	3.54	4.27	.45	3.57	4.51	5.72	6.36	6.22	7.00	7.25	"Cash Flow" per sh	8.30
1.66	1.68	1.62	1.45	1.35	1.73	1.85	1.90	1.98	2.12	d1.34	1.62	2.10	1.72	2.75	2.62	2.75	2.85	Earnings per sh B	3.45
1.15	1.19	1.23	1.27	1.29	1.32	1.35	1.39	1.42	1.46	1.50	1.78	1.78	1.78	1.78	1.78	1.78	1.78	Div'ds Decl'd per sh C ■	1.90
3.46	4.30	3.51	3.44	3.95	4.37	4.15	4.36	6.04	5.60	5.19	5.42	4.64	7.60	7.96	6.34	6.00	6.70	Cap'l Spending per sh	7.70
12.77	13.36	13.68	14.37	14.65	15.54	16.27	16.94	18.17	19.09	23.18	20.28	20.65	20.73	20.67	22.94	24.45	25.00	Book Value per sh D	29.25
35.23	38.29	37.30	42.28	43.45	46.36	47.59	48.79	49.86	50.77	130.42	133.87	136.36	139.43	142.42	159.66	160.40	161.00	Common Shs Outst'g E	162.50
9.4	10.1	11.9	13.1	15.1	14.3	13.7	12.7	13.7	13.8	--	16.8	14.8	20.6	12.7	13.1	Bold figures are Value Line estimates		Avg Ann'l P/E Ratio	12.5
.78	.76	.88	.84	.92	.84	.90	.85	.86	.80	--	.96	.96	1.07	.69	.76			Relative P/E Ratio	.85
7.4%	7.0%	6.4%	6.7%	6.4%	5.3%	5.3%	5.8%	5.3%	5.0%	4.8%	6.5%	5.7%	5.0%	5.1%	5.2%			Avg Ann'l Div'd Yield	4.6%

1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005		07-09
1338.6	1218.3	1432.0	1478.2	1721.9	2954.6	5121.5	6633.1	5970.7	6915.2	6960	7270	Revenues ($mill) A	9000
87.4	91.8	97.2	106.1	d166.9	258.6	300.8	243.7	397.4	424.2	450	470	Net Profit ($mill)	565
31.8%	32.0%	28.9%	35.0%	--	34.5%	41.8%	48.4%	36.2%	39.5%	38.0%	38.0%	Income Tax Rate	39.0%
6.5%	7.5%	6.8%	7.2%	NMF	8.8%	5.9%	3.7%	6.7%	6.1%	6.5%	6.5%	Net Profit Margin	6.3%
47.3%	46.4%	43.8%	43.5%	31.8%	37.5%	59.6%	61.2%	63.3%	60.0%	56.5%	56.5%	Long-Term Debt Ratio	54.5%
52.2%	53.2%	55.8%	56.5%	59.4%	60.6%	39.2%	37.7%	35.7%	39.1%	42.5%	42.5%	Common Equity Ratio	44.5%
1482.8	1553.8	1624.4	1714.1	5089.9	4482.1	7175.0	7672.3	8252.5	9356.9	9250	9450	Total Capital ($mill)	10650
1405.3	1512.6	1698.1	1810.6	3778.3	4240.0	6358.3	6605.9	7217.6	8894.3	7000	7300	Net Plant ($mill)	8000
7.5%	7.5%	7.4%	7.3%	NMF	7.1%	5.3%	4.5%	6.2%	5.8%	6.5%	6.5%	Return on Total Cap'l	7.0%
11.2%	11.0%	10.7%	10.9%	NMF	9.2%	10.4%	8.2%	13.1%	11.3%	11.5%	11.5%	Return on Shr. Equity	11.5%
11.2%	11.1%	10.7%	10.9%	NMF	8.2%	10.0%	8.2%	13.3%	11.4%	11.5%	11.5%	Return on Com Equity	12.0%
3.0%	2.9%	2.9%	3.3%	NMF	NMF	1.4%	NMF	4.8%	3.9%	4.0%	4.5%	Retained to Com Eq	5.0%
73%	74%	73%	70%	NMF	110%	86%	103%	65%	66%	65%	62%	All Div'ds to Net Prof	56%

CAPITAL STRUCTURE as of 6/30/04
Total Debt $5.3 bill. Due in 5 Yrs $2.7 bill.
LT Debt $5.2 bill. LT Interest $370.0 mill.
(total interest coverage: 3.1x)

Pension Assets-12/03 $1.9 bill. Oblig. $2.3 bill.

Pfd Stock $83.3 mill. Pfd Div'd $5.8 mill.

Common Stock 160,176,000 shs.

MARKET CAP: $6.2 billion (Large Cap)

CURRENT POSITION ($MILL.)	2002	2003	6/30/04
Cash Assets	170.6	205.8	818.1
Other	2045.9	2181.1	1702.6
Current Assets	2216.5	2386.9	2520.7
Accts Payable	1061.6	1141.6	738.1
Debt Due	927.1	483.4	56.5
Other	231.5	223.6	266.1
Current Liab.	2220.2	1848.6	1060.7
Fix. Chg. Cov.	289%	315%	300%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '01-'03 to '07-'09
Revenues	6.0%	13.5%	4.0%
"Cash Flow"	8.0%	17.0%	5.5%
Earnings	4.5%	21.0%	6.5%
Dividends	3.0%	4.0%	1.0%
Book Value	4.0%	1.5%	5.5%

Cal-endar	QUARTERLY REVENUES ($ mill.) A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2001	2575.1	1339.3	1102.4	1616.3	6633.1
2002	1871.6	1216.1	1079.8	1803.2	5970.7
2003	2512.5	1408.2	1131.8	1862.7	6915.2
2004	2595.6	1365.8	1109	1898.6	6960
2005	2650	1450	1160	2010	7270

Cal-endar	EARNINGS PER SHARE A B Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2001	1.61	d.06	d.28	.43	1.72
2002	1.51	.20	.02	1.02	2.75
2003	1.53	d.05	.07	1.07	2.62
2004	1.53	.28	d.06	1.00	2.75
2005	1.65	.26	.02	1.03	2.85

Cal-endar	QUARTERLY DIVIDENDS PAID A C ■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2000	.445	.445	.445	.445	1.78
2001	.445	.445	.445	.445	1.78
2002	.445	.445	.445	.445	1.78
2003	.445	.445	.445	.445	1.78
2004	.445	.445	.445		

BUSINESS: KeySpan Corp. is a holding company created 5/98, via the merger of KeySpan Energy (formerly Brooklyn Union) and Long Island Lighting. Acq. Eastern Enterprises 11/8/00, making KeySpan the largest gas distributor in the Northeast, serving most of New York City and nearby Long Island, and New England. Has 2.5 mill. gas meters; its market is mainly one-family homes and apartments. Also generates electricity and operates transmission/distr. sys. by contract with LI Power Author. Parent owns 23.5% of Houston Exploration; 20% of Iroquois Pipeline. Non-regulated subs. market gas supplies, sell ind'l energy mgmt. svcs. Has 13,000 empls. Chmn.: R.B. Catell. Inc.: NY. Address: 1 MetroTech Center, Brooklyn, NY 11201. Telephone: 718-403-1000. Web: www.keyspanenergy.com.

KeySpan is improving its financial profile. As a largely state-regulated enterprise, KeySpan has to operate with a balance sheet leveraged with senior capital. Gas distribution and power production are very capital-intensive businesses. Since the larger gas system, in particular, has no direct competition, regulators require that it finance heavily with debt—on which the interest rate is much less than the return allowed on equity capital—in order to keep charges to ratepayers as low as possible. But KeySpan, overall, has long operated with too much debt ahead of common equity, making the stock a little riskier and precluding a rising dividend. Management has been addressing the problem, and this year it has taken bolder steps to ease the pressure. In several complex financial moves, including the sale of much of its stake in Houston Exploration and a sale-and-leaseback arrangement covering the Ravenswood (New York City) power facility, KeySpan raised enough funds to effect a sizable paydown of debt while adding a bit to shareholders' equity.

The stock remains a good choice for income. KeySpan's capitalization ratios are the best they've been in many years. We expect management will keep at it to gradually lower the debt component towards a more prudent 50% via asset sales. There is the possibility of some equity financing down the road, though management would have to be careful not to dilute the regulated share earnings. Meanwhile, this year's actions and the prospect of better operating earnings for 2004 from gas distribution, power production, and miscellaneous energy-related services should afford the current quarterly dividend an ample safeguard.

The current dividend yield is moderately above the gas-stock average, reflecting the absence of a growing payout. In general, gas-utility stocks have lately been getting a stronger underpinning. KeySpan's higher market value has narrowed its yield premium. That might suggest investors believe the company's finances are closer to providing the margin of safety needed to permit a dividend hike. Our take for now is that management may want to play it cautiously and defer raising the payout for several more quarters.

Gerald Holtzman *September 17, 2004*

(A) Data for former KeySpan Energy through '97 (years end 9/30); new KeySpan Corp. from '98 on a calendar-year basis. (B) Diluted shs. Excl. nonrecur. gains (charges): '90, ($0.19); '96, $0.52; '97, $0.16; '03, ($0.23); '04, $0.53. Excl. gain (loss) discont. ops.: '00, ($0.02); '01, ($0.14); '02, ($0.14). Next egs. report due late Oct. (C) Dividends historically paid in February, May, August, and November. ■ Div'd reinvestment plan available. (D) Includes deferred charges. At 12/31/03: $18.40 /sh. (E) In millions, adjusted for split.

Company's Financial Strength	B++
Stock's Price Stability	95
Price Growth Persistence	50
Earnings Predictability	10

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LACLEDE GROUP NYSE-LG

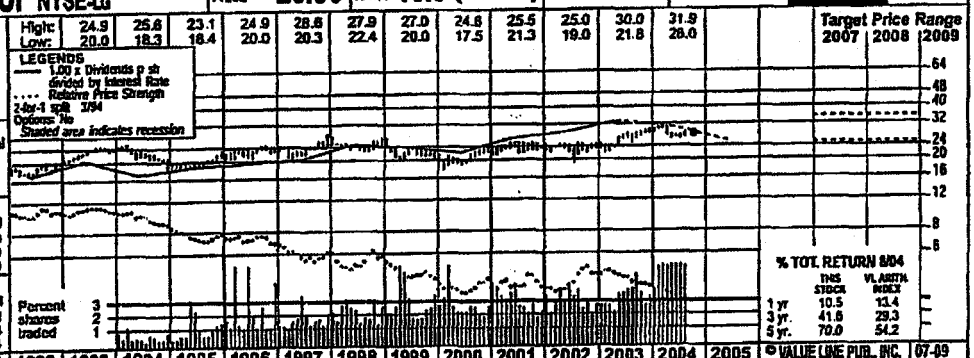
RECENT PRICE 28.30 | P/E RATIO 13.9 (Trailing: 14.1 Median: 15.0) | RELATIVE P/E RATIO 0.81 | DIV'D YLD 4.8% | VALUE LINE

TIMELINESS 4 Raised 2/6/04
SAFETY 2 Raised 6/20/03
TECHNICAL 3 Lowered 2/14/03
BETA .70 (1.00 = Market)

High:	24.9	25.6	23.1	24.9	28.6	27.9	27.0	24.6	25.5	25.0	30.0	31.9	28.0
Low:	20.0	18.3	18.4	20.0	20.3	22.4	20.0	17.5	21.3	19.0	21.8	26.0	

Target Price Range 2007 | 2008 | 2009

LEGENDS
— 1.00 x Dividends p sh divided by Interest Rate
.... Relative Price Strength
2-for-1 split 7/94
Options: No
Shaded area indicates recession



2007-09 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	35	(+25%)	9%
Low	25	(-10%)	2%

Insider Decisions

	O	N	D	J	F	M	A	M	J
to Buy	0	0	0	0	0	0	0	0	0
Options	0	0	0	0	8	0	0	0	0
to Sell	0	0	0	0	8	0	0	0	0

Institutional Decisions

	3Q2003	4Q2003	1Q2004
to Buy	45	53	51
to Sell	33	28	34
Hld's(000)	4591	5162	5834

Percent shares traded 3 2 1

% TOT. RETURN 8/04

	THIS STOCK	VL ARITH. INDEX
1 yr.	10.5	13.4
3 yr.	41.6	29.3
5 yr.	70.0	54.2

1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	© VALUE LINE PUB., INC.	07-09
30.82	31.57	30.21	28.10	26.83	32.33	33.43	24.79	31.03	34.33	31.04	26.04	29.99	53.08	39.84	54.95	59.50	60.10	Revenues per sh	59.50
2.51	2.47	2.13	2.37	2.32	2.81	2.65	2.55	3.29	3.32	3.02	2.56	2.68	3.00	2.56	3.15	3.25	3.25	"Cash Flow" per sh	4.00
1.57	1.45	1.08	1.28	1.17	1.61	1.42	1.27	1.87	1.84	1.58	1.47	1.37	1.61	1.18	1.82	2.03	2.05	Earnings per sh A B	2.10
1.10	1.15	1.18	1.20	1.20	1.22	1.22	1.24	1.26	1.30	1.32	1.34	1.34	1.34	1.34	1.34	1.36	1.36	Div'ds Decl'd per sh C■	1.38
1.92	1.82	1.87	2.46	2.87	2.62	2.50	2.63	2.35	2.44	2.88	2.58	2.77	2.51	2.80	2.67	2.60	2.70	Cap'l Spending per sh	2.50
11.44	11.74	11.75	11.83	11.79	12.19	12.44	13.05	13.72	14.26	14.57	14.96	14.99	15.26	15.07	15.65	15.85	16.60	Book Value per sh D	18.75
15.68	15.59	15.59	15.59	15.59	15.59	15.67	17.42	17.56	17.56	17.63	18.88	18.88	18.88	18.96	19.11	20.50	20.50	Common Shs Outst'g E	21.00
9.2	10.3	14.6	12.5	15.8	13.5	16.4	15.5	11.9	12.5	15.5	15.8	14.9	14.5	20.0	13.6	Bold figures are Value Line estimates		Avg Ann'l P/E Ratio	14.0
.76	.78	1.08	.80	.96	.80	1.08	1.04	.75	.72	.81	.90	.97	.74	1.09	.78			Relative P/E Ratio	.95
7.6%	7.7%	7.5%	7.5%	6.5%	5.6%	5.3%	6.3%	5.6%	5.6%	5.4%	5.8%	6.6%	5.7%	5.7%	5.4%			Avg Ann'l Div'd Yield	4.5%

CAPITAL STRUCTURE as of 6/30/04
Total Debt $409.1 mill. Due in 5 Yrs $215.0 mill.
LT Debt $380.3 mill. LT Interest $24.3 mill.
(Total interest coverage: 2.0x)(LT Debt incl. $45 million in 7.7% obligated, mandatorily redeemable preferred securities of subsidiary trust.)
(51% of Cap'l)
Leases, Uncapitalized Annual rentals $1.3 mill.
Pension Assets-9/03 $274.5 mill.
Oblig. $268.4 mill.
Pfd Stock $1.1 mill. Pfd Div'd $.07 mill.
Common Stock 20,978,823 shs.
as of 7/30/04
MARKET CAP: $550 million (Small Cap)

1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005		07-09
523.9	431.9	544.8	602.8	547.2	491.5	566.1	1002.1	755.2	1050.3	1220	1235	Revenues ($mill) A	1250
22.2	20.9	32.8	32.5	27.9	26.9	26.0	30.5	22.4	34.6	42.0	42.0	Net Profit ($mill)	44.0
36.0%	32.1%	35.9%	36.1%	35.6%	35.5%	35.2%	32.7%	35.4%	35.0%	35.0%	35.0%	Income Tax Rate	35.0%
4.2%	4.8%	6.0%	5.4%	5.1%	5.5%	4.6%	3.0%	3.0%	3.3%	3.4%	3.4%	Net Profit Margin	3.5%
43.9%	40.2%	42.5%	38.0%	40.9%	41.8%	45.2%	49.5%	47.5%	50.4%	48.0%	47.0%	Long-Term Debt Ratio	43.0%
55.5%	59.3%	57.1%	61.6%	58.6%	57.8%	54.5%	50.2%	52.3%	49.4%	52.0%	53.0%	Common Equity Ratio	57.0%
351.1	383.5	422.2	406.8	438.0	488.6	519.2	574.1	546.6	605.0	630	645	Total Capital ($mill)	700
411.7	434.3	452.2	467.6	490.8	519.4	575.4	602.5	594.4	621.2	645	675	Net Plant ($mill)	730
8.1%	7.1%	9.4%	8.7%	8.1%	7.1%	6.7%	6.9%	6.0%	7.4%	8.5%	8.0%	Return on Total Cap'l	8.0%
11.3%	9.1%	13.5%	12.9%	10.8%	9.5%	9.1%	10.5%	7.8%	11.5%	13.0%	12.5%	Return on Shr. Equity	11.0%
11.3%	9.2%	13.6%	12.9%	10.8%	9.5%	9.1%	10.5%	7.8%	11.6%	13.0%	12.5%	Return on Com Equity	11.0%
1.6%	.4%	4.5%	3.9%	1.8%	1.0%	.2%	1.6%	NMF	3.1%	5.0%	4.5%	Retained to Com Eq	4.5%
88%	96%	67%	70%	83%	89%	98%	83%	113%	74%	61%	63%	All Div'ds to Net Prof	62%

CURRENT POSITION ($MILL.)	2002	2003	6/30/04
Cash Assets	12.9	7.3	11.9
Other	209.5	280.6	251.4
Current Assets	222.4	287.9	263.3
Accts Payable	45.7	66.0	91.6
Debt Due	186.7	218.2	28.8
Other	104.4	82.1	77.0
Current Liab.	336.8	366.3	197.4
Fix. Chg. Cov.	230%	255%	255%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '01-'03 to '07-'09
Revenues	5.5%	9.0%	3.0%
"Cash Flow"	1.5%	-2.0%	5.0%
Earnings	1.5%	-2.5%	4.5%
Dividends	1.0%	0.5%	.5%
Book Value	2.5%	1.5%	3.0%

Fiscal Year Ends	QUARTERLY REVENUES ($ mill.)A Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2001	345.1	442.7	122.9	91.4	1002.1
2002	194.6	287.5	147.3	125.8	755.2
2003	280.1	422.2	186.6	161.4	1050.3
2004	332.6	475.0	245.1	167.3	1220
2005	340	470	240	185	1235

Fiscal Year Ends	EARNINGS PER SHARE A■ Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2001	.96	1.10	d.20	d.27	1.61
2002	.41	1.10	d.05	d.28	1.18
2003	.80	1.14	.11	d.21	1.82
2004	.87	1.12	.19	d.15	2.03
2005	.85	1.15	.20	d.15	2.05

Cal-endar	QUARTERLY DIVIDENDS PAID C■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2000	.335	.335	.335	.335	1.34
2001	.335	.335	.335	.335	1.34
2002	.335	.335	.335	.335	1.34
2003	.335	.335	.335	.335	1.34
2004	.335	.34	.34		

BUSINESS: Laclede Group, Inc., is a holding company for Laclede Gas, which distributes natural gas in eastern Missouri (population, 2 million), including the city of St. Louis, St. Louis County, and parts of 8 other counties. Had 628,638 customers at 9/02. Purchased SM&P for $43 million (1/02). Therms sold and transported in fiscal '02: 1.06 mill. Revenue mix: residential, 65%; commercial and industrial, 24%; transportation, 2%; other, 9%. Purchased gas obtained from various suppliers accounts for 59% of revenues. Has about 3,950 employees; 9,715 common stockholders. Off. & dir. own 6.4% of common shs. (1/04 Proxy). Chrmn., CEO, and Pres.: D.H. Yaeger. Inc.: MO. Address: 720 Olive Street, St. Louis, MO 63101. Tel.: 314-342-0500. Internet: www.lacledegas.com.

Laclede Group will likely finish fiscal 2004 (ends September 30th) on a strong note. Third quarter share-net jumped almost 73%, to $0.19, on a 31% increase in revenues. The recovery in the non-regulated division sparked the earnings gain, with operating income rising better than 78%. Higher gas prices, as well as the return of two major customers to the underground marking and locating business, were responsible for the strong performance. Meanwhile, results from the regulated distribution division were essentially on par with last year, as rising expenses offset gains from higher sales and gas prices. All told, we have raised our full year share-net estimate to $2.03, 12% above 2003's tally.

Fiscal 2005 results probably will parallel 2004. With the general rate increase and weather mitigation clause in place for more than a year now, earnings comparisons for the company are likely to be more difficult. Moreover, gas prices, which have remained elevated even in the summer months, may back down from those levels, tempering any potential gains. Nonetheless, despite the new rate structure, Laclede's earnings performance in the coming year will be largely tied to the weather during the coming winter heating months. At present, we estimate that LG will earn $2.05 in fiscal 2005, only marginally above our 2004 estimate.

The balance sheet remains in good shape. Although the debt-to-capital ratio has climbed in recent months, we believe it is still at manageable levels, and if cash flows continue to be strong, we would expect LG to begin paying down some debt.

A healthy dividend yield is the only investment appeal of these untimely shares. Yet, it is about on par with that of other firms in the Natural Gas (Distribution) Industry. Assuming that weather patterns remain at relatively normal levels, the dividend should be comfortably covered by earnings, which might lead to further increases in the payout. (Earlier this year, the board of directors increased the disbursement for the first time in several years). Since the stock already trades within our 3- to 5-year Target Price Range, total-return potential over that time is unimpressive.

Michael P. Gorman *September 17, 2004*

(A) Fiscal year ends Sept. 30th.
(B) Based on average shares outstanding thru. '97, then diluted. Next earnings report due late Oct.
(C) Dividends historically paid in early January, April, July, and October. ■ Dividend reinvestment plan available.
(D) Incl. deferred charges. In '03: $219.5 mill., $11.48/sh.
(E) In millions. Adjusted for stock split.
(F) Qtly. egs. do not sum due to change in shares outstanding.

Company's Financial Strength	B+
Stock's Price Stability	100
Price Growth Persistence	40
Earnings Predictability	60

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NICOR, INC. NYSE-GAS

RECENT PRICE 35.84 | P/E RATIO 15.7 (Trailing: 16.4; Median: 13.0) | RELATIVE P/E RATIO 0.91 | DIV'D YLD 5.2% | VALUE LINE

TIMELINESS 3 Raised 8/20/04
SAFETY 2 Raised 9/20/02
TECHNICAL 2 Raised 8/20/04
BETA 1.00 (1.00 = Market)

High:	31.6	29.3	28.5	37.1	42.9	44.4	42.9	43.9	42.4	49.0	39.3	37.4			
Low:	24.1	21.9	21.8	25.4	30.0	37.1	31.2	29.4	34.0	17.3	23.7	32.0			

Target Price Range 2007 | 2008 | 2009

2007-09 PROJECTIONS

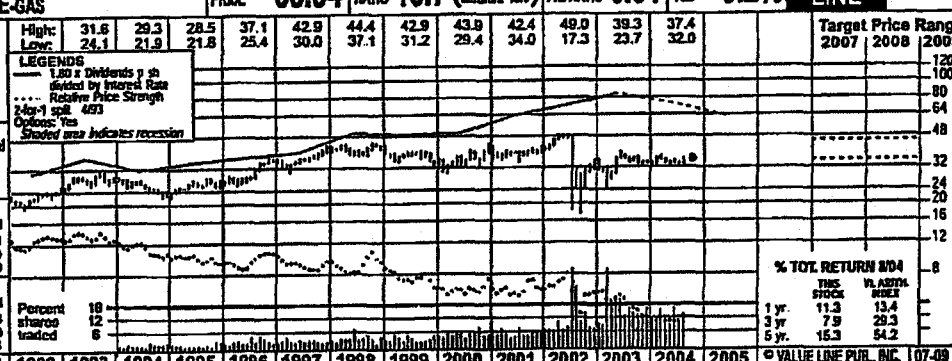
	Price	Gain	Ann'l Total Return
High	45	(+25%)	10%
Low	35	(Nil)	5%

Insider Decisions

	O	N	D	J	F	M	A	M	J
to Buy	1	0	0	1	0	0	1	0	0
Options	0	0	0	0	0	0	0	0	0
to Sell	0	0	1	0	0	0	0	0	0

Institutional Decisions

	3Q2003	4Q2003	1Q2004
to Buy	107	106	103
to Sell	102	98	99
Hld's(000)	28890	24481	25384



% TOT. RETURN 8/04

	THIS STOCK	VL ARITH. INDEX
1 yr.	11.3	13.4
3 yr.	7.9	29.3
5 yr.	15.3	54.2

1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	© VALUE LINE PUB., INC.	07-09
25.46	27.37	26.52	26.46	28.90	31.02	31.23	29.42	37.39	41.33	30.84	34.45	50.52	57.30	43.11	60.46	58.80	60.25	Revenues per sh	67.45
3.72	3.79	3.86	3.92	4.14	3.80	4.11	4.19	4.97	5.29	5.21	5.59	6.16	6.41	6.03	5.37	5.75	5.85	"Cash Flow" per sh	6.90
1.74	1.99	1.93	1.86	1.92	1.97	2.07	1.96	2.42	2.55	2.31	2.57	2.94	3.01	2.88	2.11	2.30	2.30	Earnings per sh A	2.50
.94	1.00	1.06	1.12	1.18	1.22	1.25	1.28	1.32	1.40	1.48	1.54	1.66	1.76	1.84	1.86	1.86	1.86	Div'ds Decl'd per sh B■	2.00
2.98	2.53	3.00	3.65	3.12	2.62	3.34	3.12	2.42	2.34	2.87	3.28	3.48	4.18	4.37	4.12	3.75	4.55	Cap'l Spending per sh	4.65
10.09	11.06	11.67	12.28	12.76	13.06	13.26	13.67	14.74	15.43	15.97	16.80	15.56	16.39	16.55	17.13	17.75	17.15	Book Value per sh	16.60
59.28	59.24	57.93	57.30	56.77	53.96	51.54	50.30	49.49	48.22	47.51	46.89	45.49	44.40	44.01	44.04	44.20	44.00	Common Shs Outst'g C	43.00
8.4	9.2	10.7	11.5	11.6	14.1	12.5	13.1	12.5	14.2	17.6	14.6	11.9	12.8	13.1	15.8	Bold figures are Value Line estimates		Avg Ann'l P/E Ratio	16.0
.70	.70	.79	.73	.70	.83	.82	.88	.78	.82	.92	.83	.77	.66	.72	.92			Relative P/E Ratio	1.05
6.4%	5.5%	5.1%	5.2%	5.3%	4.4%	4.8%	5.0%	4.4%	3.9%	3.6%	4.1%	4.7%	4.6%	4.9%	5.6%			Avg Ann'l Div'd Yield	5.0%

1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005		07-09
1609.4	1480.1	1850.7	1992.6	1465.1	1615.2	2298.1	2544.1	1897.4	2662.7	2600	2650	Revenues ($mill)	2900
109.5	99.8	121.2	124.3	111.1	121.9	136.4	136.3	128.0	93.1	105	100	Net Profit ($mill)	105
31.8%	35.3%	35.8%	35.0%	34.4%	34.7%	34.6%	33.5%	31.0%	35.2%	28.0%	32.0%	Income Tax Rate	35.0%
6.8%	6.7%	6.5%	6.2%	7.6%	7.5%	5.9%	5.4%	6.7%	3.5%	4.0%	3.9%	Net Profit Margin	3.7%
39.6%	40.2%	41.3%	42.3%	42.1%	35.5%	32.7%	37.8%	35.1%	39.6%	38.5%	39.5%	Long-Term Debt Ratio	42.5%
59.3%	59.0%	58.1%	57.2%	57.4%	64.0%	66.7%	61.7%	64.5%	60.3%	61.5%	60.5%	Common Equity Ratio	57.5%
1151.7	1165.2	1255.1	1300.6	1322.6	1230.1	1061.2	1180.1	1128.9	1251.5	1280	1250	Total Capital ($mill)	1165
1717.0	1779.3	1771.9	1735.8	1731.8	1735.2	1729.6	1768.6	1796.8	2484.2	2515	2540	Net Plant ($mill)	2625
11.0%	10.1%	11.1%	11.1%	9.9%	10.9%	13.7%	12.3%	12.2%	8.3%	9.0%	8.0%	Return on Total Cap'l	9.0%
15.8%	14.3%	16.4%	16.6%	14.5%	15.4%	19.1%	18.6%	17.5%	12.3%	13.0%	13.5%	Return on Shr. Equity	16.5%
15.9%	14.4%	16.6%	16.7%	14.6%	15.4%	19.2%	18.7%	17.5%	12.3%	13.5%	13.5%	Return on Com Equity	16.5%
6.2%	5.0%	7.6%	7.6%	5.4%	6.2%	8.5%	7.9%	6.5%	1.5%	2.5%	2.5%	Retained to Com Eq	3.5%
61%	65%	54%	55%	63%	60%	56%	58%	63%	88%%	80%	80%	All Div'ds to Net Prof	79%

CAPITAL STRUCTURE as of 6/30/04
Total Debt $666.3 mill. Due in 5 Yrs $290.0 mill.
LT Debt $496.6 mill. LT Interest $43.0 mill.
(Total interest coverage: 4.8x)

No Defined Benefit Pension Plan

Pfd Stock $1.8 mill. Pfd Div'd $.1 mill.

Common Stock 44,064,616 shares as of 8/06/04

MARKET CAP: $1.6 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2002	2003	6/30/04
Cash Assets	100.9	83.2	122.6
Other	606.8	832.7	533.7
Current Assets	707.7	915.9	656.3
Accts Payable	556.3	385.4	428.7
Debt Due	415.0	575.0	196.5
Other	127.3	108.3	169.9
Current Liab.	1098.6	1068.7	795.1
Fix. Chg. Cov.	442%	510%	510%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '01-'03 to '07-'09
Revenues	6.5%	8.0%	4.0%
"Cash Flow"	4.0%	3.0%	2.5%
Earnings	3.5%	2.0%	NMF
Dividends	4.5%	5.5%	1.5%
Book Value	3.0%	1.5%	NMF

Cal-endar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2001	1473.7	373.0	244.4	453.0	2544.1
2002	551.1	391.8	249.8	704.7	1897.4
2003	1171.2	452.8	294.8	743.8	2662.7
2004	1115.7	429.5	300	754.8	2600
2005	1130	470	310	740	2650

Cal-endar	EARNINGS PER SHARE A D Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2001	.85	.59	.61	1.01	3.01
2002	.90	.38	.68	.89	2.88
2003	1.11	.21	.01	.78	2.11
2004	.95	.44	.10	.80	2.30
2005	.95	.25	.15	.95	2.30

Cal-endar	QUARTERLY DIVIDENDS PAID B■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2000	.415	.415	.415	.415	1.66
2001	.415	.44	.44	.44	1.74
2002	.46	.46	.46	.46	1.84
2003	.46	.465	.465	.465	1.86
2004	.465	.465	.465		

BUSINESS: Nicor Inc. is a holding company for Nicor Gas. Serves about 2 million customers in northern and western Illinois. 2003 gas delivered: 519.1 bcf, incl. 257.7 bcf from transportation. 2003 gas sales (261.4 bcf): residential, 81%; commercial, 16%; industrial, 3%. Principal supplying pipelines: Natural Gas Pipeline, Midwestern Gas, and Northern Natural. Current operations include Tropical Shipping subsidiary. Divested inland barging, 7/86; contract drilling, 9/86; oil and gas E&P, 6/93. Has about 3,500 employees, 28,000 stockholders. Officers and directors own about 1.5% of common stock (3/04 proxy). Chairman, President & CEO: Thomas L. Fisher Incorporated: IL. Address: 1844 Ferry Road, Naperville, IL 60563-9600. Telephone: 630-305-9500. Internet: www.nicor.com.

Nicor stock has risen some 8.5% in price since our last report, based largely on improved earnings. Although warmer weather and higher natural gas prices led to a 5.9% decline in gas distribution revenue from the prior-year period, the company's other ventures filled the gap nicely. The gas distribution customer roster was up in total, with a rise in residential customers more than offsetting a decline in commercial and industrial customers. The increase in total customers augurs well for steady-to-higher earnings over time.

The company's Tropical Shipping unit increased operating income by 41% over the second quarter of 2003, reflecting general economic improvements. We look for continued improvements from this and other Nicor subsidiaries over the coming years. Taking into account second-quarter results, we have raised our 2004 estimate by $0.15 a share, to $2.30. We also have raised our 2005 estimate by a dime, also to $2.30, although we have maintained our $2.50 estimate for the 3- to 5-year pull.

The company has acknowledged that four former employees may have violated SEC regulations. This episode dates back to allegations that Nicor billked its customers of nearly $135 million between 1999 and 2002 under its performance-based rate plan. There are currently two related investigations ongoing, one conducted by the SEC, the other by the Illinois Commerce Commission (ICC). Risks from the investigation include the levying of heavy fines, or that the ICC order a rate reduction. Either outcome would hurt Nicor's earnings and put something of a cloud over the stock price.

Nicor shares advanced two notches in Timeliness to 3 (Average) since our June report, based on earnings momentum. However, 3- to 5-year price appreciation remains well below average and dividend growth has stalled. But factoring in the attractive dividend yield, total-return potential is roughly in line with the rest of the sector. Considering the current, relatively high, valuation, and the uncertainty regarding the performance-based rate plan investigations, though, we suggest investors avoid this stock for now.

Andrew Umans *September 17, 2004*

(A) Based on primary earnings thru. '96, then diluted. Excl. nonrecurring gains (losses): '89, 7¢; '97, 6¢; '98, 11¢; '99, 5¢; '00, ($1.96); '01, 16¢; '03, (27¢). Excl. items from discontinued ops.: '93, 4¢; '96, 30¢; Q1 '04, (52¢). Next earnings report due mid-October.
(B) Dividends historically paid early February, May, August, November.
■ Dividend reinvestment plan available.
(C) In millions, adjusted for stock split.
(D) 2001 and 2002 quarters don't add due to change in shares outstanding.

Company's Financial Strength	A
Stock's Price Stability	70
Price Growth Persistence	60
Earnings Predictability	80

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N.W. NAT'L GAS NYSE-NWN

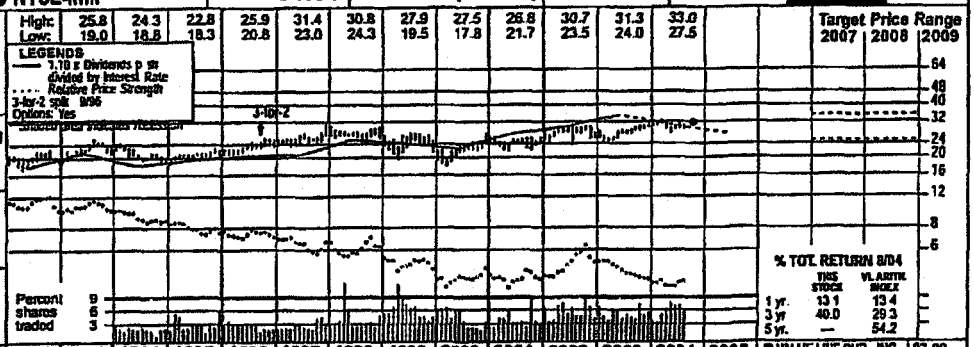
RECENT PRICE 31.89 | P/E RATIO 17.8 (Trailing: 17.8 Median: 14.0) | RELATIVE P/E RATIO 1.03 | DIV'D YLD 4.1% | VALUE LINE

TIMELINESS 5 Lowered 7/30/04
SAFETY 2 New 7/27/90
TECHNICAL 3 Lowered 8/16/04
BETA .55 (1.00 = Market)

High:	25.8	24.3	22.8	25.9	31.4	30.8	27.9	27.5	26.8	30.7	31.3	33.0	
Low:	19.0	18.8	18.3	20.8	23.0	24.3	19.5	17.8	21.7	23.5	24.0	27.5	

Target Price Range 2007 | 2008 | 2009

LEGENDS
— 1.18 x Dividends p sh divided by Interest Rate
.... Relative Price Strength
3-for-2 split 9/96
Options: Yes



2007-09 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	35	(+10%)	6%
Low	25	(-20%)	-1%

Insider Decisions

	O	N	D	J	F	M	A	M	J
to Buy	0	0	0	0	1	0	0	1	0
Options	0	2	0	0	1	0	0	0	0
to Sell	0	2	0	0	1	0	0	0	0

Institutional Decisions

	3Q2003	4Q2003	1Q2004
to Buy	50	57	67
to Sell	45	36	36
Hld's(000)	10645	11210	12425

% TOT. RETURN 8/04

	THIS STOCK	VL ARITH. INDEX
1 yr.	13.1	13.4
3 yr.	40.0	29.3
5 yr.	—	54.2

1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	© VALUE LINE PUB., INC.	07-09
17.39	15.22	17.02	18.74	14.10	18.15	18.30	16.02	16.86	15.82	16.77	18.17	21.09	25.78	25.07	23.57	24.25	25.75	Revenues per sh	30.00
2.79	2.85	3.22	2.57	3.25	3.74	3.50	3.41	3.86	3.72	3.24	3.72	3.68	3.86	3.65	3.85	3.85	4.15	"Cash Flow" per sh	4.75
1.33	1.58	1.62	.67	.74	1.74	1.53	1.61	1.97	1.76	1.02	1.70	1.79	1.88	1.62	1.78	1.80	2.05	Earnings per sh A	2.40
1.05	1.07	1.10	1.13	1.15	1.17	1.17	1.18	1.20	1.21	1.22	1.23	1.24	1.25	1.26	1.27	1.30	1.33	Div'ds Decl'd per sh B■	1.45
2.82	3.36	3.85	3.58	3.73	3.61	4.23	3.02	3.70	5.07	4.02	4.78	3.46	3.23	3.11	4.90	3.70	3.70	Cap'l Spending per sh	4.00
11.25	12.04	12.61	12.23	12.41	13.08	13.63	14.55	15.37	16.02	16.59	17.12	17.93	18.56	18.88	19.52	20.60	21.45	Book Value per sh C	23.50
15.96	17.14	17.41	17.68	19.46	18.77	20.13	22.24	22.56	22.86	24.85	25.09	25.23	25.23	25.59	25.94	27.40	27.75	Common Shs Outst'g D	28.00
10.2	9.8	10.2	28.1	27.0	12.9	13.0	12.9	11.7	14.4	26.7	14.5	12.4	12.9	17.2	15.8	Bold figures are Value Line estimates		Avg Ann'l P/E Ratio	12.5
.85	.74	.76	1.79	1.64	.76	.85	.86	.73	.83	1.39	.83	.81	.66	.94	.92			Relative P/E Ratio	.85
7.7%	6.9%	6.7%	5.9%	5.7%	5.2%	5.5%	5.7%	5.2%	4.8%	4.5%	5.0%	5.6%	5.1%	4.5%	4.5%			Avg Ann'l Div'd Yield	5.0%

CAPITAL STRUCTURE as of 6/30/04
Total Debt $505.0 mill. Due in 5 Yrs $50.0 mill.
LT Debt $500.1 mill. LT Interest $34.0 mill.
Incl. $5.6 mill. 7¼% debs. due 3/1/12, each conv. into 50.25 com. shs. at $19.90.
(Total interest coverage: 3.0x)

Pension Assets-12/03 $158.3 mill. Oblig. $205.4 mill.

Pfd Stock None

Common Stock 27,343,860 shs.
MARKET CAP $875 million (Small Cap)

1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005		07-09
368.3	356.3	360.3	361.8	416.7	455.8	632.1	650.3	641.4	611.3	665	705	Revenues ($mill)	850
35.5	38.1	46.8	43.1	27.3	44.9	47.8	50.2	43.8	48.0	49.5	56.0	Net Profit ($mill)	67.0
36.6%	36.8%	36.9%	32.9%	31.0%	35.4%	35.9%	35.4%	34.9%	33.7%	35.0%	35.0%	Income Tax Rate	35.0%
9.6%	10.7%	12.3%	11.9%	6.6%	9.9%	9.0%	7.7%	6.8%	7.5%	7.4%	7.8%	Net Profit Margin	7.9%
47.9%	43.5%	41.4%	46.0%	45.0%	46.0%	45.1%	43.0%	47.6%	49.7%	48.0%	48.0%	Long-Term Debt Ratio	48.0%
45.1%	50.3%	52.8%	49.0%	50.6%	49.6%	50.9%	53.2%	51.5%	50.3%	52.0%	52.0%	Common Equity Ratio	52.0%
607.7	643.3	657.4	748.0	815.6	861.5	887.8	860.5	937.3	1006.5	1090	1140	Total Capital ($mill)	1270
654.3	697.2	745.3	827.5	894.7	895.9	934.0	965.0	995.6	1205.9	1280	1320	Net Plant ($mill)	1325
7.8%	7.7%	8.9%	7.4%	5.0%	6.8%	6.7%	6.9%	5.9%	5.7%	6.0%	6.5%	Return on Total Cap'l	7.0%
11.2%	10.5%	12.1%	10.7%	6.1%	9.7%	9.8%	10.0%	8.9%	9.1%	9.5%	9.5%	Return on Shr. Equity	10.0%
11.8%	10.9%	12.7%	11.0%	6.0%	9.9%	10.0%	10.2%	8.5%	9.0%	9.5%	9.5%	Return on Com Equity	10.0%
3.3%	3.0%	5.0%	3.6%	NMF	2.8%	3.1%	3.5%	1.9%	2.6%	2.5%	3.5%	Retained to Com Eq	4.0%
74%	74%	63%	70%	118%	74%	70%	67%	79%	72%	72%	65%	All Div'ds to Net Prof	60%

CURRENT POSITION ($MILL.)	2002	2003	6/30/04
Cash Assets	7.3	4.7	7.5
Other	186.7	194.8	121.0
Current Assets	194.0	199.5	128.5
Accts Payable	74.4	86.0	78.7
Debt Due	89.8	85.2	4.9
Other	40.8	43.2	39.5
Current Liab.	205.0	214.4	123.1
Fx. Chg. Cov.	296%	280%	380%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '01-'03 to '07-'09
Revenues	4.5%	8.5%	3.0%
"Cash Flow"	1.5%	1.0%	4.0%
Earnings	5.0%	2.0%	5.5%
Dividends	1.0%	1.0%	2.5%
Book Value	4.0%	3.5%	3.5%

Cal-endar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2001	217.3	118.2	78.4	236.4	650.3
2002	278.6	101.9	78.7	182.2	641.4
2003	206.5	117.5	69.5	217.8	611.3
2004	254.5	109.7	74.0	226.8	665
2005	265	127	78.0	235	705

Cal-endar	EARNINGS PER SHARE A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2001	.99	.17	d.22	.94	1.88
2002	1.32	d.13	d.26	.69	1.62
2003	1.01	.17	d.25	.83	1.76
2004	1.24	d.03	d.25	.84	1.80
2005	1.23	.16	d.24	.90	2.05

Cal-endar	QUARTERLY DIVIDENDS PAID B ■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2000	.31	.31	.31	.31	1.24
2001	.31	.31	.31	.315	1.25
2002	.315	.315	.315	.315	1.26
2003	.315	.315	.315	.325	1.27
2004	.325	.325	.325		

BUSINESS: Northwest Natural Gas Co. (doing business as NW Natural) distributes natural gas at retail to 90 communities, 567,479 customers, in Oregon (96% of revs.) and in southwest Washington state. Principal cities served: Portland and Eugene, OR; Vancouver, WA. Service area population: 2.4 mill. (77% in OR). Company buys gas supply from Canadian and U.S. producers; has transportation rights on Northwest Pipeline sys. to bring gas to market. Owns local underground storage. Revenue breakdown: resident'l & comm'l, 84%; ind., 10%; transport. and other, 6%. Employs 1,291. Has about 10,000 com. shrhldrs. Insiders own about 1% of com. Ch. Exec. Off.: M.S. Dodson. Inc.: OR. Addr.: 220 N.W. 2nd Ave., Portland, OR 97209. Tel.: 503-226-4211. Internet: www.nwnatural.com.

Northwest Natural had a challenging June quarter. Warmer-than-normal weather during the second quarter sent utility earnings sharply lower for the period. The tariffs for the regulated gas system include a weather normalization clause—a provision that sets rates higher or lower to make up for the change in demand due to year-to-year seasonal temperature deviations from the region's historical average. The problem is that this rate design is operative only during the year's coldest months — November through April. As a result, since the normalized tariff isn't in force during much of the June quarter, the bottom line can display wide yearly swings for this period. The difference this time around was a $0.17-a-share dip in utility operating results. The gas distributor also had to give back, in the form of a charge for the quarter, $0.02 a share of profits recorded previously on assets that regulators are now excluding from the allowed rate base.

The recent earnings setback doesn't impair the quality of this income stock. The weather normalization provision goes into effect again in October, when the 2004-2005 home-heating season begins. Normalization insulates the utility from the adverse financial consequences of warm winters and precludes a windfall profit during periods of extreme cold. But its main purpose is to establish a more predictable revenue flow during the heating season, when the company records all of its annual earnings, and then some. And a revenue level that's on target affords management a better handle on the amount of cash flow that it can expect operations to generate. In this way, the utility's creditworthiness should improve, lowering the cost of debt a bit and making financial planning easier.

The shares are still best held for current income. NW Natural isn't a performance stock. Its support comes mainly from the dividend, which we expect will continue to grow slowly this year and next. On this prospect, the current yield is very near the gas-stock average. We look for management to submit new tariff filings from time to time to recover the cost of new capital investments and to keep the payout ratio at a comfortable level.

Gerald Holtzman *September 17, 2004*

(A) Diluted earnings per share. Excludes nonrecurring gain: '98, $0.15; '00, $0.11. Next earnings report due late October.
(B) Dividends historically paid in mid-February, mid-May, mid-August, and mid-November. In '99, extra div'd of $0.005/sh. paid Dec. 15.
■ Div'd reinvestment plan available.
(C) Includes intangibles. At 12/31/03: $6.66/sh.
(D) In millions, adjusted for stock split.

Company's Financial Strength	B++
Stock's Price Stability	100
Price Growth Persistence	40
Earnings Predictability	65

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PEOPLES ENERGY NYSE-PGL

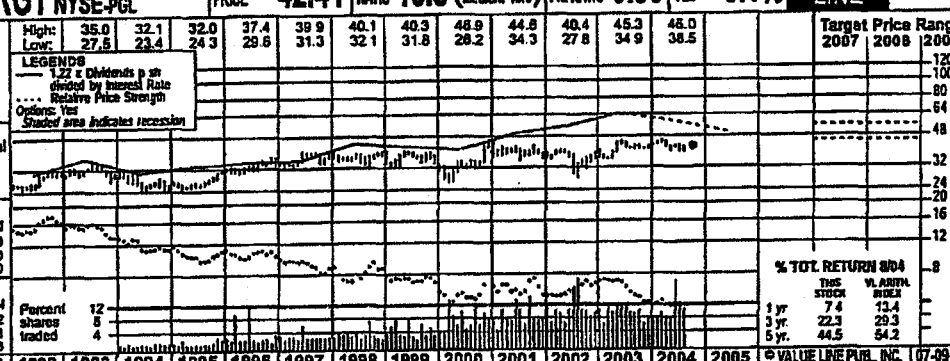
RECENT PRICE 42.41 | P/E RATIO 15.5 (Trailing: 17.0 Median: 13.0) | RELATIVE P/E RATIO 0.90 | DIV'D YLD 5.1% | VALUE LINE

TIMELINESS 5 Lowered 10/24/03
SAFETY 1 Raised 9/29/95
TECHNICAL 3 Lowered 9/17/04
BETA .75 (1.00 = Market)

High:	35.0	32.1	32.0	37.4	39.9	40.1	40.3	46.9	44.8	40.4	45.3	46.0	
Low:	27.5	23.4	24.3	29.6	31.3	32.1	31.8	28.2	34.3	27.8	34.9	38.5	

Target Price Range 2007 | 2008 | 2009

LEGENDS
— 1.22 x Dividends p sh divided by Interest Rate
.... Relative Price Strength
Options: Yes
Shaded area indicates recession



2007-09 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	55	(+30%)	11%
Low	45	(+5%)	7%

Insider Decisions

	O	N	D	J	F	M	A	M	J
to Buy	0	0	0	0	1	0	0	0	0
Options	0	0	0	0	0	0	0	0	0
to Sell	0	1	0	0	0	0	0	0	0

Institutional Decisions

	3Q2003	4Q2003	1Q2004
to Buy	105	103	102
to Sell	81	88	81
Hld's(000)	17334	18936	19273

Percent shares traded 12 8 4

% TOT. RETURN 9/04

	THIS STOCK	VL ARITH. INDEX
1 yr.	7.4	13.4
3 yr.	22.3	29.3
5 yr.	44.5	54.2

1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	© VALUE LINE PUB., INC.	07-09
34.29	36.42	35.63	33.69	31.54	36.09	36.70	29.60	34.29	36.34	32.28	33.66	40.16	64.13	41.81	58.28	60.15	60.00	Revenues per sh A	65.00
3.75	3.92	3.74	3.73	3.67	3.85	3.89	3.68	4.59	4.92	4.44	4.74	5.58	5.84	5.59	5.88	6.75	6.95	"Cash Flow" per sh	6.60
2.31	2.39	2.07	2.05	2.06	2.11	2.13	1.78	2.96	2.81	2.25	2.39	2.71	3.16	2.80	2.87	2.65	2.75	Earnings per sh B	3.15
1.50	1.58	1.65	1.71	1.76	1.78	1.80	1.80	1.82	1.87	1.91	1.95	2.00	2.04	2.07	2.12	2.16	2.20	Div'ds Decl'd per sh C■	2.24
2.66	4.15	3.15	3.10	3.40	3.77	2.50	2.75	2.45	2.55	4.05	6.45	7.02	7.52	5.66	5.10	4.05	4.85	Cap'l Spending per sh	5.70
15.09	16.20	16.61	16.95	17.72	18.02	18.39	18.38	19.49	20.43	21.03	21.66	22.02	22.76	22.74	23.11	24.65	26.15	Book Value per sh D	30.15
32.57	32.62	32.70	32.76	34.77	34.88	34.87	34.91	34.96	35.07	35.26	35.49	35.30	35.40	35.46	35.69	37.00	36.00	Common Shs Outst'g E	35.00
7.8	7.9	11.2	11.8	13.1	15.0	13.3	14.7	10.7	12.7	16.2	15.5	12.1	12.3	13.3	13.4	Bold figures are Value Line estimates		Avg Ann'l P/E Ratio	16.0
.65	.60	.83	.75	.79	.89	.87	.98	.67	.73	.84	.88	.79	.63	.73	.76			Relative P/E Ratio	1.05
6.3%	6.4%	7.1%	7.0%	6.5%	5.6%	6.3%	6.9%	5.7%	5.2%	5.2%	5.3%	6.1%	5.2%	5.5%	5.5%			Avg Ann'l Div'd Yield	4.4%

CAPITAL STRUCTURE as of 6/30/04

Total Debt $896.3 mill. Due in 5 Yrs $208.0 mill.

LT Debt $846.3 mill. LT Interest $57.0 mill
(Total interest coverage: 4.7x)

Pension Assets-9/03 $544.9 mill
Oblig. $516.8 mill

Pfd Stock None

Common Stock 37,630,892 shs.
as of 7/31/04

MARKET CAP: $1.6 billion (Mid Cap)

1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005		07-09
1279.5	1033.4	1198.7	1274.4	1138.1	1194.4	1417.5	2270.2	1482.5	2138.4	2225	2160	Revenues ($mill) A	2275
74.4	62.2	103.4	98.4	79.4	84.8	96.1	111.7	99.3	103.9	100	100	Net Profit ($mill)	110
30.1%	34.4%	37.6%	36.4%	35.2%	35.9%	34.1%	35.4%	34.2%	36.3%	36.0%	36.0%	Income Tax Rate	36.0%
5.8%	6.0%	8.6%	7.7%	7.0%	7.1%	6.8%	4.9%	6.7%	4.9%	4.5%	4.6%	Net Profit Margin	4.9%
49.4%	49.2%	43.6%	42.4%	41.1%	40.4%	35.1%	44.4%	48.7%	46.7%	48.5%	47.5%	Long-Term Debt Ratio	42.0%
50.8%	50.8%	56.4%	57.6%	58.8%	59.5%	64.9%	55.6%	59.3%	53.3%	51.5%	52.5%	Common Equity Ratio	58.0%
1267.5	1263.8	1208.3	1243.5	1255.0	1290.5	1196.7	1449.8	1360.3	1592.3	1750	1790	Total Capital ($mill)	1820
1341.9	1373.1	1381.1	1402.2	1446.7	1519.8	1645.3	1753.9	1773.9	1838.2	1895	1975	Net Plant ($mill)	2385
7.8%	7.0%	10.3%	9.5%	7.8%	8.0%	9.5%	9.3%	8.4%	8.1%	5.5%	5.5%	Return on Total Cap'l	6.0%
11.5%	9.7%	15.2%	13.7%	10.7%	11.0%	12.4%	13.9%	12.3%	12.3%	11.0%	10.5%	Return on Shr. Equity	10.5%
11.5%	9.7%	15.2%	13.7%	10.7%	11.0%	12.4%	13.9%	12.3%	12.3%	11.0%	10.5%	Return on Com Equity	10.5%
1.9%	NMF	5.9%	4.7%	1.7%	2.1%	3.4%	5.0%	3.3%	3.4%	2.0%	2.0%	Retained to Com Eq	3.0%
84%	101%	61%	66%	84%	81%	73%	64%	73%	73%	81%	80%	All Div'ds to Net Prof	71%

CURRENT POSITION ($MILL.)	2002	2003	6/30/04
Cash Assets	34.0	33.0	91.4
Other	357.9	457.1	470.3
Current Assets	391.9	490.1	561.7
Accts Payable	213.9	236.6	167.4
Debt Due	377.9	207.9	50.0
Other	178.0	156.1	329.8
Current Liab.	769.8	600.6	567.2
Flx. Chg. Cov.	259%	304%	388%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '01-'03 to '07-'09
Revenues	5.0%	10.0%	2.5%
"Cash Flow"	4.5%	4.0%	2.0%
Earnings	3.5%	2.0%	1.0%
Dividends	1.5%	2.0%	1.5%
Book Value	2.5%	2.5%	4.5%

Fiscal Year Ends	QUARTERLY REVENUES ($ mill.) A Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2001	717.0	1073.8	318.5	160.9	2270.2
2002	377.5	522.8	347.1	235.1	1482.5
2003	549.2	903.8	336.1	287.3	2138.4
2004	604.9	927.0	401.1	292	2225
2005	580	905	390	285	2160

Fiscal Year Ends	EARNINGS PER SHARE A B Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2001	1.03	1.76	.33	.04	3.16
2002	.87	1.55	.33	.05	2.80
2003	.87	1.77	.22	.04	F2.87
2004	.85	1.46	.15	.19	2.65
2005	.85	1.55	.30	.05	2.75

Cal-endar	QUARTERLY DIVIDENDS PAID C■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2000	.49	.50	.50	.50	1.99
2001	.50	.51	.51	.51	2.03
2002	.51	.52	.52	.52	2.07
2003	.53	.53	.53	.53	2.12
2004	.54	.54	.54		

BUSINESS: Peoples Energy Corporation distributes natural gas via its utility subsidiaries, Peoples Gas Light & Coke Co. (approx. 850,000 customers at 9/30/03) and North Shore Gas Co. (150,000), in Chicago and northeastern Illinois. Fiscal 2003 volume: 248 bill. cu. ft.: residential, 79%; commercial, 15%; industrial, 3%; other, 3%. Main supplier is Natural Gas Pipeline Co. of America. Purchased gas costs and revenue taxes accounted for 70% of gas revenues in fiscal '03. Depreciation rate: 3.5%. Est'd plant age: 10 years. Has 2,400 employees, 20,988 shareholders. Directors own 1% of common (1/04 Proxy). Chairman and CEO: Thomas M. Patrick. Inc.: Illinois. Address: 130 East Randolph Drive, Chicago, IL 60601. Telephone: 312-240-4000. Internet: www.pecorp.com.

Peoples Energy's stock price has barely budged since our June report. Earnings of $0.15 a share for the third fiscal quarter (years end September 30th) were a disappointment. The gas distribution business was hurt by warm weather, high natural gas prices, and a reduction in the customer base. This business unit has been on the decline for several quarters, and the June period was no exception, as distribution operating income fell more than 40% over the year-ago period. Meanwhile, **The company's other ventures did not support earnings as well as they have in the past few quarters.** The oil and gas production unit took a $0.07 per share hit from drilling a dry hole in Louisiana. Income from other groups, including Power Generation, Midstream Services, and Retail Energy Services, was largely flat. Power generation is a seasonal business, likely to pick up in the fourth fiscal quarter. Midstream Services and Retail Energy Services performed well, but comprise a small percentage of Peoples' total revenue makeup. The utility may be able to grow these lines into profitable vehicles, however. Also, pension costs came in above trend, but ought to decline in 2005.

We are confident that Peoples can iron out its operational troubles over the coming year. We also believe that the company's other energy ventures will eventually have a positive impact on earnings. Nonetheless, we have lowered our 2004 and 2005 earnings estimates, by $0.15 a share each, given weakness in the core utility business. We have also lowered our 3- to 5-year projection by a nickel.

These shares are ranked 5 (Lowest) for Timeliness. Indeed, the stock price has stalled as the company has virtually no earnings momentum for the time being. The stock now trades at a multiple that is higher than both its historical average and most of its peer group. However, as with all utilities, Peoples offers a very attractive dividend yield, and there is probably still latitude for growth in the payout. We note that due to our 3- to 5-year outlook of steadily improving earnings, this issue does have greater total-return potential out to 2007-2009 than many of its peers. There is room, therefore, for PGL shares in conservative, income-oriented accounts.

Andrew Umans *September 17, 2004*

(A) Fiscal year ends Sept. 30th.
(B) Basic earnings per share. Excludes acct'g gains/(losses): '89, $0.30; '99, $0.22; '00, ($0.27). Next earnings report due late October.
(C) Dividends historically paid mid-January, April, July, October. ■ Dividend reinvestment plan available.
(D) Includes deferred charges. At 9/30/03: $64.9 mill., $1.77/sh
(E) In millions.
(F) Earnings don't sum due to change in shares outstanding

Company's Financial Strength	A
Stock's Price Stability	100
Price Growth Persistence	45
Earnings Predictability	80

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PIEDMONT NAT'L. NYSE-PNY

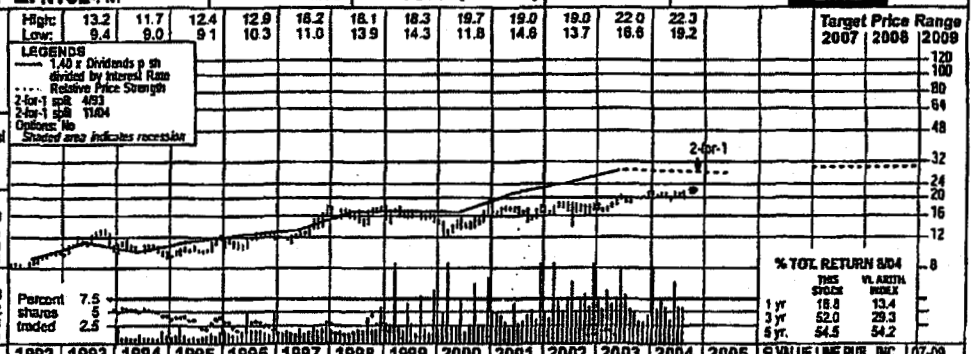
RECENT PRICE 22.20 | P/E RATIO 18.3 (Trailing: 16.0 Median: 16.0) | RELATIVE P/E RATIO 1.06 | DIV'D YLD 3.9% | VALUE LINE

TIMELINESS 4 Raised 3/5/04
SAFETY 2 New 7/27/90
TECHNICAL 3 Lowered 9/17/04
BETA .75 (1.00 = Market)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
High:	13.2	11.7	12.4	12.9	18.2	18.1	18.3	19.7	19.0	19.0	22.0	22.3
Low:	9.4	9.0	9.1	10.3	11.0	13.9	14.3	11.8	14.6	13.7	16.6	19.2

Target Price Range 2007 | 2008 | 2009

LEGENDS
1.40 x Dividends p sh divided by Interest Rate
.... Relative Price Strength
2-for-1 split 4/93
2-for-1 split 11/04
Options: No
Shaded area indicates recession



2007-09 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	30	(+35%)	13%
Low	20	(-10%)	4%

Insider Decisions

	D	N	D	J	F	M	A	M	J
to Buy	1	2	2	7	4	9	1	0	1
Options	0	0	0	0	0	0	0	0	0
to Sell	0	0	2	2	0	1	3	0	1

Institutional Decisions

	3Q2003	4Q2003	1Q2004
to Buy	57	69	92
to Sell	69	56	38
Hld's(000)	17568	22814	26630

Percent shares traded 7.5 5 2.5

% TOT. RETURN 8/04

	THIS STOCK	VL ARITH. INDEX
1 yr.	18.8	13.4
3 yr.	52.0	29.3
5 yr.	54.5	54.2

1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	© VALUE LINE PUB., INC.	07-09
9.81	10.12	9.42	8.32	8.91	10.57	10.82	8.76	11.59	12.84	12.45	10.97	13.01	17.06	12.57	18.14	20.55	21.35	Revenues per sh A	22.50
.87	.96	.97	.78	1.07	1.14	1.13	1.25	1.49	1.62	1.72	1.70	1.77	1.81	1.81	2.04	2.30	2.45	"Cash Flow" per sh	3.00
.59	.61	.61	.44	.70	.73	.68	.73	.84	.93	.98	.93	1.01	1.01	.95	1.11	1.23	1.30	Earnings per sh B	1.55
.36	.39	.42	.44	.46	.48	.51	.54	.57	.61	.64	.68	.72	.76	.80	.82	.86	.89	Div'ds Decl'd per sh C■	.95
1.57	1.56	1.62	1.37	1.41	1.58	1.95	1.72	1.64	1.52	1.48	1.58	1.65	1.29	1.21	1.16	1.15	1.30	Cap'l Spending per sh	1.45
4.13	4.37	4.58	4.83	5.13	5.45	5.68	6.15	6.53	6.95	7.45	7.86	8.26	8.63	8.91	9.36	12.10	12.55	Book Value per sh D	14.40
40.57	41.57	42.57	49.46	51.59	52.30	53.15	57.57	59.10	60.39	61.48	62.59	63.83	64.93	66.18	67.31	74.00	74.00	Common Shs Outst'g E	72.00
9.1	10.3	11.3	16.3	12.3	15.4	15.7	13.8	13.9	13.6	16.3	17.7	14.3	16.7	18.4	18.7	Bold figures are Value Line estimates		Avg Ann'l P/E Ratio	17.0
.76	.78	.84	1.04	.75	.91	1.03	.92	.87	.78	.85	1.01	.93	.86	1.01	.95			Relative P/E Ratio	1.15
6.7%	6.3%	6.0%	6.0%	5.3%	4.3%	4.8%	5.4%	4.9%	4.8%	4.0%	4.1%	5.0%	4.5%	4.6%	4.4%			Avg Ann'l Div'd Yield	3.6%

CAPITAL STRUCTURE as of 7/31/04
Total Debt $687.0 mill. Due in 5 Yrs $250.0 mill.
LT Debt $660.0 mill. LT Interest $33.0 mill.
(LT interest earned: 4.1x; total interest coverage: 3.9x)

Pension Assets-10/03 $125.1 mill. Oblig. $149.7 mill.

Pfd Stock None

Common Stock 76,657,012 shs. as of 8/3/04

MARKET CAP: $1.7 billion (Mid Cap)

1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005		07-09
575.4	505.2	685.1	775.5	765.3	686.5	830.4	1107.9	832.0	1220.8	1520	1580	Revenues ($mill) A	1620
35.5	40.3	48.6	55.2	60.3	58.2	64.0	65.5	62.2	74.4	90.0	95.0	Net Profit ($mill)	110
37.6%	38.7%	38.9%	39.1%	39.2%	39.7%	34.7%	34.6%	33.1%	34.8%	35.0%	35.0%	Income Tax Rate	35.0%
6.2%	8.0%	7.1%	7.1%	7.9%	8.5%	7.7%	5.9%	7.5%	6.1%	6.0%	6.1%	Net Profit Margin	6.8%
50.9%	50.4%	50.3%	47.6%	44.7%	46.2%	46.1%	47.6%	43.9%	42.2%	42.5%	38.5%	Long-Term Debt Ratio	36.5%
49.1%	49.6%	49.7%	52.4%	55.3%	53.8%	53.9%	52.4%	56.1%	57.8%	57.5%	60.5%	Common Equity Ratio	63.5%
615.0	716.0	777.1	800.8	829.3	914.7	978.4	1069.4	1051.5	1090.2	1555	1530	Total Capital ($mill)	1635
734.9	801.3	862.0	941.7	990.6	1047.0	1072.0	1114.7	1158.5	1812.3	1900	2000	Net Plant ($mill)	2250
7.7%	7.5%	8.2%	8.9%	9.2%	8.1%	8.3%	7.9%	7.8%	8.6%	7.5%	7.5%	Return on Total Cap'l	8.0%
11.8%	11.4%	12.6%	13.1%	13.2%	11.8%	12.1%	11.7%	10.5%	11.8%	10.0%	10.0%	Return on Shr. Equity	10.5%
11.8%	11.4%	12.6%	13.1%	13.2%	11.8%	12.1%	11.7%	10.5%	11.8%	10.0%	10.0%	Return on Com Equity	10.5%
2.8%	2.7%	3.9%	4.6%	4.7%	3.3%	3.5%	3.0%	1.7%	3.1%	3.0%	3.0%	Retained to Com Eq	4.0%
76%	76%	69%	65%	65%	72%	71%	75%	83%	74%	71%	69%	All Div'ds to Net Prof	62%

CURRENT POSITION ($MILL.)	2002	2003	7/31/04
Cash Assets	13.1	11.2	18.4
Other	162.7	296.4	252.5
Current Assets	175.8	307.6	270.9
Accts Payable	51.1	90.9	83.1
Debt Due	93.5	557.1	27.0
Other	60.5	77.2	84.9
Current Liab.	205.1	725.2	195.0
Fix. Chg. Cov.	290%	288%	356%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '01-'03 to '07-'09
Revenues	5.5%	5.5%	5.0%
"Cash Flow"	6.5%	3.0%	6.5%
Earnings	6.0%	2.5%	7.5%
Dividends	5.5%	5.5%	4.0%
Book Value	5.5%	5.0%	7.5%

Fiscal Year Ends	QUARTERLY REVENUES ($ mill.) A Jan.31	Apr.30	Jul.31	Oct.31	Full Fiscal Year
2001	467.6	408.0	121.8	110.5	1107.9
2002	288.7	293.9	127.9	121.5	832.0
2003	493.5	407.8	140.1	179.4	1220.8
2004	618.8	482.4	214.8	204.0	1520
2005	635	500	220	225	1580

Fiscal Year Ends	EARNINGS PER SHARE A B F Jan.31	Apr.30	Jul.31	Oct.31	Full Fiscal Year
2001	.78	.62	d.19	d.20	1.01
2002	.53	.64	d.14	d.18	.95
2003	.87	.47	d.15	d.08	1.11
2004	1.03	.54	d.11	d.23	1.23
2005	1.03	.52	d.13	d.12	1.30

Cal-endar	QUARTERLY DIVIDENDS PAID C■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2000	.172	.183	.183	.183	.72
2001	.183	.193	.193	.193	.76
2002	.20	.20	.20	.20	.80
2003	.208	.208	.208	.208	.83
2004	.215	.215	.215		

BUSINESS: Piedmont Natural Gas Company is primarily a regulated natural gas distributor, serving over 940,000 customers in North Carolina, South Carolina, and Tennessee. 2003 revenue mix: residential (43%), commercial (25%), industrial (9%), other (23%). Principal suppliers: Transco and Tennessee Pipeline. Gas costs: 53.3% of revenues. '03 depreciation rate: 2.6%. Estimated plant age: 8.7 years. Non-regulated operations: sale of gas-powered heating equipment; natural gas brokering; propane sales. Has about 2,155 employees, 16,433 shareholders of record. CEO & President: Thomas E. Skains. Incorporated: North Carolina. Address: 1915 Rexford Road, P.O. Box 33068 Charlotte, NC 28233. Telephone: 704-364-3120. Internet: www.piedmontng.com.

Piedmont Natural gas posted a smaller share loss in the July quarter than we anticipated. The utility's per share results were less than half of our estimate, good in this case. System throughput in the third quarter totaled 35.8 million dekatherms, about double that of the previous year's quarter, primarily due to the acquisition of North Carolina Natural Gas (NCNG) last year. Continued strong customer growth helped, as well. What's more, margin increased roughly 40% as a result of the acquisition and rate increases put into place last November. Higher operating and maintenance expenses mildly offset these positive factors.

We look for an earnings advance of roughly 10% this year. Our projection for fiscal 2004 (ends October 31st) assumes strong customer growth in the 2%-3% range, as well as the earnings-per-share accretion related to the NCNG acquisition and higher rates. Assuming normal weather, a relatively stable economy, and relatively flat wholesale natural gas prices, we expect share-net to increase at a mid-single digit clip in fiscal 2005. Higher gas prices pose somewhat of a risk to our estimate, as they tend to increase gas carrying costs and uncollectibles from low-income customers. The company is not anticipating any general rate case activity that would impact earnings next year. Our figures have been adjusted to reflect a 2-for-1 stock split occuring on October 11th.

Non-utility income continues to support the bottom line, albeit to a lesser extent. Regulated operations continue to make up the lion's share of Piedmont's total income. And management intends to remain focused on being a gas utility. Still, unregulated activities, which include Georgia-based SouthStar Energy and the Pine Needle and Cardinal Pipeline joint ventures, are likely to consistently contribute to the bottom line going forward.

This issue is appropriate for conservative, income-oriented accounts. Piedmont's dividend yield remains an attraction, and we expect steady increases in payments going forward. Currently, the yield stands at about 4%, average for the LDC group. Furthermore, risk should be held to a minimum, considering the stock's above average Safety grade.

Edward Plank *September 17, 2004*

(A) Fiscal year ends October 31st.
(B) Diluted earnings. Excl. extraordinary item: '00, 8¢. Excl. nonrecurring charge: '97, 2¢. *Next earnings report due mid-November.*
(C) Dividends historically paid mid-January, April, July, October.
■ Div'd reinvest. plan available; 5% discount.
(D) Includes deferred charges. At 10/31/03: $3.8 million, 6¢/share.
(E) In millions, adjusted for stock split.
(F) Quarters may not add to total due to change in shares outstanding.

Company's Financial Strength	B++
Stock's Price Stability	100
Price Growth Persistence	80
Earnings Predictability	85

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SOUTH JERSEY INDS. NYSE-SJI

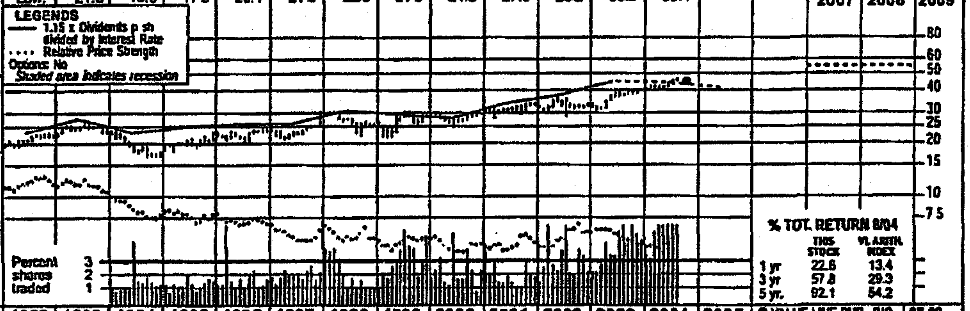
RECENT PRICE 45.27 | P/E RATIO 15.5 (Trailing: 16.1 / Median: 13.0) | RELATIVE P/E RATIO 0.90 | DIV'D YLD 3.6% | VALUE LINE

TIMELINESS 4 Raised 8/6/04
SAFETY 2 Lowered 1/4/91
TECHNICAL 3 Raised 1/9/04
BETA .55 (1.00 = Market)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
High:	27.5	24.0	23.5	24.6	30.5	30.8	30.8	30.1	34.1	36.7	40.7	46.9
Low:	21.8	16.6	17.9	20.1	21.0	22.0	21.5	24.5	27.6	28.2	30.5	39.4

Target Price Range 2007 | 2008 | 2009

LEGENDS
— 1.15 x Dividends p sh divided by Interest Rate
.... Relative Price Strength
Options: No
Shaded area indicates recession



2007-09 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	55	(+20%)	8%
Low	40	(-10%)	1%

Insider Decisions

	O	N	D	J	F	M	A	M	J
to Buy	0	0	0	0	0	0	0	0	2
Options	0	0	0	0	0	0	0	0	0
to Sell	0	0	0	0	0	0	0	1	1

Institutional Decisions

	3Q2003	4Q2003	1Q2004
to Buy	45	47	52
to Sell	30	27	23
Hld's(000)	4654	5044	5728

% TOT. RETURN 8/04

	THIS STOCK	VL ARITH. INDEX
1 yr	22.6	13.4
3 yr	57.8	29.3
5 yr.	92.1	54.2

1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	© VALUE LINE PUB., INC.	07-09
29.66	30.54	28.80	30.19	33.33	34.06	34.90	33.00	33.05	32.38	41.77	35.19	44.86	70.60	41.38	52.67	*55.35*	*56.15*	Revenues per sh	*60.35*
3.03	3.00	2.68	2.75	3.12	3.08	2.70	3.30	3.08	3.19	2.67	3.67	3.90	3.79	4.25	4.48	*4.55*	*4.80*	"Cash Flow" per sh	*5.60*
1.88	1.66	1.33	1.27	1.61	1.55	1.21	1.65	1.70	1.71	1.28	2.01	2.16	2.29	2.43	2.73	*2.90*	*3.10*	Earnings per sh A	*3.60*
1.29	1.36	1.40	1.41	1.41	1.43	1.44	1.44	1.44	1.44	1.44	1.44	1.46	1.48	1.51	1.56	*1.62*	*1.67*	Div'ds Decl'd per sh B ■	*1.77*
4.41	4.55	4.21	4.34	3.39	3.74	3.86	4.16	4.02	4.61	6.11	4.37	4.42	5.64	6.94	4.72	*4.65*	*4.90*	Cap'l Spending per sh	*4.65*
13.24	13.49	13.58	13.53	13.90	14.33	14.46	14.67	16.06	12.86	12.45	13.48	14.50	15.62	19.34	22.52	*21.05*	*23.30*	Book Value per sh	*31.60*
8.47	8.48	9.03	9.24	9.50	9.80	10.72	10.72	10.76	10.77	10.78	11.15	11.50	11.86	12.21	13.23	*14.00*	*14.25*	Common Shs Outst'g C	*14.50*
9.3	11.9	13.6	14.5	13.2	15.8	16.1	12.2	13.3	13.8	21.2	13.3	13.0	13.6	13.5	13.3	*Bold figures are*		Avg Ann'l P/E Ratio	*13.0*
.77	.90	1.01	.93	.80	.93	1.06	.82	.83	.80	1.10	.76	.85	.70	.74	.77	*Value Line*		Relative P/E Ratio	*.85*
7.4%	6.9%	7.7%	7.6%	6.6%	5.9%	7.4%	7.2%	6.4%	6.1%	5.3%	5.4%	5.2%	4.7%	4.6%	4.3%	*estimates*		Avg Ann'l Div'd Yield	*4.0%*
						374.0	353.8	355.5	348.6	450.2	392.5	515.9	837.3	505.1	696.8	*775*	*800*	Revenues ($mill)	*875*
						12.6	17.8	18.5	18.4	13.8	22.0	24.7	26.8	29.4	34.6	*40.5*	*43.0*	Net Profit ($mill)	*53.0*
						35.1%	34.4%	35.5%	36.8%	46.2%	42.8%	43.1%	42.2%	41.4%	40.6%	*42.0%*	*42.0%*	Income Tax Rate	*42.0%*
						3.4%	5.0%	5.2%	5.3%	3.1%	5.6%	4.8%	3.2%	5.8%	5.0%	*5.2%*	*5.4%*	Net Profit Margin	*6.1%*
						49.3%	51.4%	46.1%	64.6%	57.3%	53.6%	54.1%	57.0%	53.6%	50.8%	*51.0%*	*50.0%*	Long-Term Debt Ratio	*50.0%*
						49.9%	47.9%	53.2%	35.8%	33.5%	37.0%	37.6%	35.9%	46.1%	79.0%	*49.0%*	*50.0%*	Common Equity Ratio	*50.0%*
						310.6	328.4	324.8	387.1	401.1	405.9	443.5	516.2	512.5	608.4	*595*	*650*	Total Capital ($mill)	*840*
						402.1	422.7	423.9	456.5	504.3	533.3	562.2	607.0	666.6	748.3	*750*	*800*	Net Plant ($mill)	*950*
						6.1%	7.8%	7.9%	6.7%	5.3%	7.4%	7.4%	6.9%	7.6%	7.3%	*7.0%*	*7.0%*	Return on Total Cap'l	*7.0%*
						8.0%	11.2%	10.5%	10.5%	8.1%	11.7%	12.1%	12.1%	12.4%	11.5%	*13.5%*	*13.0%*	Return on Shr. Equity	*11.5%*
						8.0%	11.2%	10.6%	13.3%	10.3%	14.6%	14.8%	12.8%	12.5%	11.6%	*13.5%*	*13.0%*	Return on Com Equity	*11.5%*
						NMF	1.4%	1.6%	2.1%	NMF	4.2%	4.8%	3.5%	4.7%	5.0%	*6.5%*	*6.5%*	Retained to Com Eq	*6.5%*
						119%	88%	85%	84%	112%	72%	67%	76%	62%	57%	*56%*	*51%*	All Div'ds to Net Prof	*45%*

CAPITAL STRUCTURE as of 6/30/04
Total Debt $347.7 mill. Due in 5 Yrs $73.5 mill.
LT Debt $302.0 mill. LT Interest $16.5 mill

(Total interest coverage: 3.8x)

Pension Assets-12/03 $83.1 mill. Oblig. $91.0 mill.
Pfd Stock $1.7 mill. Pfd Div'd $.1 mill.
16,904 Series B shs. 8% cum. ($100 par) callable 106.7
Common Stock 13,792,371 common shs. as of 3/2/04
MARKET CAP: $625 million (Small Cap)

CURRENT POSITION ($MILL.)	2002	2003	6/30/04
Cash Assets	4.3	4.4	5.2
Other	208.4	261.4	232.6
Current Assets	212.7	265.8	237.8
Accts Payable	76.7	80.3	45.7
Debt Due	177.2	118.1	89.5
Other	62.7	70.1	63.7
Current Liab.	316.6	268.5	198.9
Fix. Chg. Cov.	335%	378%	360%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '01-'03 to '07-'09
Revenues	5.5%	9.0%	*1.5%*
"Cash Flow"	3.5%	6.5%	*5.0%*
Earnings	5.5%	9.5%	*6.5%*
Dividends	0.5%	1.0%	*2.5%*
Book Value	3.0%	7.0%	*8.5%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2001	342.6	218.8	107.9	168.2	837.3
2002	177.0	84.2	69.1	174.8	505.1
2003	279.9	106.2	90.1	220.6	696.8
2004	305.5	134.6	*100*	*234.9*	*775*
2005	*310*	*140*	*115*	*235*	*800*

Calendar	EARNINGS PER SHARE A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2001	1.87	d.02	d.32	.76	2.29
2002	1.65	.08	d.27	.99	2.43
2003	1.84	.16	d.13	.86	2.73
2004	1.82	*.27*	*d.10*	*.91*	*2.90*
2005	*1.85*	*.35*	*d.05*	*.95*	*3.10*

Calendar	QUARTERLY DIVIDENDS PAID B ■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2000	.36	.365	.365	.365	1.46
2001	.365	.37	.37	.37	1.48
2002	.37	.375	.375	.375	1.50
2003	.385	.385	.385	.405	1.56
2004	.405	.405	.405		

BUSINESS: South Jersey Industries, Inc. is a holding company. Its subsidiary, South Jersey Gas Co., distributes natural gas to 304,562 customers in New Jersey's southern counties, which cover 2,500 square miles and include Atlantic City. Principal suppliers include Transcontinental Gas Pipeline and Columbia Gas Pipeline. Gas revenue mix: resident'l, 31%; commercial and industrial, 10%; transportion, including off-system sales and gas marketing, 54%; off-system, 4%; cogeneration, power generation. Has 643 employees. Offs./dirs. cntrl. 1.1% of com. shares; Dimensional Fund Advisors, 5.3% (3/04 proxy). Chrmn & CEO: Edward Graham. Incorp.: N.J. Address: 1 South Jersey Plaza, Rte. 54, Folsom, NJ 08037. Telephone: 609-561-9000. Web: www.sjindustries.com.

South Jersey Industries' share price has reached company-record highs, after coming off a good earnings quarter. The company reported share net of $0.27 in the June period, which compared to our initial estimate of $0.20, and SJI's tally of $0.16 a year ago. Moreover, South Jersey announced a targeted EPS growth rate of 6%-7% annually over the next few years. Accordingly, we are raising our share-net estimate for full-year 2004 by a nickel, to $2.90, and our 2005 figure by $0.20, to $3.10.

Nonregulated operations will be the major driver behind earnings growth. Last quarter, nonutility operations accounted for 79% of the bottom line, as the June period is typically the seasonal low for South Jersey's profits from regulated businesses. Earnings from South Jersey Resources group rose to $1.4 million from $840,000 a year earlier, due to higher profits realized on wholesale gas contracts, as well as the commencement of a fuel management contract with FPL Energy Power Marketing. Meanwhile, South Jersey Energy contributed another $840,000 to profits, with the help of 5,000 additional retail gas customers. Marina Energy, the nonregulated cogeneration subsidiary, provided an extra $700,000 to profits, boosted by the thermal power plant supplying the heating and cooling needs of the Borgata Casino in Atlantic City.

South Jersey Industries has high hopes for Marina Energy. First, the still-new Borgata Casino announced plans to expand its facility by 500,000 square feet, which will provide additional revenue opportunities for Marina. Second, SJI has entered into a joint venture with DCO Energy to develop and install a 1,400 kilowatt plant at a county-owned landfill in Egg Harbor Township, NJ. The plant is scheduled to begin supplying power by the end of the year.

This issue is a good-quality income stock. The company has increased the dividend five years in a row, and we believe that it has the ability to secure more increases in the years ahead. The utility business is benefiting from a growing customer base on the regulated side, while it continues to make progress on the nonutility front.

Michael P. Maloney *September 17, 2004*

(A) Based on avg. shs. Excl. nonrecur. gain (loss): '01, $0.13. Excl gain (losses) from discont. ops.: '96, $1.14; '97, ($0.24); '98, ($0.26); '99, ($0.02); '00, ($0.04); '01, ($0.02); '02, ($0.04); '03, ($0.09). Excl. gain due to acct'g change: '93, $0.04; '01, $0.14. Next egs. report late Oct. (B) Dividends historically paid early Jan., Apr., Jul. and Oct. ■ Div. reinvest. plan avail. (2% disc.). (C) In mill.

Company's Financial Strength	B++
Stock's Price Stability	100
Price Growth Persistence	75
Earnings Predictability	80

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WGL HOLDINGS NYSE-WGL

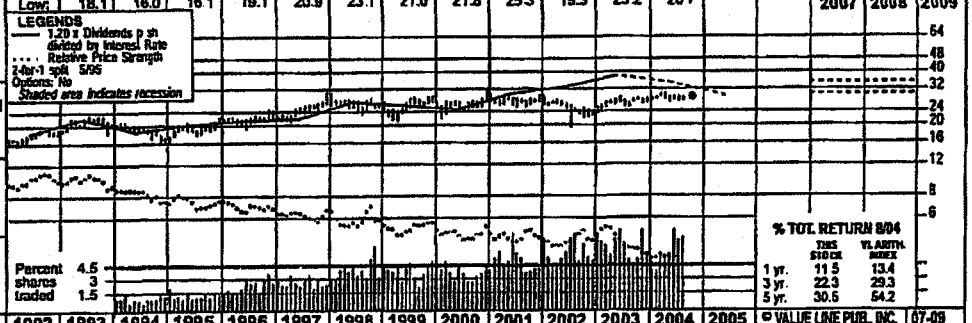
RECENT PRICE 29.04 | P/E RATIO 14.1 (Trailing: 15.7; Median: 14.0) | RELATIVE P/E RATIO 0.82 | DIV'D YLD 4.5% | VALUE LINE

TIMELINESS 5 Lowered 11/14/03
SAFETY 1 Raised 4/2/93
TECHNICAL 2 Raised 8/27/04
BETA .75 (1.00 = Market)

High:	22.9	21.3	22.4	25.0	31.4	30.8	29.4	31.5	30.5	29.6	28.8	30.4				
Low:	18.1	16.0	16.1	19.1	20.9	23.1	21.0	21.8	25.3	19.3	23.2	26.7				

Target Price Range 2007 | 2008 | 2009

LEGENDS
— 1.20 x Dividends p sh divided by Interest Rate
.... Relative Price Strength
2-for-1 split 5/95
Options: No
Shaded area indicates recession



2007-09 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	35	(+20%)	9%
Low	30	(+5%)	5%

Insider Decisions

	O	N	D	J	F	M	A	M	J
to Buy	0	1	0	0	0	0	0	0	0
Options	0	1	0	0	1	0	0	0	0
to Sell	0	1	0	0	1	0	0	0	0

Institutional Decisions

	3Q2003	4Q2003	1Q2004
to Buy	65	88	90
to Sell	73	66	62
Hld's(000)	21665	21932	21445

Percent shares traded 4.5 3 1.5

% TOT. RETURN 8/04

	THIS STOCK	VL ARITH. INDEX
1 yr.	11.5	13.4
3 yr.	22.3	29.3
5 yr.	30.6	54.2

1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	© VALUE LINE PUB., INC.	07-09
18.17	19.52	18.75	17.50	18.37	21.55	21.69	19.30	22.19	24.18	23.74	20.92	22.19	29.80	32.63	42.45	43.20	44.80	Revenues per sh A	52.40
1.90	2.03	2.17	2.04	2.17	2.25	2.43	2.51	2.93	3.02	2.79	2.74	3.20	3.24	2.63	4.00	3.70	3.90	"Cash Flow" per sh	4.55
1.26	1.22	1.28	1.14	1.27	1.31	1.42	1.45	1.85	1.85	1.54	1.47	1.79	1.88	1.14	2.30	1.95	2.05	Earnings per sh B	2.40
.94	.97	1.01	1.05	1.07	1.09	1.11	1.12	1.14	1.17	1.20	1.22	1.24	1.26	1.27	1.28	1.30	1.31	Div'ds Decl'd per sh C■	1.34
2.79	3.00	2.38	2.05	2.17	2.43	2.64	2.63	2.85	3.20	3.62	3.42	2.67	2.68	3.34	2.65	2.55	2.55	Cap'l Spending per sh	2.60
9.96	9.86	10.17	9.63	10.66	11.04	11.51	11.95	12.79	13.48	13.86	14.72	15.31	16.24	15.78	16.25	18.45	19.15	Book Value per sh D	21.85
38.42	38.70	39.23	39.89	40.62	41.50	42.19	42.93	43.70	43.70	43.84	46.47	46.47	48.54	48.56	48.63	48.65	48.65	Common Shs Outst'g E	48.65
9.6	10.6	11.7	12.8	13.6	15.6	14.0	12.7	11.5	12.7	17.2	17.3	14.8	14.7	23.1	11.1	Bold figures are Value Line estimates		Avg Ann'l P/E Ratio	14.0
.80	.80	.87	.92	.82	.92	.92	.85	.72	.73	.89	.99	.95	.75	1.26	.63			Relative P/E Ratio	.95
7.8%	7.5%	6.9%	7.2%	6.2%	5.3%	5.6%	6.1%	5.4%	5.0%	4.5%	4.8%	4.8%	4.6%	4.8%	5.0%			Avg Ann'l Div'd Yield	4.5%
						914.9	828.7	969.8	1055.8	1040.6	972.1	1031.1	1446.5	1584.8	2064.2	2100	2180	Revenues ($mill) A	2550
						60.5	62.9	81.6	82.0	68.6	68.8	84.6	89.9	65.7	112.3	94.5	100	Net Profit ($mill)	115
						38.1%	37.4%	37.7%	35.9%	35.6%	36.0%	36.1%	39.5%	34.0%	38.0%	37.0%	37.0%	Income Tax Rate	37.0%
						6.6%	7.6%	8.4%	7.8%	6.6%	7.1%	8.2%	6.2%	3.5%	5.4%	4.5%	4.6%	Net Profit Margin	4.6%
						40.0%	37.8%	37.6%	41.1%	40.3%	41.5%	43.1%	41.7%	45.7%	43.8%	41.0%	41.0%	Long-Term Debt Ratio	39.0%
						56.7%	58.9%	59.4%	56.2%	57.1%	56.1%	54.6%	56.3%	52.4%	54.3%	58.0%	58.0%	Common Equity Ratio	59.0%
						856.3	870.6	941.1	1049.0	1064.8	1218.5	1299.2	1400.8	1482.5	1454.9	1605	1665	Total Capital ($mill)	1820
						985.0	1056.1	1130.6	1217.1	1319.6	1402.7	1460.3	1519.7	1606.8	1574.9	1950	2050	Net Plant ($mill)	2250
						8.7%	8.7%	10.1%	8.3%	8.0%	7.1%	7.9%	7.9%	5.3%	9.1%	6.0%	6.0%	Return on Total Cap'l	6.5%
						11.8%	11.6%	13.9%	13.3%	10.8%	9.7%	11.4%	11.0%	7.0%	13.7%	10.0%	10.0%	Return on Shr. Equity	10.5%
						12.2%	12.0%	14.4%	13.7%	11.1%	9.9%	11.7%	11.2%	7.2%	14.0%	10.0%	10.0%	Return on Com Equity	10.5%
						2.6%	2.6%	5.6%	5.1%	2.5%	1.8%	3.7%	3.6%	NMF	6.2%	3.0%	3.5%	Retained to Com Eq	4.5%
						79%	77%	62%	63%	78%	82%	69%	67%	112%	56%	68%	65%	All Div'ds to Net Prof	57%

CAPITAL STRUCTURE as of 6/30/04
Total Debt 712.1 mill. Due in 5 Yrs 253.1 mill.
LT Debt $589.4 mill. LT Interest $40.0 mill.
(Total interest coverage: 5.1x)

Pension Assets-9/03 $661.5 mill. Oblig. $615.9 mill.
Preferred Stock $28.2 mill. Pfd Div'd $1.3 mill.

Common Stock 48,647,665 shs.
as of 7/31/04
MARKET CAP: $1.4 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2002	2003	6/30/04
Cash Assets	2.5	4.5	105.6
Other	338.3	399.9	398.1
Current Assets	340.8	404.4	503.7
Accts Payable	138.5	158.4	188.6
Debt Due	133.3	194.8	122.7
Other	65.7	48.9	130.5
Current Liab.	337.5	402.1	441.8
Fix. Chg. Cov.	337%	487%	435%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '01-'03 to '07-'09
Revenues	6.0%	8.5%	7.0%
"Cash Flow"	4.5%	2.5%	5.5%
Earnings	3.5%	0.5%	5.0%
Dividends	2.0%	1.5%	1.0%
Book Value	4.5%	4.0%	6.0%

Fiscal Year Ends	QUARTERLY REVENUES ($ mill.) A Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2001	540.3	605.2	182.4	118.6	1446.5
2002	417.1	564.8	314.2	288.7	1584.8
2003	558.7	851.1	373.2	281.2	2064.2
2004	585.3	862.2	356.9	295.6	2100
2005	600	875	410	295	2180

Fiscal Year Ends	EARNINGS PER SHARE A B Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2001	1.08	1.33	d.15	d.38	1.88
2002	.66	1.09	d.14	d.47	1.14
2003	1.10	1.61	d.05	d.36	2.30
2004	.81	1.48	d.08	d.26	1.95
2005	.85	1.55	d.08	d.27	2.05

Cal-endar	QUARTERLY DIVIDENDS PAID C ■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2000	.305	.31	.31	.31	1.24
2001	.31	.315	.315	.315	1.26
2002	.315	.318	.318	.318	1.27
2003	.318	.32	.32	.32	1.28
2004	.32	.325	.325		

BUSINESS: WGL Holdings, Inc. is the parent of Washington Gas Light, a natural gas distributor in Washington, D.C. and adjacent areas of VA. and MD. to resident'l and comm'l users (839,291 meters). Hampshire Gas, a federally regulated sub., operates an underground gas-storage facility in WV. Non-regulated subs.: Wash. Gas Energy Svcs. sells and delivers natural gas and provides energy related products in the D.C metro area; Wash. Gas Energy Sys. designs/installs comm'l heating, ventilating, and air cond. systems. Has 2,205 employees. Off./dir. own less than 1% of the common stock (1/04 proxy). Chairman & CEO: J.H. DeGraffenreidt, Jr.. Inc.: D.C. and VA. Address: 1100 H St., N.W., Washington, D.C. 20080. Tel.: 202-624-6410. Internet: www.wgloholdings.com.

WGL Holdings' earnings are down through the first three quarters of fiscal 2004 (ends September 30th). The company generated EPS of $2.21, compared to $2.66 during the first nine months of 2003. The profit shortfall was reflective of lower operating income from WGL's regulated utility business. Last year, the bottom line benefited from weather that was 20% below normal, thereby increasing natural gas demand for heating purposes. Those conditions have not been repeated in 2004. Also, while revenues in the Utility segment declined, operating and maintenance expenses in the division rose by $8.4 million in the first nine months, to $173.5 million. The rise in costs was associated with higher employee benefit costs, severance costs, higher expenses for leak repairs, technology consulting fees, and expenses for the implementation of the provisions for the Sarbanes-Oxley Act. Meanwhile, depreciation expense soared by $7 million, to $62 million, partially due to an order issued by Virginia regulators.

The company's smaller, nonutility unit is making progress. In the first nine months, profits nearly doubled from last year to $8.8 million. The main driver was the unit's retail energy-marketing operation, which benefited from higher gross margins on the sale of natural gas. Profits were partially offset, however, by a greater loss from the unit's commercial HVAC business, which recorded a loss of $2.3 million in the period.

WGL is working towards its previously defined financial objectives. It is targeting annual earnings growth of 5% between 2004 and 2008, which it intends to achieve through 3% yearly growth in its utility customer base, and the further development of its nonregulated business. WGL also plans to review its operating expenses, which have been on the rise. Finally, the trend of steady dividend increases is likely to continue.

This stock is a high-quality income issue. It offers a competitive yield and has top-notch ratings for Safety (1 ranking) and Stock Price Stability (100). It's a good choice for conservative investors. We note, however, that the stock has limited possibilities for share-price appreciation.

Michael P. Maloney *September 17, 2004*

(A) Beginning 1989, fiscal years end Sept. 30th. (B) Based on diluted shares. Excludes nonrecurring losses: '01, (13¢); '02, (34¢); 2Q'04, $12. Next earnings report due late Oct. (C) Dividends historically paid early February, May, August, and November. ■ Dividend reinvestment plan available. (D) Includes deferred charges and intangibles. '03: $152.2 million, $3.13/sh. (E) In millions, adjusted for stock split.

Company's Financial Strength	A
Stock's Price Stability	100
Price Growth Persistence	70
Earnings Predictability	60

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Southwest Gas Corporation
Indicated Common Equity Cost Rate
Through Use of a Risk Premium Model
Using an Adjusted Total Market Approach

Line No.		Southwest Gas Corporation	Proxy Group of Five Gas Distribution Companies	Proxy Group of Eleven Value Line Gas Distribution Companies
1.	Prospective Yield on Aaa Rated Corporate Bonds (1)	6.25 %	6.25 %	6.25 %
2.	Adjustment to Reflect Yield Spread Between Aaa Rated Corporate Bonds and A Rated Public Utility Bonds	0.47 (2)	0.47 (2)	0.47 (2)
3.	Adjusted Prospective Yield on A Rated Public Utility Bonds	6.72 %	6.72 %	6.72 %
4.	Adjustment to Reflect Bond Rating Difference	0.36 (3)	0.00 (4)	0.00 (4)
5.	Adjusted Prospective Bond Yield	7.08	6.72	6.72
6.	Equity Risk Premium (5)	4.41	4.64	4.47
7.	Risk Premium Derived Common Equity Cost Rate	11.49 %	11.36 %	11.19 %

Notes:
(1) Derived in Note (3) on Sheet 6 of this Exhibit.
(2) The average yield spread of A rated public utility bonds over Aaa rated corporate bonds of 0.47% from sheet 4 of this Schedule.
(3) The average yield spread of Baa over A rated public utility bonds of 0.36%, from Sheet 4 of this Exhibit in order to reflect Southwest Gas Corporation's Baa2 Moody's bond rating.
(4) No adjustment necessary as the average Moody's bond rating for the proxy group is A2.
(5) From Sheet 5 of this Exhibit.

Southwest Gas Corporation
Comparison of Bond Ratings and Business profile for
Southwest Gas Corporation, the Proxy Group of Five Gas Companies and the
Proxy Group of Eleven Value Line Gas Companies

	August 2004 Moody's Bond Rating		August 2004 Standard & Poor's Bond Rating		Standard & Poor's Business Profile (2)
	Bond Rating	Numerical Weighting (1)	Bond Rating	Numerical Weighting (1)	
Southwest Gas Corporation	Baa2	9.0	BBB-	10.0	3.0
Proxy Group of Five Gas Distribution Companies					
AGL Resources, Inc. (3)	A3	7.0	A-	7.0	2.0
Cascade Natural Gas Corp.	Baa1	8.0	BBB+	8.0	2.0
NICOR, Inc. (4)	Aa3	4.0	AA	3.0	2.0
Northwest Natural Gas Co.	A2	6.0	A	6.0	1.0
Piedmont Natural Gas Co . Inc	A3	7.0	A	6.0	2.0
Average	A2	6.4	A	6.0	1.8
Proxy Group of Eleven Value Line Gas Distribution Companies					
AGL Resources, Inc. (3)	A3	7.0	A-	7.0	2.0
Cascade Natural Gas Corp.	Baa1	8.0	BBB+	8.0	2.0
Energen Corp. (5)	A1	5.0	A-	7.0	2.0
KeySpan Corp (6)	A2	6.0	A+	5.0	2.0
Laclede Group, Inc. (7)	A3	7.0	A	6.0	3.0
NICOR, Inc. (4)	Aa3	4.0	AA	3.0	2.0
Northwest Natural Gas Co.	A2	6.0	A	6.0	1.0
Peoples Energy Corp. (8)	Aa3	4.0	A-	7.0	2.0
Piedmont Natural Gas Co., Inc.	A3	7.0	A	6.0	2.0
South Jersey Industries, Inc. (9)	Baa1	8.0	A	6.0	2.0
WGL Holdings Inc. (10)	A2	6.0	AA-	4.0	2.0
Average	A2	6.2	A	5.9	2.0

Notes:
(1) From Sheet 3 of this Exhibit.
(2) From Standard & Poor's Utilities Perspectives, Global Utilities Ratings Service, Vol. 13, No. 38, October 4, 2004.
(3) Ratings and business profile are those of Atlanta Gas Light Company.
(4) Ratings and business profile are those of NICOR Gas Co.
(5) Ratings and business profile are those of Alabama Gas Corporation.
(6) Ratings and business profile are a composite of those of Boston Gas Co., Colonial Gs Co. and KeySpan Energy Delivery Long Island.
(7) Ratings and business profile are those of Laclede Gas Co.
(8) Ratings and business profile are a composite of those of North Shore Gas Company and Peoples Gas Light & Coke Company.
(9) Ratings and business profile are those of South Jersey Gas Company.
(10) Ratings and business profile are those of Washington Gas Light Company

Source of Information: Moody's Investors Service
Standard & Poor's Global Utility Rating Service

Southwest Gas Corporation
Numerical Assignment for
Moody's and Standard & Poor's Bond Ratings

Moody's Bond Rating	Numerical Bond Weighting	Standard & Poor's Bond Rating
Aaa	1	AAA
Aa1	2	AA+
Aa2	3	AA
Aa3	4	AA-
A1	5	A+
A2	6	A
A3	7	A-
Baa1	8	BBB+
Baa2	9	BBB
Baa3	10	BBB-
Ba1	11	BB+
Ba2	12	BB
Ba3	13	BB-

Moody's
Comparison of Interest Rate Trends
for the Two Months Ending August 2004 (1)

Years	Corporate Bonds Aaa Rated	Public Utility Bonds Aa Rated	Public Utility Bonds A Rated	Public Utility Bonds Baa Rated	Spread - Corporate v. Public Utility Bonds: Aa (Pub. Util.) over Aaa (Corp.)	Spread - Corporate v. Public Utility Bonds: A (Pub. Util.) over Aaa (Corp.)	Spread - Corporate v. Public Utility Bonds: Baa (Pub. Util.) over Aaa (Corp.)	Spread - Public Utility Bonds: A over Aa	Spread - Public Utility Bonds: Baa over A
July-04	5.82 %	6.09 %	6.27 %	6.67 %	0.27 %	0.45 %	0.85 %	0.18 %	0.40 %
August-04	5.65	5.95	6.14	6.45	0.30 %	0.49 %	0.80 %	0.19 %	0.31 %
Average Spread (2)					0.29 %	0.47 %	0.83 %	0.19 %	0.36 %

Notes: (1) All yields are distributed yields.
(2) Equal weight has been given to the July and August 2004 spread.

Source of Information: Mergent Bond Record Monthly Update, September 2004, Vol. 71, No. 9

Southwest Gas Corporation
Judgment of Equity Risk Premium for
the Proxy Group of Five Gas Distribution Companies and the
Proxy Group of Eleven Value Line Gas Distribution Companies

Line No.		Southwest Gas Corporation	Proxy Group of Five Gas Distribution Companies	Proxy Group of Eleven Value Line Gas Distribution Companies
1	Calculated equity risk premium based on the total market using the beta approach (1)	5.19 %	5.13 %	4.80 %
2	Mean equity risk premium based on a study using the holding period returns of public utilities with:			
	a. Baa rated bonds (2)	3.62		
	b A rated bonds (2)		4.14	4.14
3.	Average equity risk premium	4.41 %	4.64 %	4.47 %

Notes: (1) From Sheet 6 of this Exhibit.
(2) From Sheet 8 of this Exhibit.

Southwest Gas Corporation
Derivation of Equity Risk Premium Based on the Total Market Approach
Using the Beta for Southwest Gas Corporation,
the Proxy Group of Five Gas Distribution Companies and the
Proxy Group of Eleven Value Line Gas Distribution Companies

Line No.		Southwest Gas Corporation	Proxy Group of Five Gas Distribution Companies	Proxy Group of Eleven Value Line Gas Distribution Companies
1	Arithmetic mean total return rate on the Standard & Poor's 500 Composite Index - 1926-2003 (1)	12 40 %	12 40 %	12 40 %
2	Arithmetic mean yield on Aaa and Aa Corporate Bond 1926-2003 (1)	(6.10)	(6.10)	(6.10)
3	Historical Equity Risk Premium	6.30 %	6.30 %	6.30 %
4	Forecasted 3-5 year Total Annual Market Return (2)	12 93 %	12 93 %	12 93 %
5	Prospective Yield an Aaa Rated Corporate Bonds (3)	(6.25)	(6.25)	(6.25)
6	Forecasted Equity Risk Premium	6.68 %	6.68 %	6.68 %
7	Average of Historical and Forecasted Equity Risk Premium (4)	6 49 %	6 49 %	6.49 %
8	Adjusted Value Line Beta (5)	0.80	0.79	0.74
9	Beta Adjusted Equity Risk Premium	5.19 %	5.13 %	4.80 %

Notes:
(1) From Moody's Industrial Manual and Mergent Bond Record Monthly Update
(2) From Note 1, Sheet 4 of Exhibit___ (FJH-13).
(3) Average forecast based upon six quarterly estimates of Aaa rated corporate bonds per the consensus of nearly 50 economists reported in Blue Chip Financial Forecasts dated September 1, 2004 (see Sheet 7 of this exhibit) The estimates are detailed below

Fourth Quarter 2004	5.80 %
First Quarter 2005	6.00
Second Quarter 2005	6 20
Third Quarter 2005	6 40
Fourth Quarter 2005	6 50.
First Quarter 2006	6.60
Average	6.25 %

(4) Average of the Historical Equity Risk Premium of 6.20% from Line No. 3 and the Forecasted Equity Risk Premium of 6.48% from Line No. 6 ((6 20% + 6 68%) / 2 = 6 44%.

(5) From Sheet 9 of this Exhibit.

Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

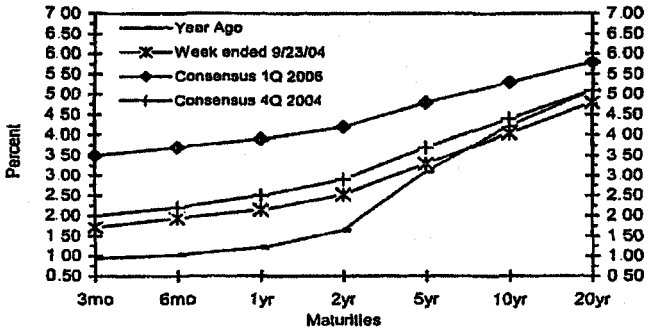
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			*Latest Q*	4Q	1Q	2Q	3Q	4Q	1Q
Interest Rates	Sep.24	Sep.17	Sep.10	Sep.3	Aug.	July	June	*3Q 2004**	2004	2005	2005	2005	2005	2006
Federal Funds Rate	1.64	1.49	1.50	1.53	1.43	1.26	1.03	*1.41*	1.9	2.3	2.7	3.1	3.4	3.6
Prime Rate	4.57	4.50	4.50	4.50	4.42	4.25	4.00	*4.40*	4.9	5.3	5.7	6.1	6.4	6.6
LIBOR, 3-mo.	1.92	1.89	1.86	1.81	1.73	1.63	1.49	*1.74*	2.2	2.5	2.9	3.3	3.6	3.8
Commercial Paper, 1-mo.	1.72	1.67	1.61	1.53	1.48	1.29	1.13	*1.47*	2.0	2.4	2.7	3.1	3.5	3.6
Treasury bill, 3-mo	1.72	1.67	1.65	1.61	1.50	1.36	1.29	*1.51*	2.0	2.3	2.7	3.1	3.4	3.5
Treasury bill, 6-mo.	1.94	1.88	1.89	1.82	1.76	1.70	1.64	*1.78*	2.2	2.5	2.9	3.2	3.5	3.7
Treasury bill, 1 yr	2.14	2.09	2.10	2.03	2.02	2.10	2.12	*2.07*	2.5	2.8	3.2	3.5	3.8	3.9
Treasury note, 2 yr	2.53	2.49	2.52	2.47	2.51	2.64	2.76	*2.55*	2.9	3.3	3.6	3.9	4.1	4.2
Treasury note, 5 yr.	3.29	3.35	3.42	3.39	3.47	3.69	3.93	*3.51*	3.7	4.1	4.3	4.6	4.7	4.8
Treasury note, 10 yr.	4.04	4.14	4.21	4.19	4.28	4.50	4.73	*4.31*	4.4	4.7	4.9	5.1	5.3	5.3
Treasury note, 20 yr.	4.80	4.92	4.99	4.98	5.07	5.24	5.45	*5.08*	5.1	5.4	5.5	5.6	5.7	5.8
Corporate Aaa bond	5.37	5.48	5.54	5.55	5.65	5.82	6.01	*5.65*	5.8	6.0	6.2	6.4	6.5	6.6
Corporate Baa bond	6.17	6.29	6.36	6.37	6.46	6.62	6.78	*6.46*	6.5	6.8	6.9	7.1	7.2	7.3
State & Local bonds	4.46	4.54	4.61	4.63	4.70	4.87	5.05	*4.71*	4.8	4.9	5.1	5.2	5.3	5.4
Home mortgage rate	5.70	5.75	5.83	5.77	5.87	6.06	6.29	*5.90*	6.0	6.2	6.4	6.6	6.7	6.8

	History								Consensus Forecasts-Quarterly Avg.					
	4Q	1Q	2Q	3Q	4Q	1Q	2Q	*3Q*	4Q	1Q	2Q	3Q	4Q	1Q
Key Assumptions	2002	2003	2003	2003	2003	2004	2004	*2004**	2004	2005	2005	2005	2005	2006
Major Currency Index	100.0	95.1	90.8	90.7	87.8	85.3	88.0	*86.5*	86.4	86.6	86.0	85.9	86.0	86.4
Real GDP	0.7	1.9	4.1	7.4	4.2	4.5	2.8	*3.6*	3.9	3.6	3.6	3.5	3.4	3.3
GDP Price Index	2.0	2.7	1.1	1.4	1.6	2.8	3.2	*2.0*	2.0	2.1	2.1	2.1	2.1	2.3
Consumer Price Index	2.0	3.8	0.7	2.4	0.7	3.5	4.8	*2.3*	2.3	2.4	2.4	2.4	2.5	2.5

[1]Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Definitions reported here are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for the U.S. Federal Reserve Board's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS). ***Interest rate data for 3Q 2004 based on historical data through the week ended September 24. .Data for 3Q 2004 Major Currency Index also is based on data through week ended September 24. Figures shown for 3Q 2004 Real GDP, GDP Chained Price Index and Consumer Price Index are consensus forecasts based on a special question survey this month of the panel members.***

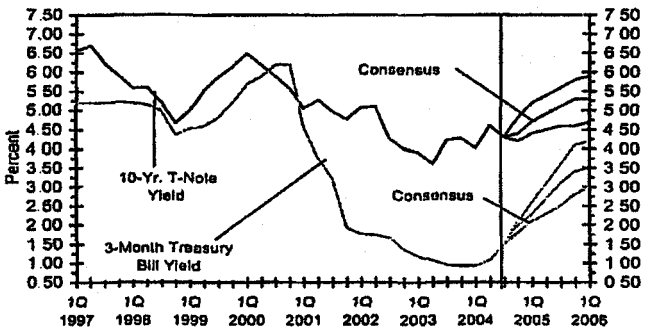
U.S. Treasury Yield Curve

Week ended September 24, 2004 and Year Ago vs 4Q 2004 and 1Q 2006 Consensus forecasts



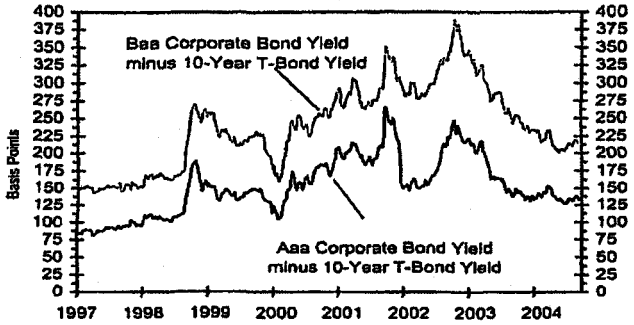
U.S. 3-Mo. T-Bills & 10-Yr. T-Note Yield

(Quarterly Average) History — Forecast



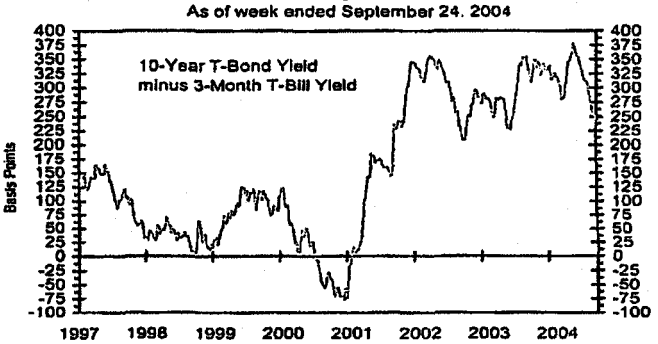
Corporate Bond Spreads

As of week ended September 24, 2004



U.S. Treasury Yield Curve

As of week ended September 24, 2004



Southwest Gas Corporation
Derivation of Mean Equity Risk Premium Based on a Study
Using Holding Period Returns of Public Utilities

Line No.		Over Baa Rated Public Utility Bonds AUS Consultants - Utility Services Study (1) 1	Over A Rated Public Utility Bonds AUS Consultants - Utility Services Study (1) 1
Time Period		1928-2003	1928-2003
1.	*Arithmetic Mean Holding Period Returns (2):* Standard & Poor's Public Utility Index	10.77 %	10.77 %
2.	Arithmetic Mean yield on:		
	a. Baa-rated Public Utility Bonds	(7.15)	
	b A-rated Public Utility Bonds		(6.63)
3.	Equity Risk Premium	3.62 %	4.14 %

Notes: (1) S&P Public Utility Index and Moody's Public Utility Bond Average Annual Yields, 1928-2003 (AUS Consultants - Utility Services, 2004).

(2) Holding period returns are calculated based upon income received (dividends and interest) plus the relative change in the market value of a security over a one-year holding period.

Southwest Gas Corporation
Value Line Adjusted Betas for Southwest Gas Corporation,
the Proxy Group of Five Gas Distribution Companies and the
Proxy Group of Eleven Value Line Gas Distribution Companies

	Value Line Adjusted Beta
Southwest Gas Corporation	0.80
Proxy Group of Five Gas Distribution Companies	
AGL Resources, Inc.	0.80
Cascade Natural Gas Corp.	0.75
NICOR, Inc.	1.00
Northwest Natural Gas Co.	0.65
Piedmont Natural Gas Co., Inc.	0.75
Average	0.79
Proxy Group of Eleven Value Line Gas Distribution Companies	
AGL Resources, Inc.	0.80
Cascade Natural Gas Corp.	0.75
Energen Corp.	0.70
KeySpan Corp.	0.75
Laclede Gas Company	0.70
NICOR, Inc.	1.00
Northwest Natural Gas Co.	0.65
Peoples Energy Corp.	0.75
Piedmont Natural Gas Co., Inc.	0.75
South Jersey Industries, Inc.	0.55
WGL Holdings Inc.	0.75
Average	0.74

Source of Information: Value Line Investment Survey, (Standard Edition)
September 17, 2004

Exhibit __ (FJH-12)
Sheet 1 of 8

Stocks, Bonds, Bills and Inflation

SBBI

Valuation Edition
2004 Yearbook

Ibbotson Associates

For example, if bond yields rise unexpectedly, investors can receive a higher coupon payment from a newly issued bond than from the purchase of an outstanding bond with the former lower-coupon payment. The outstanding lower-coupon bond will thus fail to attract buyers, and its price will decrease, causing its yield to increase correspondingly, as its coupon payment remains the same. The newly priced outstanding bond will subsequently attract purchasers who will benefit from the shift in price and yield; however, those investors who already held the bond will suffer a capital loss due to the fall in price.

Anticipated changes in yields are assessed by the market and figured into the price of a bond. Future changes in yields that are not anticipated will cause the price of the bond to adjust accordingly. Price changes in bonds due to unanticipated changes in yields introduce price risk into the total return. Therefore, the total return on the bond series does not represent the riskless rate of return. There is no evidence that investors expect the historical trend of bond capital losses to be repeated in the future (otherwise, bond prices would be adjusted accordingly). Therefore, historical total returns are biased downward as indicators of future expectations. The income return better represents the unbiased estimate of the purely riskless rate of return, since an investor can hold a bond to maturity and be entitled to the income return with no capital loss.

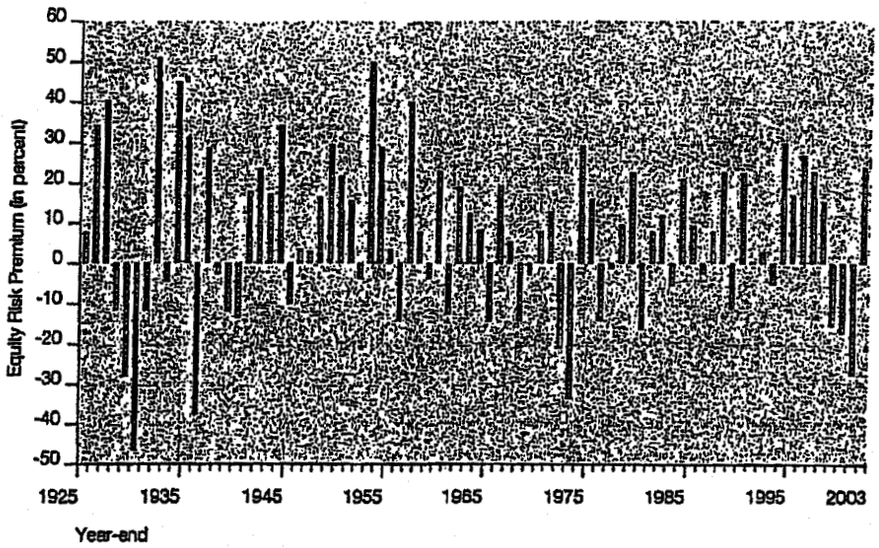
Arithmetic versus Geometric Means

The equity risk premium data presented in this book are arithmetic average risk premia as opposed to geometric average risk premia. The arithmetic average equity risk premium can be demonstrated to be most appropriate when discounting future cash flows. For use as the expected equity risk premium in either the CAPM or the building block approach, the arithmetic mean or the simple difference of the arithmetic means of stock market returns and riskless rates is the relevant number. This is because both the CAPM and the building block approach are additive models, in which the cost of capital is the sum of its parts. The geometric average is more appropriate for reporting past performance, since it represents the compound average return.

The argument for using the arithmetic average is quite straightforward. In looking at projected cash flows, the equity risk premium that should be employed is the equity risk premium that is expected to actually be incurred over the future time periods. Graph 5-3 shows the realized equity risk premium for each year based on the returns of the S&P 500 and the income return on long-term government bonds. (The actual, observed difference between the return on the stock market and the riskless rate is known as the realized equity risk premium.) There is considerable volatility in the year-by-year statistics. At times the realized equity risk premium is even negative.

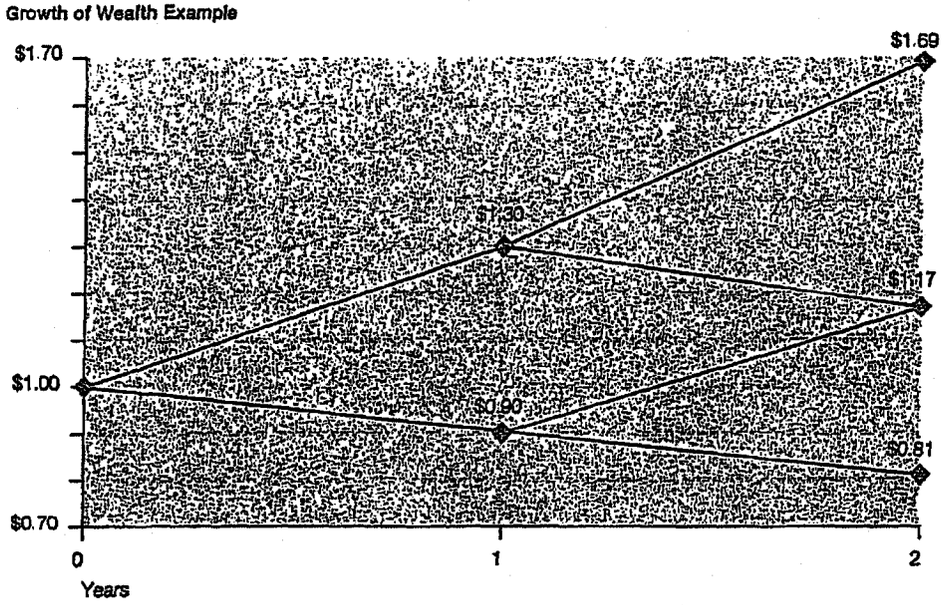
Graph 5-3

Realized Equity Risk Premium Per Year
1926–2003



To illustrate how the arithmetic mean is more appropriate than the geometric mean in discounting cash flows, suppose the expected return on a stock is 10 percent per year with a standard deviation of 20 percent. Also assume that only two outcomes are possible each year— +30 percent and –10 percent (i.e., the mean plus or minus one standard deviation). The probability of occurrence for each outcome is equal. The growth of wealth over a two-year period is illustrated in Graph 5-4.

Graph 5-4
Growth of Wealth Example



The most common outcome of $1.17 is given by the geometric mean of 8.2 percent. Compounding the possible outcomes as follows derives the geometric mean:

$$[(1+0.30)\times(1-0.10)]^{1/2}-1=0.082$$

However, the expected value is predicted by compounding the arithmetic, not the geometric, mean. To illustrate this, we need to look at the probability-weighted average of all possible outcomes:

(0.25 × $1.69) =	$0.4225
+ (0.50 × $1.17) =	$0.5850
+ (0.25 × $0.81) =	$0.2025
Total	$1.2100

Therefore, $1.21 is the probability-weighted expected value. The rate that must be compounded to achieve the terminal value of $1.21 after 2 years is 10 percent, the arithmetic mean:

$$\$1\times(1+0.10)^2=\$1.21$$

The geometric mean, when compounded, results in the median of the distribution:

$$\$1\times(1+0.082)^2=\$1.17$$

The arithmetic mean equates the expected future value with the present value; it is therefore the appropriate discount rate.

Appropriate Historical Time Period

The equity risk premium can be estimated using any historical time period. For the U.S., market data exists at least as far back as the late 1800s. Therefore, it is possible to estimate the equity risk premium using data that covers roughly the past 100 years.

The Ibbotson Associates equity risk premium covers the time period from 1926 to the present. The original data source for the time series comprising the equity risk premium is the Center for Research in Security Prices. CRSP chose to begin their analysis of market returns with 1926 for two main reasons. CRSP determined that the time period around 1926 was approximately when quality financial data became available. They also made a conscious effort to include the period of extreme market volatility from the late twenties and early thirties; 1926 was chosen because it includes one full business cycle of data before the market crash of 1929. These are the most basic reasons why Ibbotson Associates' equity risk premium calculation window starts in 1926.

Implicit in using history to forecast the future is the assumption that investors' expectations for future outcomes conform to past results. This method assumes that the price of taking on risk changes only slowly, if at all, over time. This "future equals the past" assumption is most applicable to a random time-series variable. A time-series variable is random if its value in one period is independent of its value in other periods.

Does the Equity Risk Premium Revert to Its Mean over Time?

Some have argued that the estimate of the equity risk premium is upwardly biased since the stock market is currently priced high. In other words, since there have been several years with extraordinarily high market returns and realized equity risk premia, the expectation is that returns and realized equity risk premia will be lower in the future, bringing the average back to a normalized level. This argument relies on several studies that have tried to determine whether reversion to the mean exists in stock market prices and the equity risk premium.[3] Several academics contradict each other on this topic; moreover, the evidence supporting this argument is neither conclusive nor compelling enough to make such a strong assumption.

Our own empirical evidence suggests that the yearly difference between the stock market total return and the U.S. Treasury bond income return in any particular year is random. Graph 5-3, presented earlier, illustrates the randomness of the realized equity risk premium.

3 Fama, Eugene E., and Kenneth R. French. "Permanent and Temporary Components of Stock Prices," *Journal of Political Economy*, April 1988, pp. 246–273. Poterba, James M., and Lawrence H. Summers. "Mean Reversion in Stock Prices," *Journal of Financial Economics*, October 1988, pp. 27–59. Lo, Andrew W., and A. Craig MacKinlay. "Stock Market Prices Do Not Follow Random Walks: Evidence from a Simple Specification Test," *The Review of Financial Studies*, Spring 1988, pp. 41–66. Finnerty, John D., and Dean Leistikow. "The Behavior of Equity and Debt Risk Premiums: Are They Mean Reverting and Downward-Trending?" *The Journal of Portfolio Management*, Summer 1993, pp. 73–84. Ibbotson, Roger G., and Scott L. Lummer. "The Behavior of Equity and Debt Risk Premiums: Comment," *The Journal of Portfolio Management*, Summer 1994, pp. 98–100. Finnerty, John D., and Dean Leistikow. "The Behavior of Equity and Debt Risk Premiums: Reply to Comment," *The Journal of Portfolio Management*, Summer 1994, pp. 101–102.

A statistical measure of the randomness of a return series is its serial correlation. Serial correlation (or autocorrelation) is defined as the degree to which the return of a given series is related from period to period. A serial correlation near positive one indicates that returns are predictable from one period to the next period and are positively related. That is, the returns of one period are a good predictor of the returns in the next period. Conversely, a serial correlation near negative one indicates that the returns in one period are inversely related to those of the next period. A serial correlation near zero indicates that the returns are random or unpredictable from one period to the next. Table 5-3 contains the serial correlation of the market total returns, the realized long-horizon equity risk premium, and inflation.

Table 5-3
Interpretation of Annual Serial Correlations
1926–2003

Series	Serial Correlation	Interpretation
Large Company Stock Total Returns	0.03	Random
Equity Risk Premium	0.04	Random
Inflation Rates	0.65	Trend

The significance of this evidence is that the realized equity risk premium next year will not be dependent on the realized equity risk premium from this year. That is, there is no discernable pattern in the realized equity risk premium—it is virtually impossible to forecast next year's realized risk premium based on the premium of the previous year. For example, if this year's difference between the riskless rate and the return on the stock market is higher than last year's, that does not imply that next year's will be higher than this year's. It is as likely to be higher as it is lower. The best estimate of the expected value of a variable that has behaved randomly in the past is the average (or arithmetic mean) of its past values.

Table 5-4 also indicates that the equity risk premium varies considerably by decade, from a high of 17.9 percent in the 1950s to a low of 0.3 percent in the 1970s. This look at the historical equity risk premium reveals no observable pattern.

Table 5-4
Long-Horizon Equity Risk Premium by Decade
1926–2003

1920s*	1930s	1940s	1950s	1960s	1970s	1980s	1990s	2000s**	1994-2003
17.6%	2.3%	8.0%	17.9%	4.2%	0.3%	7.9%	12.1%	-9.2%	7.0%

*Based on the period 1926–1929.

**Based on the period 2000–2003.

Finnerty and Leistikow perform more econometrically sophisticated tests of mean reversion in the equity risk premium. Their tests demonstrate that—as we suspected from our simpler tests—the equity risk premium that was realized over 1926 to the present was almost perfectly free of mean reversion and had no statistically identifiable time trends.[4] Lo and MacKinlay conclude, "the rejection of the random walk for weekly returns does not support a mean-reverting model of asset prices."

Choosing an Appropriate Historical Period

The estimate of the equity risk premium depends on the length of the data series studied. A proper estimate of the equity risk premium requires a data series long enough to give a reliable average without being unduly influenced by very good and very poor short-term returns. When calculated using a long data series, the historical equity risk premium is relatively stable.[5] Furthermore, because an average of the realized equity risk premium is quite volatile when calculated using a short history, using a long series makes it less likely that the analyst can justify any number he or she wants. The magnitude of how shorter periods can affect the result will be explored later in this chapter.

Some analysts estimate the expected equity risk premium using a shorter, more recent time period on the basis that recent events are more likely to be repeated in the near future; furthermore, they believe that the 1920s, 1930s, and 1940s contain too many unusual events. This view is suspect because all periods contain "unusual" events. Some of the most unusual events of this century took place quite recently, including the inflation of the late 1970s and early 1980s, the October 1987 stock market crash, the collapse of the high-yield bond market, the major contraction and consolidation of the thrift industry, the collapse of the Soviet Union, and the development of the European Economic Community—all of these happened approximately in the last 20 years.

It is even difficult for economists to predict the economic environment of the future. For example, if one were analyzing the stock market in 1987 before the crash, it would be statistically improbable to predict the impending short-term volatility without considering the stock market crash and market volatility of the 1929–1931 period.

Without an appreciation of the 1920s and 1930s, no one would believe that such events could happen. The 78-year period starting with 1926 is representative of what can happen: it includes high and low returns, volatile and quiet markets, war and peace, inflation and deflation, and prosperity and depression. Restricting attention to a shorter historical period underestimates the amount of change that could occur in a long future period. Finally, because historical event-types (not specific

4 Though the study performed by Finnerty and Leistikow demonstrates that the traditional equity risk premium exhibits no mean reversion or drift, they conclude that, "the processes generating these risk premiums are generally mean-reverting." This conclusion is completely unrelated to their statistical findings and has received some criticism. In addition to examining the traditional equity risk premia, Finnerty and Leistikow include analyses on "real" risk premia as well as separate risk premia for income and capital gains. In their comments on the study, Ibbotson and Lummer show that these "real" risk premia adjust for inflation twice, "creating variables with no economic content." In addition, separating income and capital gains does not shed light on the behavior of the risk premia as a whole.

5 This assertion is further corroborated by data presented in *Global Investing: The Professional's Guide to the World of Capital Markets* (by Roger G. Ibbotson and Gary P. Brinson and published by McGraw-Hill, New York). Ibbotson and Brinson constructed a stock market total return series back to 1790. Even with some uncertainty about the accuracy of the data before the mid-nineteenth century, the results are remarkable. The real (adjusted for inflation) returns that investors received during the three 50-year periods and one 51-year period between 1790 and 1990 did not differ greatly from one another (that is, in a statistically significant amount). Nor did the real returns differ greatly from the overall 201-year average. This finding implies that because real stock-market returns have been reasonably consistent over time, investors can use these past returns as reasonable bases for forming their expectations of future returns.

events) tend to repeat themselves, long-run capital market return studies can reveal a great deal about the future. Investors probably expect "unusual" events to occur from time to time, and their return expectations reflect this.

A Look at the Historical Results

It is interesting to take a look at the realized returns and realized equity risk premium in the context of the above discussion. Table 5-5 shows the average stock market return and the average (arithmetic mean) realized long-horizon equity risk premium over various *historical time periods*. Similarly, Graph 5-5 shows the average (arithmetic mean) realized equity risk premium calculated through 2003 for different starting dates. The table and the graph both show that using a longer historical period provides a more stable estimate of the equity risk premium. The reason is that any unique period will not be weighted heavily in an average covering a longer historical period. It better represents the probability of these unique events occurring over a long period of time.

Table 5-5

Stock Market Return and Equity Risk Premium Over Time 1926–2003

Period Length	Period Dates	Large Company Stock Arithmetic *Mean Total Return*	Long-Horizon Equity *Risk Premium*
78 years	1926–2003	12.4%	7.2%
70 years	1934–2003	12.9%	7.5%
60 years	1944–2003	13.4%	7.5%
50 years	1954–2003	13.1%	6.5%
40 years	1964–2003	11.9%	4.5%
30 years	1974–2003	13.7%	5.6%
20 years	1984–2003	14.3%	6.8%
15 years	1989–2003	13.8%	7.1%
10 years	1994–2003	13.0%	7.0%
5 years	1999–2003	1.3%	–4.3%

Looking carefully at Graph 5-5 will clarify this point. The graph shows the realized equity risk premium for a series of time periods through 2003, starting with 1926. In other words, the first value on the graph represents the average realized equity risk premium over the period 1926–2003. The next value on the graph represents the average realized equity risk premium over the period 1927–2003; and so on, with the last value representing the average over the most recent five years, 1999–2003. Concentrating on the left side of Graph 5-5, one notices that the realized equity risk premium, when measured over long periods of time, is relatively stable. In viewing the graph from left to right, moving from longer to shorter historical periods, one sees that the value of the realized equity risk premium begins to decline significantly. Why does this occur? The reason is that the severe bear market of 1973–1974 is receiving proportionately more weight in the shorter, more recent average. If you continue to follow the line to the right, however, you will also notice that when 1973 and 1974 fall out of the recent average, the realized equity risk premium jumps up by nearly 1.5 percent.

Southwest Gas Corporation
Indicated Common Equity Cost Rate Through Use
of the Capital Asset Pricing Model for Southwest Gas Corporation,
the Proxy Group of Five Gas Distribution Companies and the
Proxy Group of Eleven Value Line Gas Distribution Companies

Line No.		Southwest Gas Corporation	Proxy Group of Five Gas Distribution Companies	Proxy Group of Eleven Value Line Gas Distribution Companies
			Traditional Capital Asset Pricing Model	
1.	Capital Asset Pricing Model Derived Company Equity Cost Rate (1)	11.37 %	11.29 %	11.08 %
			Empirical Capital Asset Pricing Model	
2.	Capital Asset Pricing Model Derived Company Equity Cost Rate (2)	11.73 %	11.68 %	11.41 %
3.	Conclusion	11.55 %	11.49 %	11.25 %

Notes: (1) Developed on Sheet 2 of this Exhibit.
(2) Developed on Sheet 3 of this Exhibit.

Southwest Gas Corporation
Indicated Common Equity Cost Rate Through Use
of the Capital Asset Pricing Model

	Value Line Adjusted Beta	Company-Specific Risk Premium Based on Market Premium of 7.31% (1)	CAPM Result Including Risk-Free Rate of 5.52% (2)	Recommended CAPM Result (3)
		Traditional Capital Asset Pricing Model (4)		
Southwest Gas Corporation	0.80	5.85 %	11 37 %	11.37 %
Proxy Group of Five Gas Distribution Companies				
AGL Resources, Inc.	0.80	5.85 %	11 37 %	11.37 %
Cascade Natural Gas Corp.	0.75	5.48	11 00	11.00
NICOR, Inc.	1 00	7 31	12.83	12.83
Northwest Natural Gas Co.	0.65	4.75	10.27	10.27
Piedmont Natural Gas Co., Inc.	0.75	5.48	11.00	11.00
Average	0.79	5.77 %		11.29 %
Proxy Group of Eleven Value Line Gas Distribution Companies				
AGL Resources, Inc.	0.80	5.85 %	11.37 %	11.37 %
Cascade Natural Gas Corp.	0.75	5.48	11.00	11 00
Energen Corp.	0.70	5.12	10.64	10.64
KeySpan Corp.	0.75	5.48	11.00	11 00
Laclede Group	0.70	5.12	10.64	10.64
NICOR, Inc.	1 00	7.31	12.83	12.83
Northwest Natural Gas Co.	0.65	4.75	10.27	10.27
Peoples Energy Corp.	0.75	5.48	11 00	11 00
Piedmont Natural Gas Co., Inc.	0.75	5.48	11 00	11 00
South Jersey Industries, Inc	0.55	4.02	9 54	--
WGL Holdings	0.75	5.48	11.00	11.00
Average	0.74	5.42 %		11.08 %

See Sheet 4 for notes

Southwest Gas Corporation
Indicated Common Equity Cost Rate Through Use of the Capital Asset Pricing Model

	Value Line Adjusted Beta	Company-Specific Risk Premium Based on Market Premium of 7.31% (1)	CAPM Result Including Risk-Free Rate of 5.52% (2)	Recommended CAPM Result (3)
		Empirical Capital Asset Pricing Model (5)		
Southwest Gas Corporation	0.80	6.21 %	11 73 %	11.73 %
Proxy Group of Five Gas Distribution Companies				
AGL Resources, Inc	0.80	6.21 %	11 73 %	11 73 %
Cascade Natural Gas Corp.	0.75	5.94	11 46	11.46
NICOR, Inc.	1.00	7 31	12.83	12.83
Northwest Natural Gas Co.	0.65	5.39	10.91	10.91
Piedmont Natural Gas Co., Inc.	0.75	5.94	11 46	11.46
Average	0.79	6.16 %		11.68 %
Proxy Group of Eleven Value Line Gas Distribution Companies				
AGL Resources, Inc.	0.80	6.21 %	11 73 %	11.73 %
Cascade Natural Gas Corp.	0.75	5.94	11 46	11 46
Energen Corp.	0.70	5.67	11.19	11 19
KeySpan Corp.	0.75	5.94	11.46	11 46
Laclede Group	0.70	5.67	11 19	11 19
NICOR, Inc.	1.00	7.31	12.83	12.83
Northwest Natural Gas Co.	0.65	5.39	10.91	10.91
Peoples Energy Corp.	0.75	5.94	11 46	11.46
Piedmont Natural Gas Co., Inc	0.75	5.94	11.46	11.46
South Jersey Industries, Inc	0.55	4 84	10.36	10 36
WGL Holdings	0.75	5.94	11.46	11.46
Average	0.74	5.89 %		11.41 %

See Sheet 4 for notes.

Southwest Gas Corporation
Development of the Market-Required Rate of Return on Common Equity Using the Capital Asset Pricing Model for Southwest Gas Corporation, the Proxy Group of Five Gas Distribution Companies and the Proxy Group of Eleven Value Line Gas Distribution Companies Adjusted to Reflect a Forecasted Risk-Free Rate and Market Return

Notes:

(1) From the two previous month-end (August '04 – September '04), as well as a recently available (October 1, 2004), Value Line Summary & Index, a forecasted 3-5 year total annual market return of 12.93% can be derived by averaging the August 2004, September 2004, and spot forecasted total 3-5 year total appreciation, converting it into an annual market appreciation and adding the Value Line average forecasted annual dividend yield.

The 3-5 year average total market appreciation of 53%, produces a four-year average annual return of 11.22% $(((1.53^{0.25}) - 1)*100)$. When the average annual forecasted dividend yield of 1.71% is added, a total average market return of 12.93% (1.71% + 11.22%) is derived.

The August 2004, September 2004, and spot forecasted total market return of 12.93% minus the risk-free rate of 5.52% (developed in Note 2) is 7.41% (12.93% - 5.52%). The Ibbotson Associates calculated market premium of 7.20% for the period 1926-2003 results from a total market return of 12.40% less the average income return on long-term U.S. Government Securities of 5.20% (12.40% - 5.20% = 7.20%). This is then averaged with the 7.41% Value Line market premium resulting in a 7.305%, rounded to 7.31%, market premium. The 7.31% market premium is then multiplied by the beta in column 1 of sheets 2 and 3 of this Exhibit.

(2) Average forecast based upon six quarterly estimates of 20-year Treasury Bond yields per the consensus of nearly 50 economists reported in the Blue Chip Financial Forecasts dated October 1, 2004 (see sheet 7 of Exhibit __ (FJH-11)). The estimates are detailed below:

	20-Year Treasury Bond Yield
Fourth Quarter 2004	5.10
First Quarter 2005	5.40%
Second Quarter 2005	5.50
Third Quarter 2005	5.60
Fourth Quarter 2005	5.70
First Quarter 2006	5.80
Average	5.52%

(3) Includes only those indicated common equity cost rates which are greater than 9.9% for reasons fully explained in Mr. Hanley's accompanying direct testimony.

(4) The traditional Capital Asset Pricing Model (CAPM) is applied using the following formula:

$R_S = R_F + \beta (R_M - R_F)$

Where R_S = Return rate of common stock
R_F = Risk Free Rate
β = Value Line Adjusted Beta
R_M = Return on the market as a whole

(5) The empirical CAPM is applied using the following formula:

$R_S = R_F + .25 (R_M - R_F) + .75 \beta (R_M - R_F)$

Where R_S = Return rate of common stock
R_F = Risk-Free Rate
β = Value Line Adjusted Beta
R_M = Return on the market as a whole

Source of Information: Value Line Summary & Index (Standard Edition)
Blue Chip Financial Forecasts, October 1, 2004
Value Line Investment Survey, September 17, 2004
Stocks, Bonds, Bills and Inflation – Valuation Edition -2004 Yearbook Market Results for 1926-2003 Ibbotson Associates, Inc., Chicago, IL

Southwest Gas Corporation
Comparable Earnings Analysis
for a Proxy Group of Twenty-Five Non-Utility Companies Comparable to
Southwest Gas Corporation (1)

Proxy Group of Twenty-Five Non-Utility Companies Comparable to Southwest Gas Corporation (1)	Adj. Beta	Unadj. Beta	Standard Error of the Regression	5-Year Projected Rate of Return on Net Worth, Equity or Partners' Capital (2) Percent	Student's T-Test
3M Company	0.90	0.79	2.8172	25.50 %	1.15
Alberto Culver 'B'	0.70	0.50	2.9480	14.50	(0.18)
Alexander & Baldwin	0.85	0.77	3.1103	12.50	(0.42)
Ashland Inc.	0.85	0.70	3.0684	9.00	(0.85)
Baldor Electric	0.85	0.74	3.0142	15.00	(0.12)
Banta Corp.	0.75	0.56	2.9767	13.00	(0.36)
Capitol Fed. Fin'l	0.70	0.50	2.9386	10.00	(0.73)
Crescent Real Est.	0.80	0.64	2.9690	12.00	(0.49)
Duke Realty Corp.	0.70	0.53	2.6465	8.50	(0.91)
Dun & Bradstreet	0.80	0.63	3.0979	30.50	1.76
Exxon Mobil Corp.	0.80	0.65	2.6481	17.00	0.12
First Midwest Bancorp	0.90	0.78	2.9450	18.50	0.30
Kimberly-Clark	0.70	0.49	3.0057	23.50	0.91
Liberty Corp.	0.75	0.61	2.7468	7.00	(1.09)
Markel Corp.	0.80	0.62	2.9782	13.00	(0.36)
McClatchy Co.	0.75	0.60	3.0524	10.50	(0.67)
Meredith Corp.	0.85	0.76	3.0251	16.00	-
Moody's Corp.	0.80	0.63	2.8700	43.50 (3)	3.34
New York Times	0.85	0.77	3.1153	23.50	0.91
Plum Creek Timber	0.70	0.54	2.9782	16.00	-
Pulitzer Inc.	0.75	0.59	2.9221	6.50	(1.15)
Unitrin Inc.	0.90	0.79	2.9145	10.00	(0.73)
Washington Federal	0.85	0.74	3.0532	14.00	(0.24)
Washington R.E.I.T.	0.70	0.53	2.7567	18.50	0.30
Webster Fin'l	0.90	0.79	3.0862	12.00	(0.49)
Average for the Non-Utility Group	0.80	0.65	2.9474		
Southwest Gas Corporation	0.80	0.64 (4)	2.8762 (5)		
Mean				14.85 %	
Conservative Conclusion (6)				13.65 %	

See Sheet 4 for notes.

Southwest Gas Corporation
Comparable Earnings Analysis
for a Proxy Group of Thirty- Six Non-Utility Companies Comparable to
the Proxy Group of Five Gas Distribution Companies (7)

Proxy Group of Thirty- Six Non-Utility Companies Comparable to the Proxy Group of Five Gas Distribution Companies (7)	Adj. Beta	Unadj. Beta	Standard Error of the Regression	5-Year Projected Rate of Return on Net Worth, Equity or Partners' Capital (2) Percent	Student's T-Test
3M Company	0.90	0.79	2.8172	25.50 %	1.29
Albemarle Corp.	0.85	0.77	3.1649	13.00	(0.31)
Alberto Culver 'B'	0.70	0.50	2.9480	14.50	(0.11)
Alexander & Baldwin	0.85	0.77	3.1103	12.50	(0.37)
Ashland Inc.	0.85	0.70	3.0684	9.00	(0.82)
Baldor Electric	0.85	0.74	3.0142	15.00	(0.05)
Banta Corp.	0.75	0.56	2.9767	13.00	(0.31)
Capitol Fed. Fin'l	0.70	0.50	2.9386	10.00	(0.69)
Catellus Development	0.80	0.63	3.1379	20.50	0.65
Cincinnati Financial	0.85	0.73	3.1407	7.50	(1.01)
ConocoPhillips	0.85	0.75	3.1745	8.00	(0.94)
Crescent Real Est.	0.80	0.64	2.9690	12.00	(0.43)
Dentsply Int'l	0.70	0.54	3.3077	13.50	(0.24)
Dun & Bradstreet	0.80	0.63	3.0979	30.50	1.93
First Midwest Bancorp	0.90	0.78	2.9450	18.50	0.40
Harte-Hanks	0.80	0.66	3.2423	18.00	0.33
Hospitality Properties	0.80	0.68	3.1431	8.00	(0.94)
Kimberly-Clark	0.70	0.49	3.0057	23.50	1.03
Markel Corp.	0.80	0.62	2.9782	13.00	(0.31)
McClatchy Co.	0.75	0.60	3.0524	10.50	(0.63)
McGraw-Hill	0.80	0.65	3.1551	25.00	1.22
Media General 'A'	0.90	0.78	3.1339	6.50	(1.14)
Mercury General	0.90	0.80	3.3096	18.00	0.33
Meredith Corp.	0.85	0.76	3.0251	16.00	0.08
Moody's Corp.	0.80	0.63	2.8700	43.50 (8)	3.58
New York Times	0.85	0.77	3.1153	23.50	1.03
People's Bank	0.85	0.72	3.2209	10.50	(0.63)
Plum Creek Timber	0.70	0.54	2.9782	16.00	0.08
Pulitzer Inc.	0.75	0.59	2.9221	6.50	(1.14)
RLI Corp.	0.75	0.55	3.1468	11.00	(0.56)
Toro Co.	0.80	0.69	3.2798	27.00	1.48
Union Pacific	0.90	0.78	3.2485	9.00	(0.82)
Unitrin Inc.	0.90	0.79	2.9145	10.00	(0.69)
Washington Federal	0.85	0.74	3.0532	14.00	(0.18)
Webster Fin'l	0.90	0.79	3.0862	12.00	(0.43)
Weis Markets	0.70	0.52	3.2491	10.00	(0.69)
Average for the Non-Utility Group	0.81	0.67	3.0817		
Average for the Proxy Group of Five Gas Distribution Companies	0.79	0.64 (9)	3.0515 (10)		
Mean				14.60 %	
Conservative Conclusion (6)				13.30 %	

See Sheets 4 and 5 for notes.

Southwest Gas Corporation
Comparable Earnings Analysis
for a Proxy Group of Twenty- Six Non-Utility Companies Comparable to
the Proxy Group of Eleven Value Line Gas Distribution Companies (11)

Proxy Group of Twenty-Six Non-Utility Companies Comparable to the Proxy Group of Eleven Value Line Gas Distribution Companies (11)	Adj. Beta	Unadj. Beta	Standard Error of the Regression	5-Year Projected Rate of Return on Net Worth, Equity or Partners' Capital (2) Percent	Student's T-Test
Alberto Culver 'B'	0.70	0.50	2.9480	14.50 %	(0.09)
Ashland Inc	0.85	0.70	3.0684	9.00	(0.75)
BRE Properties	0.70	0.48	2.6861	10.50	(0.57)
Banta Corp.	0.75	0.56	2.9767	13.00	(0.27)
Buckeye Partners L.P.	0.65	0.44	2.7915	23.50	0.98
Capitol Fed. Fin'l	0.70	0.50	2.9386	10.00	(0.63)
Catellus Development	0.80	0.63	3.1379	20.50	0.62
Cincinnati Financial	0.85	0.73	3.1407	7.50	(0.93)
Crescent Real Est.	0.80	0.64	2.9690	12.00	(0.39)
Dun & Bradstreet	0.80	0.63	3.0979	30.50	1.82
Federal Rlty. Inv. Trust	0.70	0.47	2.8049	15.00	(0.03)
Healthcare R'lty Trust	0.65	0.43	3.0801	11.50	(0.45)
Hospitality Properties	0.80	0.68	3.1431	8.00	(0.87)
Kimberly-Clark	0.70	0.49	3.0057	23.50	0.98
Liberty Corp.	0.75	0.61	2.7468	7.00	(0.99)
Mack-Cali R'lty	0.65	0.44	2.7554	10.50	(0.57)
Markel Corp.	0.80	0.62	2.9782	13.00	(0.27)
McClatchy Co.	0.75	0.60	3.0524	10.50	(0.57)
McGraw-Hill	0.80	0.65	3.1551	25.00	1.16
Moody's Corp.	0.80	0.63	2.8700	43.50 (12)	3.37
Plum Creek Timber	0.70	0.54	2.9782	16.00	0.08
Pulitzer Inc.	0.75	0.59	2.9221	6.50	(1.05)
RLI Corp.	0.75	0.55	3.1468	11.00	(0.51)
Simon Property Group	0.70	0.48	2.6908	14.50	(0.09)
Tootsie Roll Ind.	0.65	0.43	2.9675	12.50	(0.33)
Washington R.E.I.T.	0.70	0.53	2.7567	18.50	0.38
Average for the Non-Utility Group	0.74	0.56	2.9542		
Average for the Proxy Group of Eleven Value Line Gas Distribution Companies	0.74	0.58 (13)	2.9347 (14)		
Mean				14.16 %	
Conservative Conclusion (6)				12.44 %	

See Sheet 5 for notes.

Southwest Gas Corporation
Comparable Earnings Analysis

Notes:

(1) The criteria for selection of the proxy group of twenty-five non-utility companies was that the non-utility companies be domestic and have a meaningful projected 2007 – 2009 rate of return on net worth or partners' capital as reported in Value Line Investment Survey (Standard Edition). The proxy group of twenty-five non-utility companies was selected based upon Southwest Gas Corporation's unadjusted beta range of 0.49 – 0.79 and standard error of the regression range of 2.6234 – 3.1290. These ranges are based upon plus or minus two standard deviations of the unadjusted beta and standard error of the regression as detailed in Mr. Hanley's accompanying direct testimony. Plus or minus two standard deviations captures 95.5% of the distribution of unadjusted betas and standard errors of the regression.

(2) 2007-2009.

(3) The Student's T-statistic associated with this projected return exceeds 2.064 at the 95% level of confidence with twenty-four (24 = 25 observations –1) degrees of freedom. Therefore, it has been excluded, as an outlier, to arrive at a proper mean projected return as fully explained in the accompanying direct testimony.

(4) The standard deviation of Southwest Gas Corporation's unadjusted beta is 0.0745.

(5) The standard deviation of Southwest Gas Corporation's standard error of the regression is 0.1264. The standard deviation of the standard error of the regression is calculated as follows:

Standard Deviation of the Standard Error of the Regression =

$$\frac{\text{Standard Error of the Regression}}{\sqrt{2N}}$$

where: N = number of observations. Since Value Line betas are derived from weekly price change observations over a period of five years, N = 259

$$\text{Thus, } 0.1264 = \frac{2.8762}{\sqrt{518}} = \frac{2.8762}{22.7596}$$

(6) Average of 5-year projected rates of return excluding those above 20% and below the prospective yield of 9.9% on A rated Moody's public utility bonds (from Sheet 1 of Schedule ___(FJH-11).

(7) The criteria for selection of the proxy group of thirty-six non-utility companies was that the non-utility companies be domestic and have a meaningful projected 2007 – 2009 rate of return on net worth or partners' capital as reported in Value Line Investment Survey (Standard Edition). The proxy group of thirty-six non-utility companies was selected based upon the proxy group of five gas distribution companies' unadjusted beta range of 0.48 – 0.80 and standard error of the regression range of 2.7833 – 3.3197. These ranges are based upon plus or minus two standard deviations of the unadjusted beta and standard error of the regression as detailed in Mr. Hanley's

Southwest Gas Corporation
Comparable Earnings Analysis

accompanying direct testimony. Plus or minus two standard deviations captures 95.5% of the distribution of unadjusted betas and standard errors of the regression.

(8) The Student's T-statistic associated with this projected return exceeds 1.96 at the 95% level of confidence. Therefore, it has been excluded, as an outlier, to arrive at a proper mean projected return as fully explained in the accompanying direct testimony.

(9) The standard deviation of the proxy group of five gas distribution companies' unadjusted beta is 0.0790.

(10) The standard deviation of the proxy group of five gas distribution companies' standard error of the regression is 0.1341= (3.0515/ 22.7596).

(11) The criteria for selection of the proxy group of twenty-six non-utility companies was that the non-utility companies be domestic and have a meaningful projected 2007 – 2009 rate of return on net worth or partners' capital as reported in Value Line Investment Survey (Standard Edition). The proxy group of twenty-six non-utility companies was selected based upon the proxy group of eleven Value Line gas distribution companies' unadjusted beta range of 0.43 – 0.73 and standard error of the regression range of 2.6769 – 3.1925. These ranges are based upon plus or minus two standard deviations of the unadjusted beta and standard error of the regression as detailed in Mr. Hanley's accompanying direct testimony. Plus or minus two standard deviations captures 95.5% of the distribution of unadjusted betas and standard errors of the regression.

(12) The Student's T-statistic associated with this projected return exceeds 2.060 at the 95% level of confidence with twenty-five (25 = 26 observations – 1) degrees of freedom. Therefore, it has been excluded, as an outlier, to arrive at a proper mean projected return as fully explained in the accompanying direct testimony.

(13) The standard deviation of the proxy group of eleven Value Line gas distribution companies' unadjusted beta is 0.0760.

(14) The standard deviation of the proxy group of eleven Value Line gas distribution companies' standard error of the regression is 0.1289= (2.9347 / 22.7596).

Source of Information: Value Line, Inc., September 17, 2004
Value Line Investment Survey (Standard Edition)

Southwest Gas Corporation
Authorized Returns on Common Equity and
Common Equity Ratios for Gas Distribution Companies
for the Year 2003 through September 2004

Company	Date	Jurisdiction	Authorized Return on Common Equity	Authorized Common Equity Ratio
Peoples Gas System	01/06/03	FL	11.25 % (1)	50.92 % (2)
Madison Gas and Electric	02/28/03	WI	12.30	55.42
Rochester Gas & Electric	03/07/03	NY	9.96	41.40
Aquila Networks-MGU	03/12/04	NI	11.40	- -
Wisconsin Public Service	03/20/03	WI	12.00	55.00
Wisconsin Power & Light	04/03/03	WI	12.00	51.72
SEMCO Energy Gas	05/02/03	MI	11.40 (1)	- -
Interstate Power and Light	05/15/03	IA	11.05	47.84 (3)
Public Service of Colorado	06/26/03	CO	11.00 (1)	51.40
Citizens Utilities	07/01/03	AZ	11.00 (1)	- -
Peoples Natural Gas	07/29/03	MN	11.71 (1)	49.99
Northwest Natural Gas	08/22/03	OR	10.20 (1)	49.50
Arkansas Western Gas	09/17/03	AR	9.90 (1)	35.20 (2)
Avista Corp.	09/25/03	OR	10.25 (1)	48.25
AmerenCILCO	10/17/03	IL	10.54	48.54
AmerenCIPS	10/22/03	IL	10.71	44.44
AmerenUE	10/22/03	IL	10.46	52.70
North Carolina Natural Gas	10/30/03	NC	11.00 (1)	51.14
Boston Gas	10/31/03	MA	10.20	50.00
Washington Gas	10/31/03	MD	10.75	51.49
Washington Gas	11/10/03	DC	10.60	50.30
Delmarva Power & Light	12/09/03	DE	10.50 (1)	45.87
Washington Gas	12/18/03	VA	10.50	50.96
Wisconsin Power & Light	12/19/03	WI	12.00	60.27
Wisconsin Public Service	12/19/03	WI	12.00	56.00
Madison Gas and Electric	1/13/2004	WI	12.00	55.91
Public Service of New Mexico	1/13/2004	NM	10.25 (1)	47.77
City Gas Co. of Florida	2/9/2004	FL	11.25	36.77 (2)
Southwest Gas	3/16/2004	CA	10.90	42.00
Interstate Power and Light	4/5/2004	MN	11.00	47.15
TXU - Gas	5/25/2004	TX	10.00	49.80
Southern Indiana Gas & Electric	6/30/2004	IN	10.50 (1)	44.00 (2)
South Jersey Gas	7/8/2004	NJ	10.00	46.00
Centerpoint Energy Arkla	7/22/2004	LA	10.25	45.80
Southwest Gas, Southern Division	8/26/2004	NV	10.50	40.00
Southern Gas, Northern Division	8/26/2004	NV	10.50	40.00
Avista Corp	9/9/2004	ID	10.40	42.59
Missouri Gas Energy	9/21/2004	MO	10.50	29.99
Average			10.86 %	47.60 %
Average of Litigated Cases			10.91 %	47.68 %

Notes: (1) Order followed stipulation or settlement by the parties. Decision particulars not necessarily precedent-setting or specifically adopted by the regulatory body.

(2) Capital structure includes cost-free items or tax credit balances at the overall rate of return.

(3) Double leveraged capital structure used.

Source of Information: Major Rate Case Decisions - January - December 2003, Regulatory Research Associates, January 22, 2004
Major Rate Case Decisions - January - September 2004, Regulatory Research Associates, October 6, 2004

Cattanach

Southwest Gas Corporation
Docket No. G-01551A-04-__

BEFORE THE ARIZONA CORPORATION COMMISSION

Prepared Direct Testimony
of
JAMES L. CATTANACH

Q. 1 Please state your name and business address.

A. 1 My name is James L. Cattanach. My business address is 5241 Spring Mountain Road, Las Vegas, Nevada 89150-0002.

Q. 2 By whom are you employed and in what capacity?

A. 2 I am employed by Southwest Gas Corporation (Southwest or the Company) as Manager/Demand Planning.

Q. 3 Please state your educational background and business experience.

A. 3 I graduated from Utah State University, Logan, Utah, with a Bachelor of Science degree in Economics in 1983. Thereafter in 1990, I graduated from the University of Nevada, Las Vegas with a Master of Arts degree in Economics.

In 1984, I joined Southwest as a Load Research Analyst in the Rate Department. In September 1985, I was promoted to the position of Economist in the Resource Planning Department. In November 1993, I was promoted to Senior Economist in the Revenue Requirements and Resource Planning Department. In August 2002, I was promoted to Supervisor in the Systems Planning Department. In July 2003, I was promoted to my current position as Manager/Demand Planning in the Systems Planning Department.

Since 1989, I have held the position of Adjunct Lecturer in the College of Business, Department of Economics, at the University of Nevada, Las Vegas. I currently teach an Applied Regression Analysis and Forecasting course each Fall and Spring Semester. I have previously taught courses in Business Statistics, Microeconomics, and Macroeconomics.

In addition to receiving my formal degrees in the study of Economics, I have attended seminars related to both public utility ratemaking and load forecasting. I am a member of the International Association for Energy Economics, National Association of Business Economics, National Association of Forensic Economics, Institute of Business Forecasting, and Southern Nevada Population Projection and Estimation Committee. I am also a contributing panel member of the Western Blue Chip Economic Forecast published by the Bank One Economic Outlook Center, W.P. Carey College of Business, Arizona State University. Between 1997 and 2000, I was an advising member of the Energy Economics Project Advisors Group, at The Gas Research Institute.

Q. 4 Briefly state the nature of your present responsibilities and duties with Southwest.

A. 4 I report to the Director/Systems Planning. I am responsible for the development of weather normalized billing determinants for rate cases, the development of short- and long-range demand forecasts for rate cases and

systems planning, analysis and monitoring of the regional economy in each of Southwest's rate jurisdictions, assorted load research activities, and the ongoing review of weather normalization procedures and heating degree days.

Q. 5 Have you previously testified before any regulatory commission?

A. 5 Yes. I have testified before the Arizona Corporation Commission (Commission), the Public Utilities Commission of Nevada, the California Public Utilities Commission, and the Federal Energy Regulatory Commission.

Q. 6 Briefly describe the purpose of your prepared direct testimony in this proceeding.

A. 6 I am sponsoring testimony that provides an analytical perspective on historical declines in residential consumption per customer that have been experienced in the Arizona rate jurisdiction.

I am presenting testimony in support of Southwest's weather normalization adjustment of the volumes for the test period, which is presented in Schedule H-2, Sheet 14, column (d). I am also sponsoring an estimate of the residential price elasticity of demand for natural gas that Southwest has econometrically derived for the Arizona rate jurisdiction in compliance with Decision No. 64172.

. . . . .

. . . . .

DECLINING RESIDENTIAL CONSUMPTION PER CUSTOMER

Q. 7 Could you provide a historical perspective on the trend in residential consumption per customer in the Arizona rate jurisdiction?

A. 7 Yes. In Southwest's Arizona rate jurisdiction, residential consumption per customer has followed a significant downward trend over the last 19 years. The dramatic decline in residential consumption per customer experienced historically in Arizona is revealed by examining the trend in weather normalized residential consumption per customer utilized in Arizona rate case proceedings between 1986 and 2004. The rate case consumption per customer histories reflects rate cases where the former southern Arizona and central Arizona rate jurisdictions had coinciding test years prior to the consolidating rate case in 1996.

In the Arizona rate jurisdiction, weather normalized residential consumption per customer has declined from 555.6 therms in the 1986 rate cases (Docket Nos. U-1551-86-300 and U-1551-86-301) to 347.0 therms in the current rate case. This is a decline of **208.6 therms or 37.5 percent** between 1986 and the 2004 rate case. In fact, residential consumption per customer dropped **41.4 therms or 10.7 percent** since Southwest's last rate proceeding (Docket No. G-01551A-00-0309) in 2000. The decline in residential consumption per customer utilized in Southwest's rate proceedings in Arizona between 1986 and 2004 is graphically

presented in Exhibit No.___(JLC-1).

Q. 8 Have you performed any other analyses to assess the downward trend in residential consumption per customer?

A. 8 Yes. Southwest also examined the historical trend in residential baseload consumption per customer. This was accomplished by examining residential consumption per customer for the month of August associated with each test year included in the historical rate case comparison. The zero heating degree days recorded during August for each test year in Tucson and Phoenix make August a useful month to analyze the historical trend in baseload consumption. Between the 1986 rate cases and the 2004 rate case, August consumption per customer has declined from 16.4 therms to 10.0 therms. This is a decline of **6.4 therms or 39.0 percent** between 1986 and 2004. The significant downward trend in August consumption per customer is graphically depicted in attached Exhibit No.___(JLC-2). This analysis suggests that declining residential consumption per customer is pervasive and associated with both space heating (seasonal) and baseload consumption.

Q. 9 What are the primary reasons that weather normalized residential consumption per customer utilized in rate cases has been declining over the last 19 years?

A. 9 Although there are a multiplicity of contributing factors, the improved efficiency gains of natural gas space- and water-heating appliances, improved home energy

efficiency, and dramatic customer growth are the primary reasons that weather-normalized residential consumption per customer has declined significantly.

Q. 10 How have improved appliance and dwelling efficiencies and dramatic customer growth contributed to the decline in overall residential consumption per customer?

A. 10 The improved appliance and dwelling efficiencies and accelerated customer growth in Arizona have two important implications related to declining residential consumption per customer. First, the significant improvements in both appliance and dwelling efficiencies have resulted in lower natural gas consumption for new residential customers. The improved efficiencies are primarily the result of federal legislation and local building codes that have been enacted over the years. In turn, the combination of lower natural gas consumption for new customers and the significant customer growth experienced by Southwest in recent years has resulted in a significant decline in overall residential consumption per customer.

Second, the downward trend in overall residential consumption per customer is not just related to new customer growth. It would be a reasonable expectation that each year a certain number of existing customers would be replacing older appliances with new appliances, which would be relatively more efficient. Additionally, it would be reasonable to expect that a certain number of

existing customers would be adopting energy conservation practices to improve the thermal integrity of their dwellings. The combined appliance turnover and dwelling conservation effects would be expected to reduce natural gas consumption for existing customers and, in turn, contribute to lower overall residential consumption per customer.

To summarize, the improved energy efficiencies of natural gas appliances and dwellings have implications for both new customer additions and existing customers. That is, the downward decline in overall residential consumption per customer is related to both new customer growth and the existing customer base. Since Southwest has experienced robust residential customer growth in Arizona in recent years, the decline in overall residential consumption per customer has been significant in the Arizona rate jurisdiction.

Q. 11 What other factors have contributed to the downward decline in residential consumption per customer in Arizona?

A. 11 Other plausible factors contributing to the decline in residential consumption per customer include the increased utilization of set-back thermostats, changes in the characteristics of the housing stock, demographic factors, behavioral factors, and economic variables such as the price of natural gas.

Q. 12 Is the significant downward trend in residential

consumption per customer unique to Southwest's Arizona rate jurisdiction?

A. 12 No. Southwest has also experienced significant declines in residential consumption per customer in its Nevada and California rate jurisdictions. In addition, the American Gas Association has performed studies that identify the national phenomenon of declining residential natural gas consumption per customer.

Q. 13 Do you have any expectations regarding when this dramatic decline in residential consumption per customer will possibly slowdown or stop in the Arizona rate jurisdiction?

A. 13 Unfortunately, no. However, reasonable conjecture would conclude a significant likelihood exists that the downward trend in residential consumption per customer will continue for the foreseeable future. My expectation is that continued robust customer growth that Southwest is expected to experience, combined with continued emphasis on energy conservation, will exert downward pressure on future residential natural gas consumption per customer in Arizona. Furthermore, Southwest is proposing a number of new and expanded energy efficiency programs which will have the effect of lowering residential consumption per customer. Southwest witness Vivian E. Scott discusses the current and future energy efficiency programs in Arizona that Southwest is proposing in this rate case.

Q. 14 Please summarize the results of the analyses of declining residential consumption per customer in the Arizona rate jurisdiction.

A. 14 Yes. With apologies for stating the obvious, the evidence is unambiguous regarding the significant historical decline in residential consumption per customer that Southwest has experienced in its Arizona service territories. Examination of both annual residential consumption per customer and August consumption per customer utilized in previous rate cases in Arizona indicate a significant downward trend in consumption.

RESIDENTIAL PRICE ELASTICITY OF DEMAND

Q. 15 Why is Southwest providing an estimated residential price elasticity of demand for natural gas for the Arizona rate jurisdiction?

A. 15 Pursuant to Decision No. 64172 issued by the Commission in Southwest's last general rate case, Southwest was directed to file a price elasticity study with its next general rate case.

Q. 16 Could you briefly explain what is meant by price elasticity of demand?

A. 16 Price elasticity of demand is a quantitative measure of the responsiveness or sensitivity of quantity demanded to a change in price. It is defined as the percent change in quantity demanded divided by the percent change in price. The price elasticity of demand is always negative, since the First Law of Demand states that "As price increases,

quantity demanded decreases, ceteris paribus." An estimated price elasticity between 0 and -1 is classified as inelastic demand, or demand that is relatively insensitive to price changes. Conversely, an estimated price elasticity less than -1 is classified as elastic demand, or demand that is relatively sensitive to price changes. For example, a price elasticity of demand equal to -.20 (inelastic) indicates that when price increases by one percent, quantity demanded would decrease by two-tenths of one percent, holding all other variables constant. Stated differently, when demand is inelastic, the decline in quantity demanded is proportionally less than the proportionate increase in price.

Typically goods and services that are essential to living and have few substitutes have inelastic demand. Residential natural gas demand is generally considered inelastic, based on both theoretical and pragmatic considerations. Other factors that typically influence the magnitude of the price elasticity of demand include the importance of the commodity in consumer's budgets and the time horizon to which demand pertains.

Q. 17 What is the estimated residential price elasticity of demand for natural gas that Southwest has empirically quantified?

A. 17 The econometric research conducted by Southwest suggests the residential price elasticity of natural gas in Arizona is relatively inelastic and approximately equal

to -.31 and statistically significant. Therefore, a sustained 10 percent increase in the real price of natural gas would result in residential consumption per customer declining 3.1 percent, holding all other variables constant. The results compare favorably to a review of the published literature. A research paper titled *"The Residential Price Elasticity of Demand for Natural Gas in Arizona: An Econometric Analysis"* written by James Cattanach and Frank Maglietti for this general rate case details the methodology and empirical results related to estimating the residential price elasticity, and is attached as Exhibit No.___(JLC-3).

WEATHER NORMALIZATION ADJUSTMENT

Q. 18 Please explain the purpose of the weather normalization adjustment.

A. 18 Weather normalization adjustments were performed for the purpose of providing an accurate depiction of monthly test period volumes under typical weather conditions. To the extent that weather for the test period deviates from normal (average) weather conditions, heat-sensitive consumption per customer should be adjusted to provide an accurate representation of monthly test period volumes under normal weather conditions.

For the test period, actual billing cycle heating degree days were approximately 1.9 percent colder than normal in Tucson, and approximately 2.8 percent warmer than normal in Phoenix. As a result of these deviations

from normal weather, adjustments to test period volumes were computed to reflect anticipated volumes under normal weather conditions.

Weather normalization adjustments were completed for the residential rate schedule, low income residential rate schedule, special residential rate schedule, the master metered apartment, small commercial and large commercial classes within the general service rate schedules, the master metered mobile home park rate schedule, armed forces rate schedule, and weather-sensitive residential and small and large commercial customers whose volumes are aggregated under a single transportation service agreement.

Q. 19 What heating degree day normal did Southwest utilize to weather normalize the heat-sensitive volumes for the test period?

A. 19 Southwest utilized ten-year averages (120 months ended August 2004) of heating degree days to represent normal weather conditions.

Q. 20 Is the use of ten-year average heating degree days to weather normalize the heat-sensitive volumes consistent with Southwest's prior practices for general rate cases in Arizona?

A. 20 Yes. Southwest has consistently utilized ten-year average heating degree days to weather normalize test period volumes in every general rate case filed in Arizona since 1986 (U-1551-86-300, U-1551-86-301, U-1551-89-102, U-1551-89-103,

U-1551-90-322, U-1551-92-253, U-1551-93-272, U-1551-96-596, G-01551A-00-0309).

Q. 21 Please explain Southwest's procedure for calculating the weather normalization adjustments.

A. 21 Southwest utilized regression analysis to quantify the relationships between actual monthly consumption per customer and weighted heating degree days for each heat-sensitive customer class. The monthly consumption per heating degree day factors (regression coefficients) quantified in the regression analyses were then applied to monthly weighted heating degree day deviations from normal, to quantify the corresponding adjustments to consumption per customer.

Q. 22 What were the impacts of the weather normalizations upon test period volumes?

A. 22 The net result of the weather normalization adjustments was a decrease in test year volumes of 566,341 therms for the Arizona rate jurisdiction, as shown in Schedule H-2, Sheet 14, line 22, column (d).

Q. 23 Does this conclude your prepared direct testimony?

A. 23 Yes, it does.

ARIZONA
RESIDENTIAL GAS SERVICE (G-5)
RATE CASE CONSUMPTION PER CUSTOMER
1986 - 2004

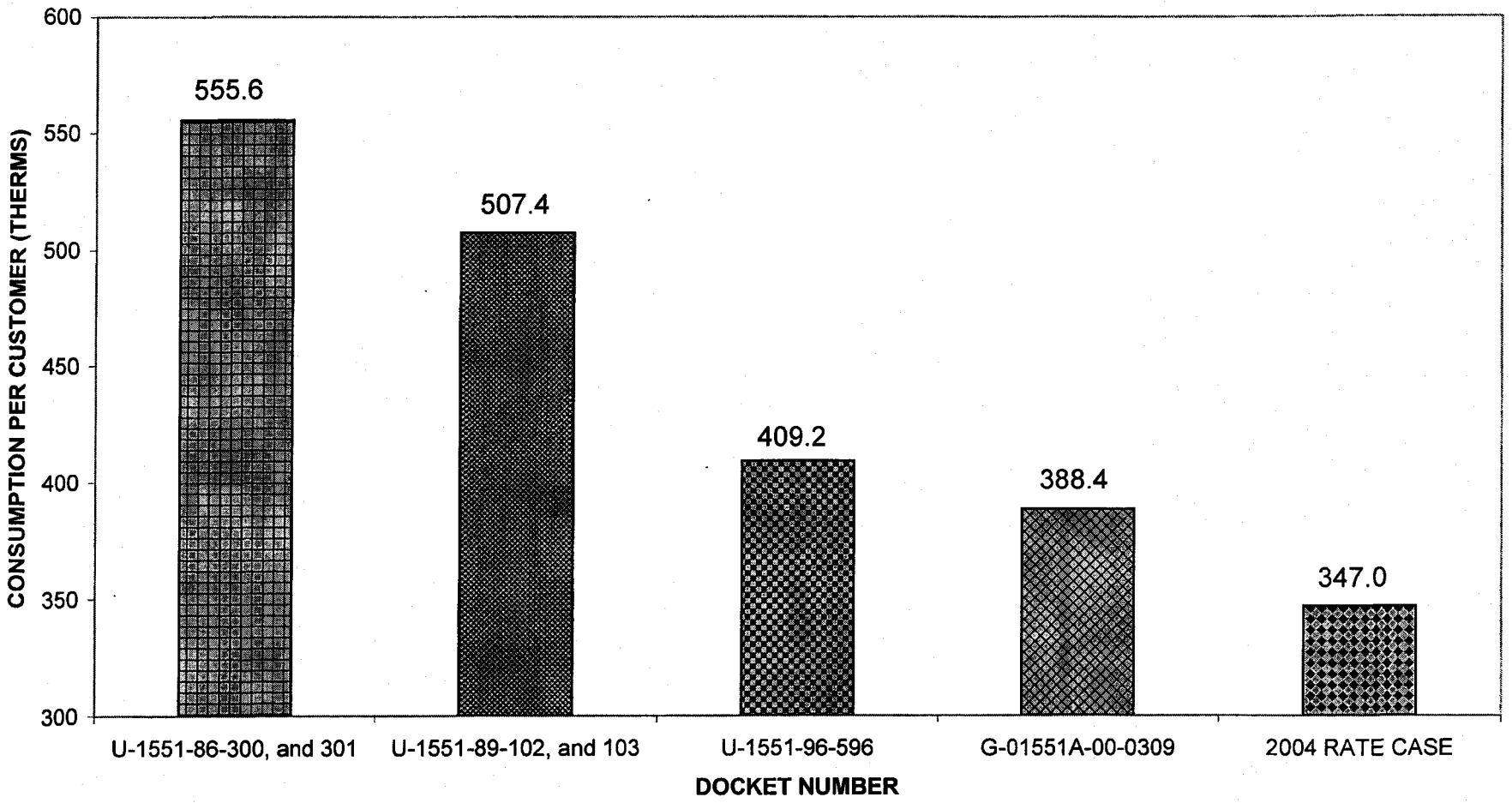


Exhibit No. __(JLC-1)
Sheet 1 of 1

ARIZONA
RESIDENTIAL GAS SERVICE (G-5)
AUGUST CONSUMPTION PER CUSTOMER
1986 - 2004

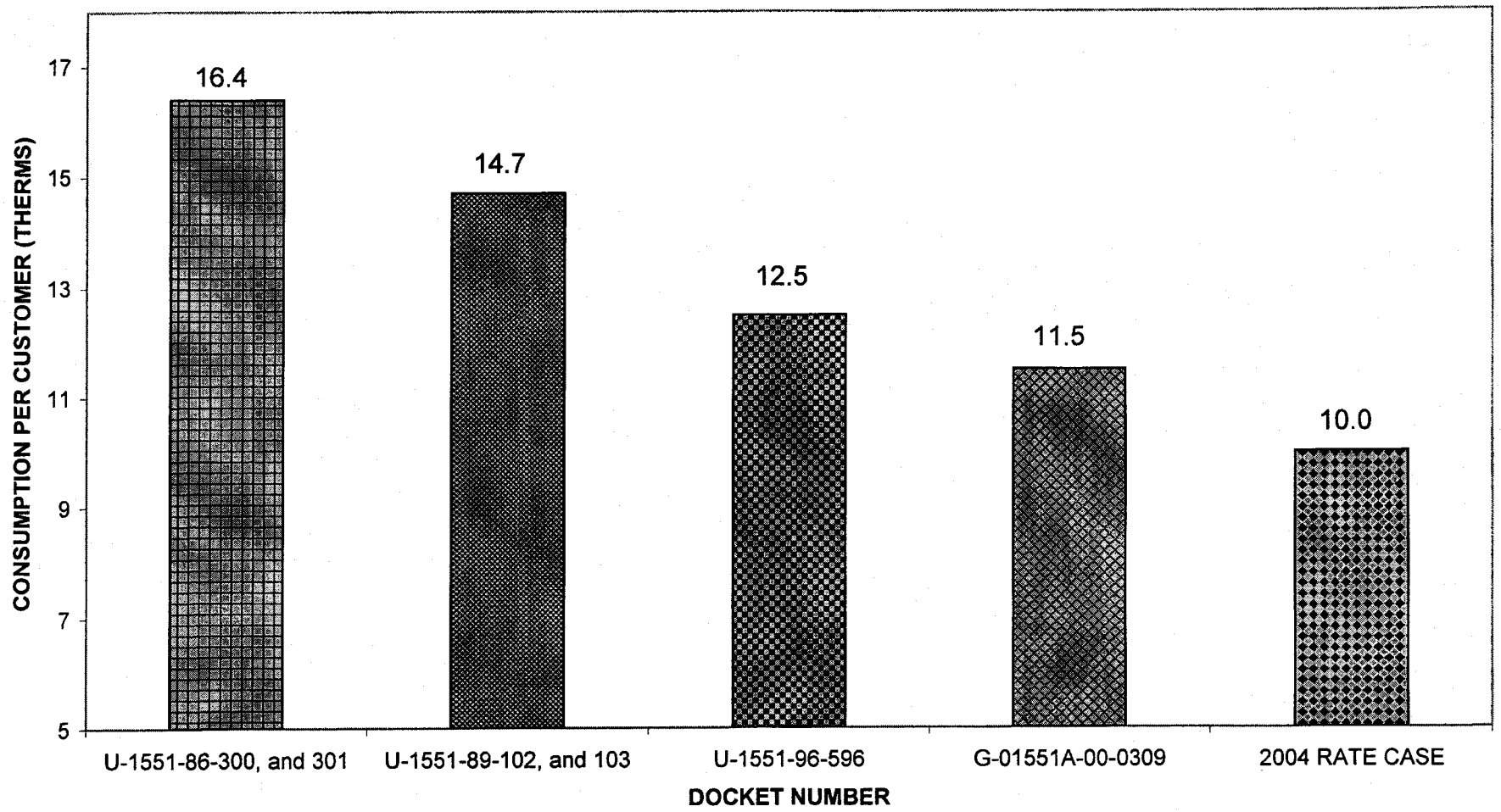


Exhibit No. __(JLC-2)
Sheet 1 of 1

Exhibit No._____(JLC-3)

THE RESIDENTIAL PRICE ELASTICITY OF DEMAND FOR NATURAL GAS IN ARIZONA:

AN ECONOMETRIC ANALYSIS

Jamie Cattanach
Demand Planning

Frank Maglietti
Pricing and Tariffs

Southwest Gas Corporation

November 2004

1. Introduction

This paper presents the salient features and results of the residential price elasticity study conducted by Southwest Gas Corporation (Southwest) for the Arizona rate jurisdiction. Pursuant to Decision No. 64172, issued by the Arizona Corporation Commission (the Commission), Southwest was directed to file a price elasticity study with its next general rate case.

The central hypothesis tested in this paper is that a statistically significant inverse relationship exists between the demand for and price of residential natural gas in the Arizona rate jurisdiction. Utilizing econometric techniques, a reduced-form multiple regression model is specified with residential consumption per customer as the dependent variable. The explanatory variables specified in the model include the real residential price of natural gas, heating degree days (hdds), base conservation variables, and monthly summer dummy variables. The results confirm the hypothesis that a statistically significant negative relationship exists (although not highly sensitive) between residential consumption and price. The empirical results also show that heating degree days, base conservation, and monthly summer dummy variables are important determinants explaining the pattern and trend of residential natural gas consumption.

The remainder of this paper is organized as follows. Section 2 provides a primer on the microeconomic concept of price elasticity of demand. In Section 3, a brief review of the empirical literature is presented. Section 4 discusses the data utilized in the econometric analyses. Section 5 outlines the analytical modeling framework utilized to econometrically estimate the price elasticity of demand. In Section 6 both the estimated multiple regression equation and residential price elasticity are presented. Finally in Section 7, the paper is summarized and concluded.

2. Price Elasticity of Demand

Price elasticity of demand is a quantitative measure of the responsiveness or sensitivity of quantity demanded to a change in price. The British economist Alfred Marshall (1842-1924) pioneered the mathematical techniques related to measuring the sensitivity of consumer demand to price and are presented in his treatise, the "Principles of Economics" (1920). The price elasticity of demand (E) is mathematically defined as

$$E = \frac{\%\Delta Q}{\%\Delta P} = \frac{\text{Percentage change in quantity demanded}}{\text{Percentage change in price}}$$

The price elasticity is always negative, since the First Law of Demand states "As price increases, quantity demanded decreases, *ceteris paribus*." The price elasticity is calculated for movements along a given demand curve as price changes and all other factors affecting quantity demanded are held constant. An estimated price elasticity

between 0 and -1 is classified as inelastic, or demand that is relatively insensitive to price changes. Conversely, an estimated price elasticity of demand less than -1 is classified as elastic demand, or demand that is relatively sensitive to price changes. An elasticity equal to -1 is considered unitary elastic. For example, a price elasticity equal to -.20 (inelastic) indicates that when price increases by one percent, quantity demanded decreases by two-tenths of one percent, holding all other variables constant. Stated differently, when demand is inelastic, the decline in quantity demanded is proportionally less than the proportionate increase in price.

Three factors typically determine the magnitude of the price elasticity of demand for goods and services. They are 1) availability of substitutes, 2) the proportion of income spent on the good or service, and 3) length of time. Goods and services that are essential to living and have few substitutes have inelastic demand. Demand tends to be relatively inelastic for goods and services that account for only a small portion of consumer's total expenditures. The demand for a good or service is typically more elastic in the long run versus the short run. In the long run, consumers have more opportunities to adjust to changes in prices. Residential natural gas demand, as is the case with most utility services, is generally considered relatively inelastic, based on both these theoretical and pragmatic considerations.

3. Literature Review

A general consensus has emerged in the literature on the residential price elasticity of demand for natural gas: the price elasticity is relatively inelastic. Several surveys of the literature related to energy price elasticity studies have been conducted. Bohi (1981) established that the price elasticity of residential natural gas demand is statistically significant, but small in absolute magnitude. A review of the summary included in Bohi's study indicates short-run price elasticity estimates that range from -.15 to -.50, with the average elasticity equal to approximately -.3143. Later Bohi and Zimmerman (1984) reported a consensus residential price elasticity estimate of -.20 in the short run to -.30 in the long run. In addition, a conclusion was made that residential natural gas demand appears to respond to price to the same extent as electricity in the short run, but is significantly less elastic in the long run.

Al-Sahlawi (1989) conducted a survey of elasticity studies that concluded the residential price elasticity for natural gas is inelastic in the short run. The short-run price elasticity varied between -.053 to -.95. Neri (1990) conducted a survey of residential price elasticity estimates that included those from the existing published literature and estimates developed by local natural gas distribution companies. The results of the survey indicate price elasticity of demand estimates varying between -.14 to -.48, with the bulk of the estimates around -.30. In the Mountain and Pacific region, price elasticities varied between -.17 and -.31. Neri concluded that overall, residential gas demand has been shown to be relatively price inelastic.

4. The Data

The data utilized to estimate the multiple regression equation consisted of monthly aggregated data for the Tucson and Phoenix operating districts for the period January 1989 through August 2004. Monthly consumption per customer was developed using sales and customer information obtained from Southwest's billing records. Figure 1 of Appendix A shows the precipitous decline in residential consumption per customer between 1989 and 2004 (12-months ended August 2004). Over this period, residential consumption per customer (non-weather normalized) declined over 115 therms or 24.9 percent.

The nominal price of natural gas is defined as the tail block tariff rate (as applicable) for Southwest's Residential Gas Service (G-5) rate schedule and was obtained from Southwest's superceded tariff sheets. The tail block tariff rate is referred to as the marginal price of natural gas. The monthly Consumer Price Index – All Urban (Bureau of Labor Statistics) was used to deflate the nominal residential price of natural gas into real natural gas prices. The real price of residential natural gas was calculated by dividing the nominal price by the consumer price index and multiplying by 100. Figure 2 depicts the real residential price (12-month average) for the period 1989 through 2004. As indicated, the real residential price of natural gas generally trended downward between 1989 and 1997. Since 1998, real residential natural gas prices have been moving upwards.

Monthly cycle-billed heating degree days were developed using daily maximum and minimum temperature data from the National Oceanic and Atmospheric Administration. A heating degree day represents the number of degrees Fahrenheit the average temperature for a day falls below a base temperature of 65 degrees Fahrenheit. Monthly cycle-billed heating degree days were developed to synchronize the billed deliveries for a particular month with related heating degree days. For example, billing for the residential rate schedule is spread across the month based on 21 cycles, with each cycle including approximately 30 days of consumption. In this case, recorded residential consumption in a month actually reflects consumption which occurred in the current calendar month as well as the prior calendar month. The monthly cycle-billed heating degree days calculated for each month reflect this phenomenon. Figure 3 plots annual cycle-billed heating degree days for the years 1989 through 2004. Over this period, heating degree days are relatively stationary.

Monthly customers were utilized in conjunction with time-trend variables to develop seasonal base conservation variables. Figure 4 plots year-end customers for the years 1989 through 2003. As depicted, an acceleration of customer growth commenced in 1994 and has continued through the present.

5. Modeling Framework

The general form of the residential demand equation is as follows:

$$Q = f(HDD, PRICE, BCONW, BCONS, DUM) + e \quad (1)$$

where Q is the monthly residential consumption per customer, HDD is monthly cycle-billed heating degree days, PRICE is the monthly real residential price of natural gas, BCONW and BCONS represent base conservation in winter and summer respectively, DUM represents monthly dummy variables for the summer months, and e is a random error term.

Monthly heating degree day (cycle-billed basis) variables were developed based on the tenet that not only is consumption per customer strongly sensitive to heating degree days, but the sensitivity varies between months in the heating season. The monthly heating degree day variables were constructed by interacting heating degree days with monthly dummy variables. For example, the January heating degree day variable includes cycle-billed heating degree days for each January in the sample range and zero for all other months. Heating degree day variables for other months were constructed in a similar manner. The specification of monthly heating degree day variables allows for the quantification of the varying sensitivities. The expected sign on each heating degree day coefficient is positive since colder weather translates into increased residential natural gas consumption during the winter months.

The real residential price of natural gas was modeled using a polynomial distributed lag (PDL) specification. Modeling the effects of price as a polynomial distributed lag accounts for the impact of lagged prices on demand and facilitates to the development of a parsimonious regression equation. This specification reflects the fact that the influence of price changes on consumption is not simply contemporaneous, but affects consumption over a period of time. In addition, the PDL price formulation recognizes that a consumer's response to price changes is typically gradual and the relative importance of price responsiveness varies across months included in the lag structure. In the econometric modeling of time- series data such as residential consumption per customer, the noncontemporaneous or lagged relationship between a dependent variable and an explanatory variable such as price is a tenable assumption. The PDL price structure is a more realistic variation of specifying price as a moving average (e.g., 36 month) function. A moving average specification implicitly assumes the relative importance of all past price changes in the lag structure are the same. Figure 5 depicts a 36-month average of real residential natural gas prices for the period 1989 through 2004. As indicated, real prices trended downwards between 1989 and 1997. Since 1998, prices have trended upwards, although the 36-month average has leveled off in the most recent years. As outlined in the price elasticity primer presented in Section 2, a negative relationship would be expected between residential natural gas consumption and price. Hence, the expected

sign on the regression price coefficient should be negative.

Winter and summer base conservation variables were included in the regression model to capture the long-term decline in residential natural gas consumption per customer not directly induced by price changes. This would include the improved appliance and dwelling efficiencies that have occurred over time. The improved efficiencies are primarily the result of federal legislation and local building codes that have been enacted over the years. This is sometimes referred to by researchers modeling energy consumption as "autonomous energy efficiency improvements." Since a specific base conservation variable is not available, a proxy variable was developed to represent the autonomous or base conservation that has occurred over time. Time-trend variables weighted by customer growth were constructed to represent proxy variables for base conservation. Separate base conservation variables were developed for the summer and winter months to capture the decline in baseload and space heating consumption, respectively. While the residential price variable included in the regression equation is intended to capture movements along a demand curve, the base conservation variables capture the inward shift in the demand curve. Figure 6 illustrates the theoretical difference between a movement along the demand curve (P1 to P2 or vice versa) and a shift in the demand curve (D1 to D2 or vice versa). The inclusion of base conservation in the model ensures an important contributing factor to the decline in residential consumption per customer is included as variables in the equation. This in turn will minimize the likelihood of omitted variable bias in the regression coefficients. Since energy conservation practices lower residential natural gas consumption, *ceteris paribus*, the *a priori* expectation is a negative sign on the base conservation regression coefficients.

Monthly dummy variables were included in the regression equation to account for varying consumption per customer across months where heating degree days did not have a significant impact on residential consumption per customer. Since it would be expected that summer (June – October) consumption would be lower than winter (November – May) consumption, the *a priori* expectation would be a negative sign on the estimated regression coefficients for the summer month dummy variables.

The residential demand equation (1) is assumed to take a double logarithmic (double-log) functional form as follows:

$$\begin{aligned} LNQ = {} & \alpha+\beta HDD_{jan}+\beta HDD_{feb}+\beta HDD_{mar}+\beta HDD_{apr} \\ & +\beta HDD_{may}+\beta DUM_{jun}+\beta DUM_{jul}+\beta DUM_{aug}+\beta DUM_{sep}+\beta DUM_{oct} \\ & +\beta HDD_{nov}+\beta HDD_{dec}+\beta LNBCONW+\beta LNBCONS+\beta LNPRICE + e \end{aligned}$$

where α is the intercept and the β's are the regression coefficients quantifying the exogenous effects on residential natural gas consumption. The double-log specification is appropriate since the primary purpose of the regression equation is to estimate the residential price elasticity of demand. With the use of the double-log specification, the

estimated regression coefficient for the price variable measures the constant price elasticity of demand. The use of the double-log functional form is standard practice in the econometric estimation of price elasticities.

6. Empirical Results

The empirical results for the estimated regression equation are presented in Table 1 of Appendix A. The estimated regression equation exhibits excellent statistical characteristics in terms of summary diagnostic regression statistics such as the Rsquare, Durbin-Watson Statistic, Root Mean Square Error, and F-Statistic. Overall, the estimated equation reveals a very good "statistical fit" of the data as evidenced by an Rsquare of .9864. The Rsquare of .9864 indicates that over 98 percent of the variation in residential consumption per customer over the historical sample range is attributable to the explanatory variables included in the regression equation. The estimated regression coefficients all conform to *a priori* theoretical expectations and are statistically significant at an alpha=.05 (probability of a Type 1 error) when conducting one-tailed hypothesis tests ($\beta>0$ or $\beta<0$). The estimated regression equation included a first-order autoregressive term to correct for autocorrelation of the regression residuals.

The estimated coefficient for the price and the aggregated coefficients for the lagged prices are negative, as expected *a priori*, and statistically significant. A number of different lag lengths for the price variable were examined during the modeling process. An equation specification that included modeling the price effects as a 36-month lag structure was optimal. The PDL was specified as a first-order (linear) polynomial with a far constraint. The highly statistically significant estimated regression coefficients on all the lagged price variables validate the distributed lag effects underlying the equation specification. Examination of the estimated lagged price coefficients associated with the polynomial distributed lag specification indicate the residential price elasticity of demand varies between -.18 in the short term (12-month lag) to -.31 in the long term (36-month lag). These elasticity results suggest that residential demand for natural gas in Arizona is relatively price inelastic. In the long term, a sustained one percent increase in the real residential price of natural gas would result in consumption per customer declining three-tenths of one percent, holding all other variables constant. Therefore, the residential demand for natural gas does respond to price changes in an inverse fashion, but the response is relatively insensitive. The empirical results seem plausible and conform to both economic theory and the results of other empirical price elasticity studies.

The monthly heating degree day coefficients were all positive and statistically significant. The estimated regression coefficients for the monthly summer dummy variables were negative and statistically significant. Both the summer and winter base conservation regression coefficients were negative and statistically significant. The importance of the base conservation variables is not surprising given that between 1989 and 1997, consumption per customer declined significantly, even though real prices were declining

during this period. This confirms both theoretical and intuitive expectations that autonomous energy efficiency improvements are an important contributing factor in the historical decline in residential consumption per customer. These results corroborate a number of studies conducted by the American Gas Association (2000, 2003) that concluded improved appliance and dwelling efficiencies are important factors contributing to the historical declines in residential consumption per customer.

7. Concluding Remarks

This study estimated a multiple regression equation using data between January 1989 and August 2004. The estimated equation exhibits strong statistical results, reflects "Best Practice" econometric methods, and adheres to the principle of Occam's Razor. The results suggest the residential price elasticity of demand for natural gas in Arizona is relatively inelastic and equal to approximately -.31 in the longer term. Therefore, residential consumption is relatively insensitive to changes in the price of natural gas. The estimated price elasticity results compare favorably to the estimates in the published literature. The study also found statistical evidence that base conservation has shifted the residential demand curve for natural gas inward. The results also demonstrated that heating degree days and summer dummy variables are important determinants explaining the variation in residential consumption per customer.

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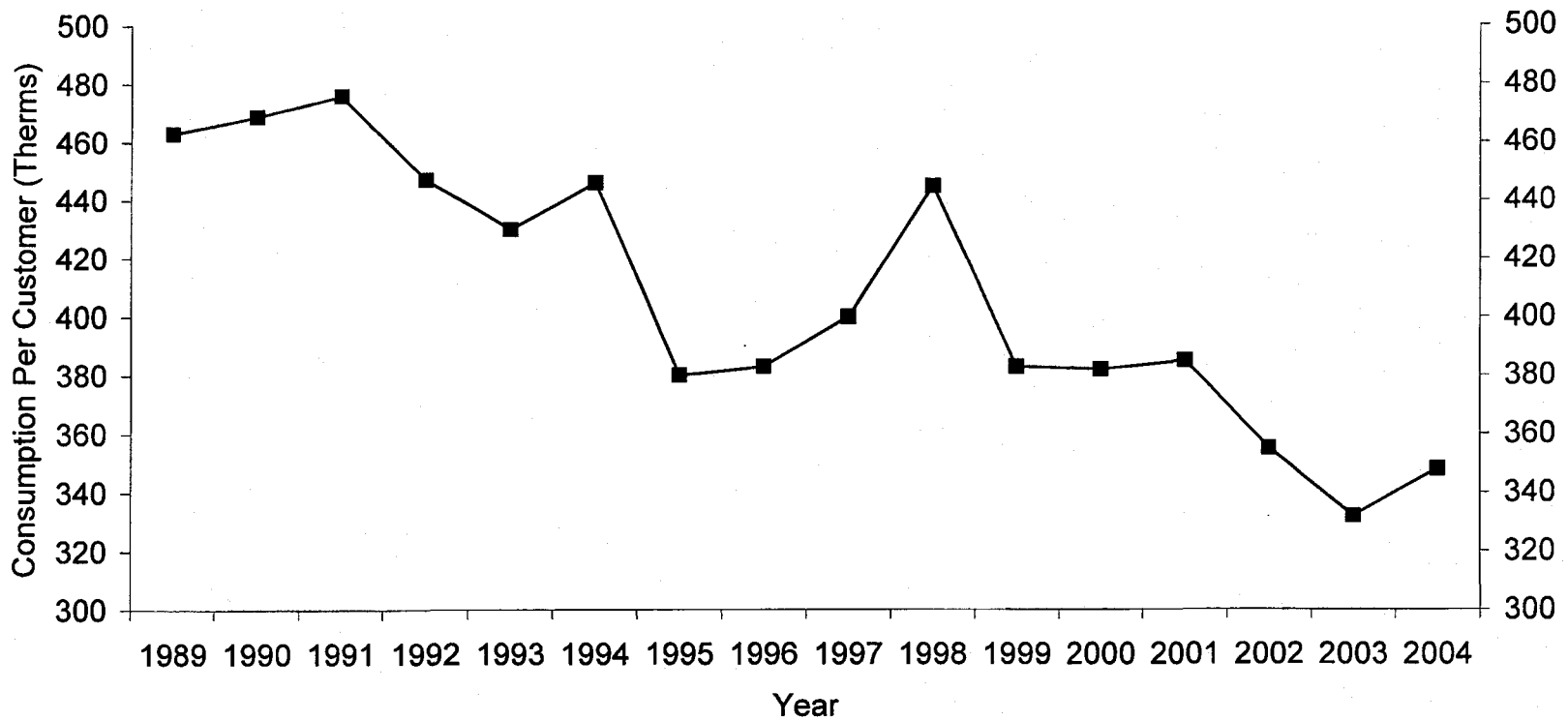
APPENDIX A

FIGURE 1

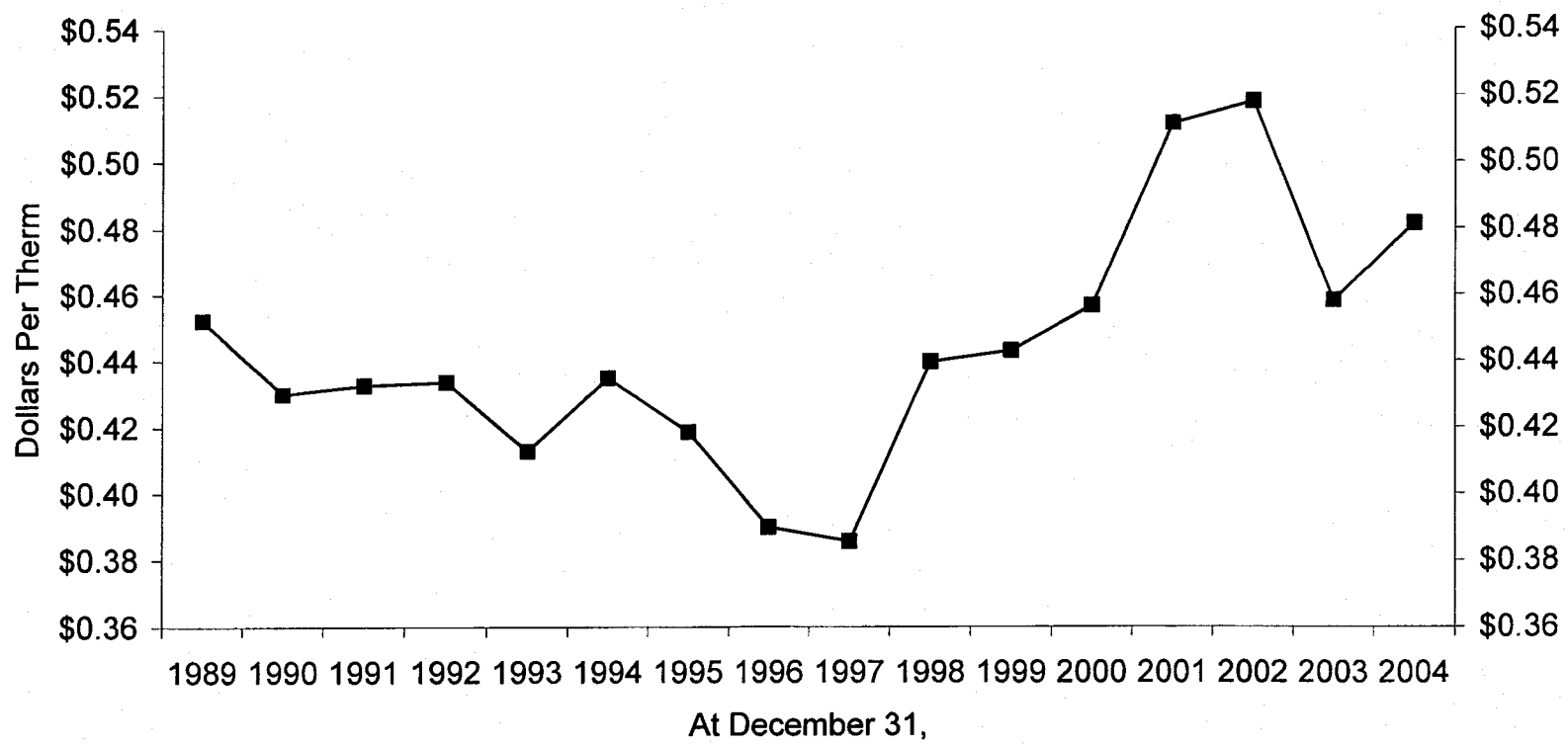
TUCSON AND PHOENIX DISTRICTS
RESIDENTIAL CUSTOMER CLASS (G-5)
ANNUAL CONSUMPTION PER CUSTOMER
1989 - 2004



Year 2004 - 12 Months Ended August 2004

FIGURE 2

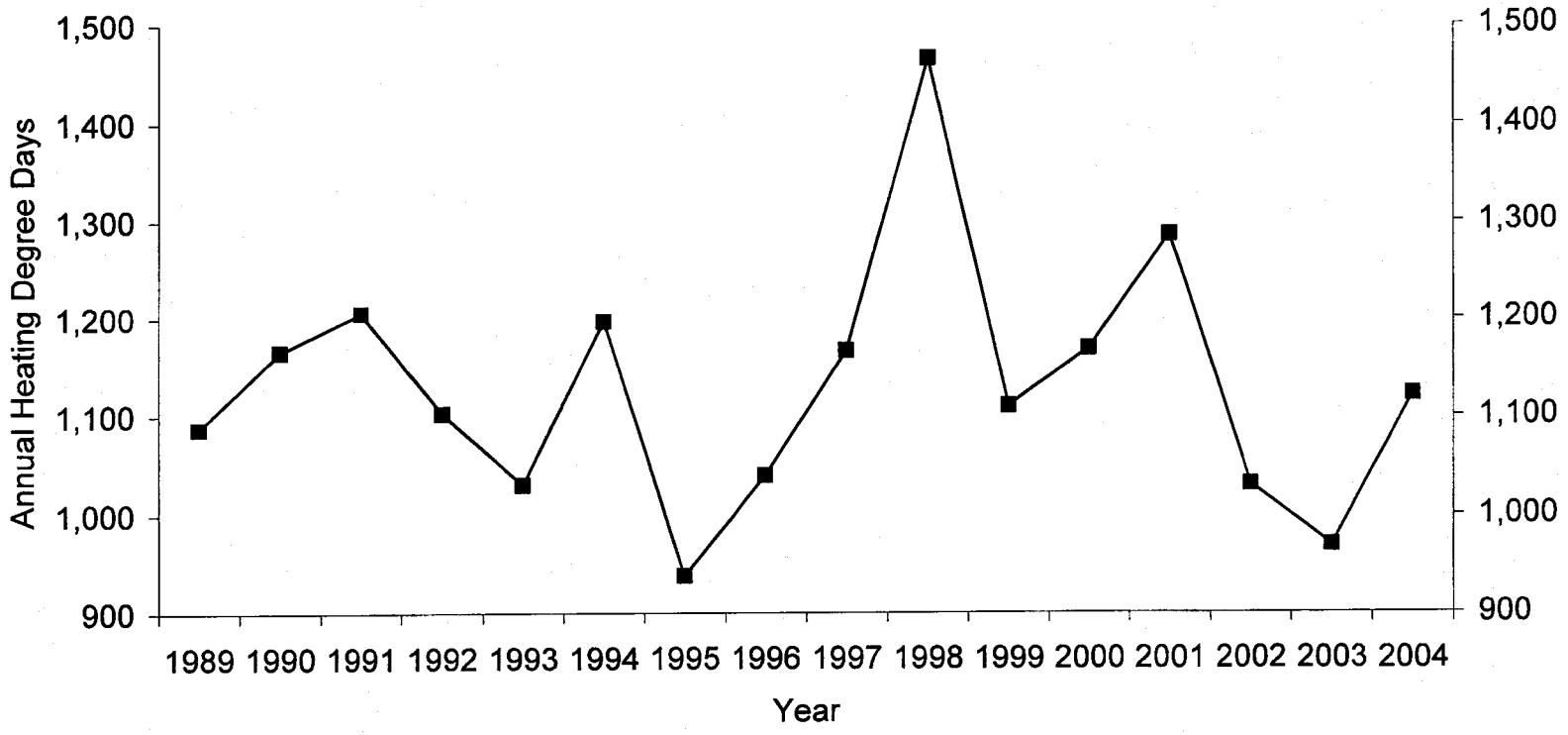
TUCSON AND PHOENIX DISTRICTS
RESIDENTIAL GAS SERVICE (G-5)
12-MONTH AVERAGE REAL PRICE PER THERM
1989 - 2004



Year 2004 - 12 months ended August 2004

FIGURE 3

TUCSON AND PHOENIX DISTRICTS
ANNUAL HEATING DEGREE DAYS
1989 - 2004



Year 2004 - 12 Months Ended August 2004

FIGURE 4

TUCSON AND PHOENIX DISTRICTS
NUMBER OF YEAR-END RESIDENTIAL CUSTOMERS (G-5)
1989 - 2003

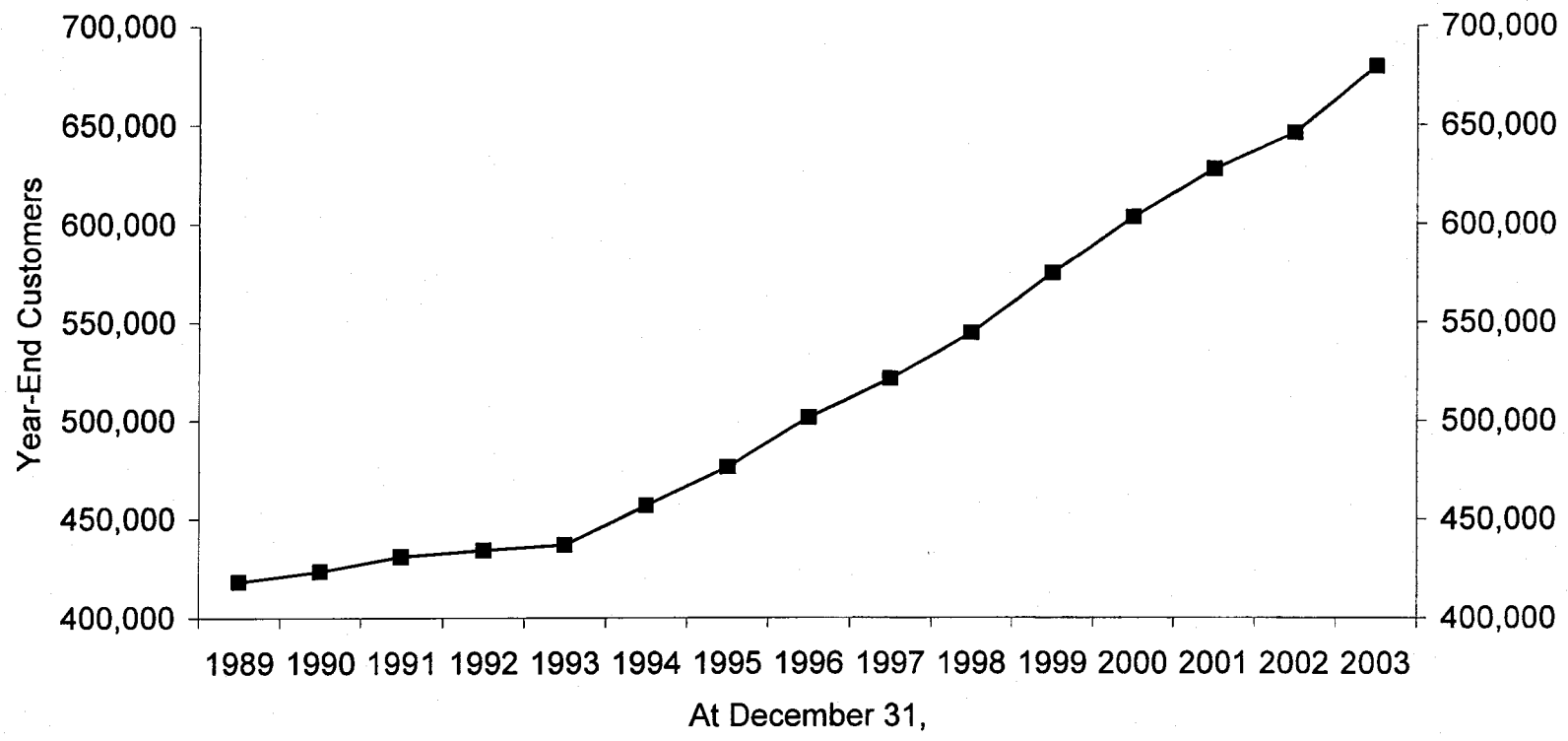
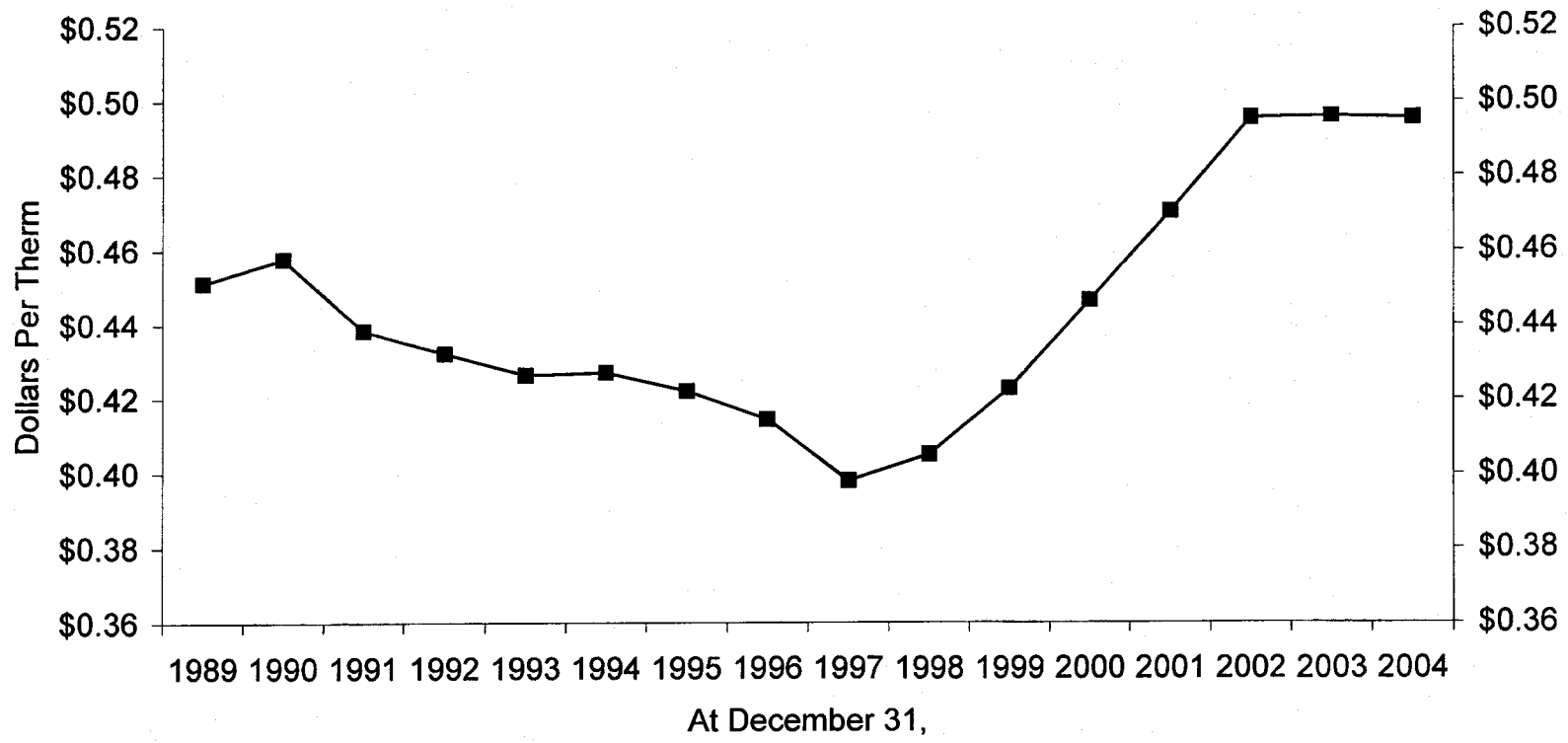


FIGURE 5

TUCSON AND PHOENIX DISTRICTS
RESIDENTIAL GAS SERVICE (G-5)
36-MONTH AVERAGE REAL PRICE PER THERM
1989 - 2004



Year 2004 - 12 months ended August 2004

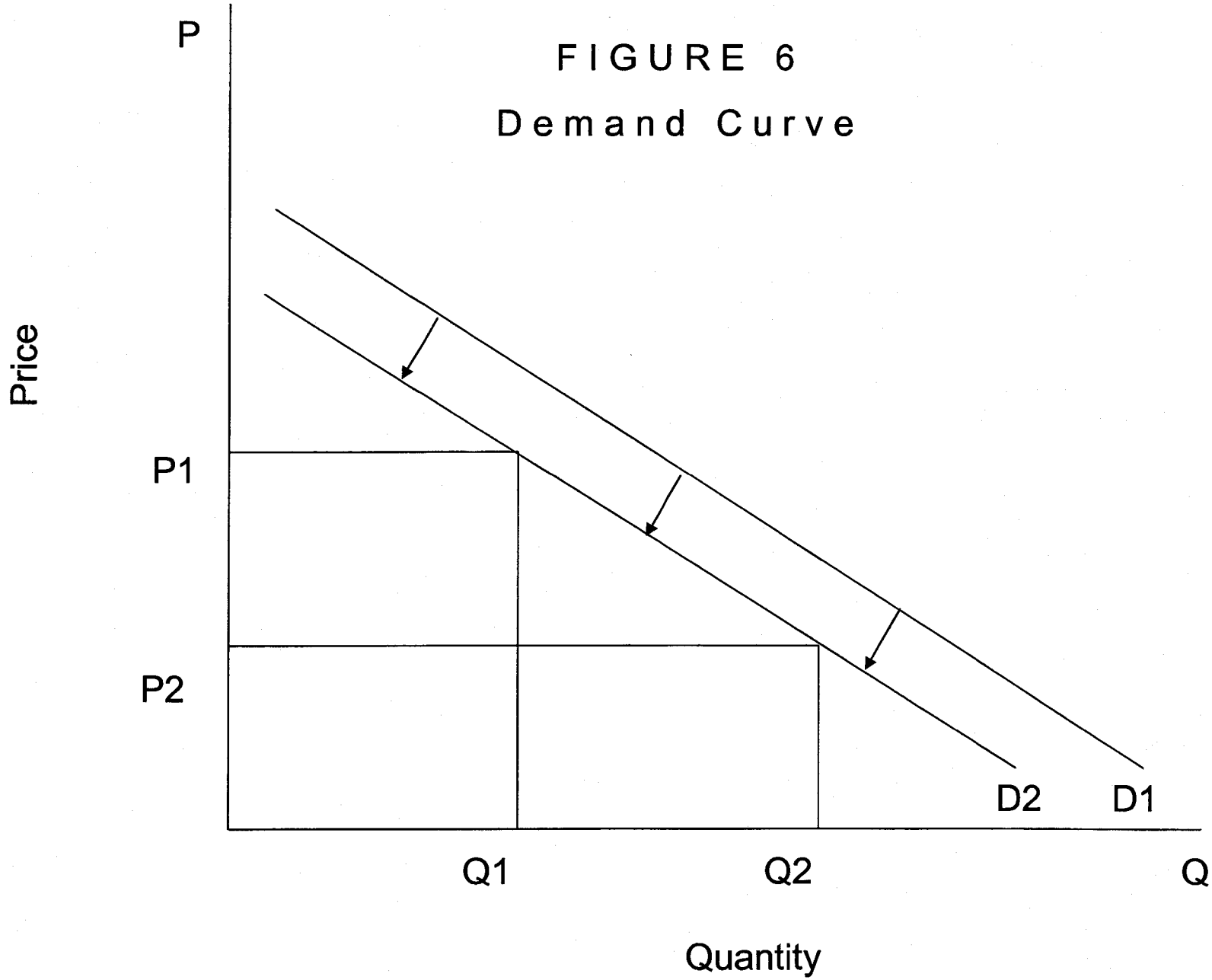


FIGURE 6

Demand Curve

TABLE 1
TUCSON AND PHOENIX DISTRICTS
RESIDENTIAL CONSUMPTION REGRESSION STATISTICS

Dependent Variable: Residential Consumption Per Customer

Sample Range: January 1989 – August 2004

Variable Name	Description	Parameter Estimate	Standard Error	T-Ratio for HO: Parameter=0
Intercept	-	2.988190	0.1165	25.660
HDDJAN	January Heating Degree Days	0.003781	0.00009	42.064
HDDFEB	February Heating Degree Days	0.004240	0.000118	36.012
HDDMAR	March Heating Degree Days	0.004844	0.000176	27.514
HDDAPR	April Heating Degree Days	0.004895	0.000387	12.661
HDDMAY	May Heating Degree Days	0.004362	0.00140	3.125
HDDNOV	November Heating Degree Days	0.002706	0.000489	5.530
HDDDEC	December Heating Degree Days	0.004300	0.000131	32.905
DUMJUN	June Binary Variable	-0.196378	0.0316	-6.211
DUMJUL	July Binary Variable	-0.383413	0.0341	-11.256
DUMAUG	August Binary Variable	-0.503849	0.0347	-14.528
DUMSEP	September Binary Variable	-0.453078	0.0350	-12.940
DUMOCT	October Binary Variable	-0.334968	0.0344	-9.748
LBCONW	Winter Base Conservation	-0.072392	0.0121	-5.975
LBCONS	Summer Base Conservation	-0.123268	0.0118	-10.405
A(1)	First-Order Autoregressive Term	-0.292460	0.0788	-3.711

Total R-square = .9864
Regression R-Square = .9775
Durbin-Watson Statistic = 1.9778
Number of Observations = 188

TABLE 1
POLYNOMIAL DISTRIBUTED LAG SPECIFICATION
FIRST ORDER (LINEAR), FAR CONSTRAINT

Variable Name	Description	Parameter Estimate	Standard Error	T-Ratio for HO: Parameter=0
LRPRICE(0)	Current Month Price	-0.01630	0.0071	-2.30
LRPRICE(1)	Price – 1 Month Lag	-0.01586	0.0069	-2.30
LRPRICE(2)	Price – 2 Month Lag	-0.01542	0.0067	-2.30
LRPRICE(3)	Price – 3 Month Lag	-0.01498	0.0065	-2.30
LRPRICE(4)	Price – 4 Month Lag	-0.01454	0.0063	-2.30
LRPRICE(5)	Price – 5 Month Lag	-0.01410	0.0061	-2.30
LRPRICE(6)	Price – 6 Month Lag	-0.01366	0.0059	-2.30
LRPRICE(7)	Price – 7 Month Lag	-0.01322	0.0057	-2.30
LRPRICE(8)	Price – 8 Month Lag	-0.01278	0.0056	-2.30
LRPRICE(9)	Price – 9 Month Lag	-0.01234	0.0054	-2.30
LRPRICE(10)	Price – 10 Month Lag	-0.01190	0.0052	-2.30
LRPRICE(11)	Price – 11 Month Lag	-0.01146	0.0050	-2.30
LRPRICE(12)	Price – 12 Month Lag	-0.01102	0.0048	-2.30
LRPRICE(13)	Price – 13 Month Lag	-0.01058	0.0046	-2.30
LRPRICE(14)	Price – 14 Month Lag	-0.01014	0.0044	-2.30
LRPRICE(15)	Price – 15 Month Lag	-0.00969	0.0042	-2.30
LRPRICE(16)	Price – 16 Month Lag	-0.00925	0.0040	-2.30
LRPRICE(17)	Price – 17 Month Lag	-0.00881	0.0038	-2.30
LRPRICE(18)	Price – 18 Month Lag	-0.00837	0.0036	-2.30
LRPRICE(19)	Price – 19 Month Lag	-0.00793	0.0034	-2.30
LRPRICE(20)	Price – 20 Month Lag	-0.00749	0.0033	-2.30
LRPRICE(21)	Price – 21 Month Lag	-0.00705	0.0031	-2.30
LRPRICE(22)	Price – 22 Month Lag	-0.00661	0.0029	-2.30
LRPRICE(23)	Price – 23 Month Lag	-0.00617	0.0027	-2.30
LRPRICE(24)	Price – 24 Month Lag	-0.00573	0.0025	-2.30
LRPRICE(25)	Price – 25 Month Lag	-0.00529	0.0023	-2.30
LRPRICE(26)	Price – 26 Month Lag	-0.00485	0.0021	-2.30
LRPRICE(27)	Price – 27 Month Lag	-0.00441	0.0019	-2.30
LRPRICE(28)	Price – 28 Month Lag	-0.00397	0.0017	-2.30
LRPRICE(29)	Price – 29 Month Lag	-0.00353	0.0015	-2.30
LRPRICE(30)	Price – 30 Month Lag	-0.00308	0.0013	-2.30
LRPRICE(31)	Price – 31 Month Lag	-0.00264	0.0011	-2.30
LRPRICE(32)	Price – 32 Month Lag	-0.00220	0.0010	-2.30
LRPRICE(33)	Price – 33 Month Lag	-0.00176	0.0008	-2.30
LRPRICE(34)	Price – 34 Month Lag	-0.00132	0.0006	-2.30
LRPRICE(35)	Price – 35 Month Lag	-0.00088	0.0004	-2.30
LRPRICE(36)	Price – 36 Month Lag	-0.00044	0.0002	-2.30

Price Elasticity Summary

12 – Month Lag = -0.17758
24 – Month Lag = -0.2754
36 – Month Lag = -0.30977

Berger

Southwest Gas Corporation
Docket No. G-01551A-04-__

BEFORE THE ARIZONA CORPORATION COMMISSION

Prepared Direct Testimony
of
CHRISTY M. BERGER

Q. 1 Please state your name and business address.

A. 1 My name is Christy M. Berger. My business address is 5241 Spring Mountain Road, Las Vegas, Nevada 89150-0002.

Q. 2 By whom are you employed and in what capacity?

A. 2 I am employed by Southwest Gas Corporation (Southwest) in the Pricing and Tariffs department as Senior Specialist/ Pricing and Tariffs.

Q. 3 Please state your educational background and business experience.

A. 3 I received a Bachelor of Science degree in Accounting from the University of Nevada, Las Vegas in 1994. In September 1994, I began my employment with Southwest as a Corporate Accountant in the Gas and Regulatory Accounting department and was subsequently promoted to Analyst/Gas and Regulatory Accounting in December 1996. My primary responsibilities included accounting and billing with respect to Southwest's large transportation customers, as well as calculation and accounting entries for gas costs in Southwest's various rate jurisdictions.

In February 1998, I started on a 15-month training program in Southwest's Pricing and State Regulatory Affairs departments. During this program, I spent six

months in the Pricing and Tariffs department, six months in the Revenue Requirements department, and three months in the State Regulatory Affairs department. In May 1999, I was permanently assigned to Pricing and Tariffs. In January 2001, I was promoted to Specialist/Pricing and Tariffs, and in July 2003, I was promoted to my current position of Senior Specialist/Pricing and Tariffs.

Q. 4 Briefly state the nature of your present responsibilities and duties with Southwest.

A. 4 I report to the Director/Pricing and Tariffs. My primary responsibilities include the development of Class Cost of Service Studies (CCOSS), as well as other rate case related duties and various pricing and tariff analyses.

Q. 5 Have you previously testified before any regulatory commission?

A. 5 No, this is the first time.

Q. 6 Briefly describe the purpose of your prepared direct testimony in this proceeding.

A. 6 I am sponsoring Southwest's CCOSS at present and proposed rates. I have prepared one study using Southwest's present rate schedules and another using Southwest's proposed rate schedules. The results of the two studies are shown in the CCOSS summaries.

Q. 7 Please describe the CCOSS summaries included in this filing.

A. 7 There are four schedules that summarize the results of the CCOSS at present and proposed rate schedules.

Schedule G-1A, Sheet 1, illustrates the rate of return on investment at current rates for the present rate schedules. The next schedule, as shown on Schedule G-1B, Sheet 1, illustrates the rate of return at present rates and proposed rate schedules. The summary shown in Workpaper G-2B, Sheet 1, illustrates the margin required for each proposed rate schedule to achieve the system average rate of return on investment. Finally, Schedule G-2B, Sheet 1 shows the results of the CCOSS using proposed rate schedules and proposed rates.

Q. 8 What is the purpose of preparing a Class Cost of Service Study?

A. 8 The purpose of preparing a CCOSS is to determine the cost of providing service to each rate class. It provides a tool to evaluate return on investment, or profitability, on service to each customer class. The CCOSS determines the rate base and operating costs, including taxes and tax adjustments, associated with each class of service. Subtracting operating costs from revenues by class of service yields net income by class of service. Net income divided by rate base produces the rate of return for each rate class.

Q. 9 How is the Class Cost of Service Study used?

A. 9 The CCOSS is used as a basis or starting point for the determination of customer class margin responsibility and rate design, which is discussed more fully in the testimonies of Southwest witnesses Edward B. Gieseking and

A. Brooks Congdon.

Q. 10 Please describe the process of developing the CCOSS.

A. 10 Common costs are allocated among the customer classes through the process of functionalization, classification and allocation of the costs to provide service.

Q. 11 What is meant by cost functionalization?

A. 11 Functionalization is the process of analyzing and assigning investments in plant and expenses to the appropriate operating function. The functions are production, storage, transmission, distribution, and customer accounting. Since Southwest has no production, storage, or transmission plant in Arizona, the functions are limited to distribution and customer accounting. Southwest's functionalization procedure follows the Federal Energy Regulatory Commission's uniform system of accounts.

Q. 12 What is meant by cost classification?

A. 12 Cost classification assesses the relationship between the cost and what causes the investment in plant or expense to occur. This process assigns cost to either demand-, customer-, or commodity-related components.

Demand-related costs are not directly impacted by the total number of customers served. They are more specifically related to the peak requirement of the system as a whole.

Costs that are customer-related increase based on an increase in the number of customers served. Items such

as customer accounting, meters, and meter reading are all impacted by the number of customers served, but these items are not sensitive to the amount of gas customers consume.

The commodity cost is the cost of gas. Gas costs are impacted by the amount of gas delivered to Southwest's system. However, the amount of gas delivered does not necessarily have a direct relationship to the number of customers served or the overall capacity of the system.

Q. 13 What is meant by cost allocation?

A. 13 Cost allocation uses "allocation factors," which are ratios that are used to distribute classified costs to each rate class. Demand-related allocations are based upon relative customer class demands. Customer-related allocations are based upon the number of customers served and are weighted to recognize variations in providing service, such as meter and service costs, meter reading, and billing expenses. Finally, commodity-related allocations are based upon relative annual customer class consumption.

Q. 14 How are negotiated rate customers treated in the CCOSS?

A. 14 The revenue from customers who receive service from Southwest at negotiated rates is credited back to the other rate classes according to each customer class margin. These customers are provided service at market-based contract specific rates. These negotiated

rate contracts are for specified contract terms and are reviewed and approved by the Commission.

Q. 15 Is Southwest using the same methodology it used to prepare the CCOSS in the previous general rate case filing?

A. 15 Yes. Southwest has prepared the CCOSS at present and proposed rates utilizing the same methodology that was used in the previous general rate case filing, Docket No. G-01551A-00-0127. However, Southwest has incorporated minor changes suggested by intervenors, which include modifying the allocation of other operating revenues. Specifically, late payment charges and service establishment charges are based on the classes that pay the charges instead of allocating them based on total revenue. In addition, expenses related to large customer sales have been allocated to customer classes that are directly serviced by that department.

Q. 16 Does this conclude your prepared direct testimony?

A. 16 Yes, it does.

Fetter

TESTIMONY OF STEVEN M. FETTER
PRESIDENT, REGULATION UnFETTERED
ON BEHALF OF SOUTHWEST GAS CORPORATION
DOCKET NO. G-01551A-04-____ BEFORE THE
ARIZONA CORPORATION COMMISSION

I. INTRODUCTION AND BACKGROUND

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Steven M. Fetter, and my business address is P.O. Box 475, Rumson, New Jersey 07760.

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

A. I am President of REGULATION UnFETTERED, an energy advisory firm I started in early April 2002.

Q. PLEASE BRIEFLY DESCRIBE YOUR ROLE AS PRESIDENT OF REGULATION UnFETTERED.

A. As President of REGULATION UnFETTERED I use my financial, regulatory, legislative and legal expertise to aid the deliberations of regulators, legislative bodies, and the courts, and to assist them in evaluating regulatory issues. My clients include electric and gas utilities, state public utility commissions, state consumer advocates, a non-utility energy supplier, international financial services and consulting firms, and investors.

Q. PLEASE BRIEFLY DESCRIBE YOUR EDUCATIONAL BACKGROUND AND YOUR RELEVANT WORK HISTORY PRIOR TO STARTING REGULATION UnFETTERED.

1 A. In 1974 I graduated with high honors from the University of Michigan with an
2 A.B. in Communications, and in 1979 I graduated from the University of
3 Michigan Law School with a J.D.

4 Prior to starting Regulation UnFettered, I was employed by Fitch, Inc.
5 ("Fitch"), a credit rating agency based in New York and London. Fitch is the
6 third largest full service credit rating agency in the United States and the largest
7 European rating agency. It is also one of four Nationally Recognized Statistical
8 Rating Organizations recognized by the U.S. Securities and Exchange
9 Commission, and is also recognized by the U.S. Department of Labor, state bank
10 and thrift regulators, and the National Association of Insurance Commissioners.
11 Fitch performs credit ratings of corporate obligations, asset-backed transactions,
12 and government and municipal debt. I started with Fitch in October of 1993 as
13 the Senior Vice President and Director of Regulatory and Government Affairs. I
14 subsequently served as a Group Head and Managing Director of the Global Power
15 Group within Fitch. In that role, I served as group manager of the combined 18-
16 person New York and Chicago Utility Team and was also responsible for
17 interpreting the impact of regulatory and legislative developments on utility credit
18 ratings. Shortly after I left Fitch to start Regulation UnFettered, Fitch retained me
19 as a consultant.

20 Prior to joining Fitch, I was employed by the Michigan Public Service
21 Commission ("MPSC"). In October of 1987 I was appointed as a Commissioner
22 to the three-member MPSC by Democratic Governor James Blanchard. In
23 January of 1991, I was promoted to Chairman by incoming Republican Governor

1 John Engler, who reappointed me in July of 1993. During my tenure as
2 Chairman, the MPSC eliminated the agency's case backlog for the first time in 23
3 years.

4 Prior to my employment with the MPSC, I was employed by the U.S.
5 Department of Labor in Washington, D.C. from August 1985 until October 1987.
6 While employed by the U.S. Department of Labor I served as an executive
7 assistant to the Deputy Under Secretary at the U.S. Department of Labor in
8 Washington, D.C. and later was Acting Associate Deputy Under Secretary of
9 Labor. From January 1983 until August 1985, I was legal counsel within the
10 Michigan Senate and later was appointed Senate Majority General Counsel. From
11 March 1982 through January 1983, I served as assistant legal counsel to Michigan
12 Governor William Milliken. Prior to March 1982, I was employed as an appellate
13 litigation attorney for the National Labor Relations Board in Washington, D.C.

14 Please refer to my curriculum vitae, attached hereto as Exhibit
15 No. ___(SMF-1), for a list of additional qualifications and relevant experience.

16 **Q. HOW DOES YOUR EXPERIENCE RELATE TO YOUR TESTIMONY IN**
17 **THIS PROCEEDING?**

18 A. My experience while at Fitch has given me solid insight into the importance of a
19 regulator's role in both setting rates and also determining appropriate terms and
20 conditions of service. These are the factors that enter into the process of utility
21 credit analysis and formulation of individual company credit ratings. It goes
22 without saying that a company's credit ratings have a significant impact as to

1 whether a utility will be able to raise capital on a timely basis and upon favorable
2 terms.

3 Also, during my six years at the MPSC, in addition to authorizing one of
4 the earliest gas transportation programs in the U.S., my colleagues and I sought
5 ways to encourage conservation and other demand-side programs among utility
6 customers. While we were able to offer the state's regulated gas and/or electric
7 utilities commitments that their expenditures for such programs would be
8 recoverable, we never succeeded in removing the financial disincentives for
9 utilities to aggressively promote conservation and energy efficiency. For this
10 reason, the Michigan commissioners believed that it was inappropriate to require
11 the utilities under our jurisdiction to work against their own interests by
12 mandating conservation gains. However, as I discuss later in my testimony, a
13 forward-thinking concept has emerged within the gas industry to address this
14 dilemma.

15 **Q. HAVE YOU PREVIOUSLY SPONSORED TESTIMONY BEFORE**
16 **REGULATORY OR LEGISLATIVE BODIES?**

17 A. Yes. Since 1990, I have testified on numerous occasions before the U.S. Senate,
18 the U.S. House of Representatives, and various state legislative and regulatory
19 bodies on the subjects of credit risk within the utility sector, electric utility
20 restructuring, utility securitization bonds, and nuclear energy.

21 **II. <u>SUMMARY</u>**

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

1 A. The purpose of my testimony is to offer my opinion, based upon my prior
2 experience as a state utility regulator and with a credit rating agency, as to what
3 comprises fair and economically prudent regulation within today's diverse U.S.
4 gas distribution industry. My testimony focuses on a forward-thinking concept
5 that seeks to decouple core revenues from the Company's sales volumes, thus
6 allowing conservation gains to be made without compromising the interests of
7 Southwest Gas Corporation's ("Southwest" or "Company") equity and debt
8 investors. This new concept in rate design, which has been endorsed in a
9 landmark agreement among environmental, gas industry, and regulatory
10 leadership -- and is currently being utilized in other jurisdictions -- holds out
11 promise for a break from past regulatory policies in a way that strikes a fair
12 balance between customer and shareholder interests. Remembering the
13 challenges I faced as a regulator to achieve such a "win-win result" years ago, I
14 strongly urge the Arizona Corporation Commission ("Commission") to give
15 serious consideration to this innovative program and authorize Southwest to
16 undertake its implementation.
17 I then focus on the fact that, with gas prices escalating, many gas
18 distribution companies are facing margin deterioration from growing efficiency of
19 customer usage at the same time that they are having to invest substantial amounts
20 of funds in capital infrastructure programs to ensure reliability of service and meet
21 growing demand. With such a significant need for funds in a time of tightening
22 margins, I explain why I believe that utilities, operating within today's more
23 challenging financial environment, and their regulatory authorities should seek to

minimize the regulatory uncertainties that could affect a utility's financial profile, its credit ratings, and thus its access to capital on favorable terms. I then relate these factors to the current credit ratings and capital market access of Southwest and offer cautions about how they could be affected by the final decision of the Commission in this proceeding. In particular, I address Southwest's current credit ratings which are at or near the bottom of the investment-grade category. I firmly believe that such status places the Company in a very difficult situation under current industry circumstances, because it chills the interests of investors in committing funds to the Company and results in increased cost of debt and equity capital, which translates into higher rates for consumers.

III. CONSERVATION MARGIN TRACKER

Q. YOU REFERRED TO A LANDMARK AGREEMENT AMONG ENVIRONMENTALISTS, THE GAS INDUSTRY AND REGULATORS. PLEASE EXPLAIN WHAT OCCURRED?

A. In July 2004, the American Gas Association (AGA) and the Natural Resources Defense Council (NRDC) issued a Joint Statement that attempted to deal with what they described as "The Energy Efficiency Problem: Regulated Natural Gas Utilities are Penalized for Aggressively Promoting Energy Efficiency."

Q. WHAT SOLUTION DID THE TWO GROUPS PROPOSE?

A. The AGA and the NRDC, two groups that I cannot remember ever sharing views on a major natural gas issue, stated the problem and proceeded to offer a solution:

> When customers use less natural gas, utility profitability almost always suffers, because recovery of fixed costs is reduced in proportion to the reduction in sales. Thus, conservation may prevent the utility from recovering its authorized fixed costs and

> earning its state-allowed rate of return. In this important respect, traditional utility rate practices fail to align the interests of utility shareholders with those of utility customers and society as a whole. This need not be the case. Public utility commissions should consider utility rate proposals and other innovative programs that reward utilities for encouraging conservation and managing customer bills to avoid certain negative impacts associated with colder-than-normal weather. There are a number of ways to do this, and NRDC and AGA join in supporting mechanisms that use modest automatic rate true-ups to ensure that a utility's opportunity to recover authorized fixed costs is not held hostage to fluctuations in retail gas sales.[1]

Q. YOU ALSO STATED THAT REGULATORS HAVE ENDORSED THIS CONCEPT. PLEASE EXPLAIN?

A. Yes. The NRDC and the AGA, with the added support of the American Council for an Energy-Efficient Economy ("ACEEE"), forwarded the Joint Statement on to the National Association of Regulatory Utility Commissioners ("NARUC") for consideration at the NARUC Summer Committee Meetings held in July 2004. At that meeting, the NARUC Board of Directors passed a resolution encouraging state commissions to review and consider the recommendations contained in the Joint Statement.[2]

Thereafter, Stan Wise, President of NARUC and a Georgia PSC Commissioner, endorsed these ideas, stating:

> Recovering fixed costs through fixed fees removes the utility's need to meet an expected sales volume in order to recover its costs. This means that the utility can promote energy conservation without worrying that it is undermining its ability to survive.[3]

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[1] Joint Statement of the American Gas Association and the Natural Resources Defense Council, July 2004, a copy of which is attached hereto as Exhibit No. ___(SMF-2) and incorporated by reference herein.
[2] Resolution on Gas and Electric Energy Efficiency, NARUC Board of Directors, Salt Lake City, Utah, July 14, 2004 a copy of which is attached hereto as Exhibit No. ___(SMF-3) and incorporated by reference herein.
[3] "Striking the Right Balance," American Gas Magazine, October 2004.

1 **Q. HAVE OTHER STATE PUBLIC UTILITY COMMISSIONS DECOUPLED**
2 **THE RECOVERY OF AUTHORIZED MARGIN FROM SALES?**
3 A. Yes. There are at least three states that I am currently aware of that employ a
4 decoupling mechanism. The Oregon Public Utility Commission has approved a
5 conservation tariff to break the link between a natural gas utility's sales and its
6 profitability, so that the utility can assist its customers with energy efficiency
7 without conflict. The conservation tariff seeks to do that by using modest
8 periodic rate adjustments to decouple recovery of the utility's authorized fixed
9 costs from unexpected fluctuations in retail sales.[4] The California Public Utilities
10 Commission has authorized margin tracking mechanisms to balance actual margin
11 revenues with authorized levels for all of the state's natural gas utilities. In
12 addition, the Public Service Commission of Maryland approved a mechanism to
13 decouple the recovery of authorized margin from gas sales for Baltimore Gas &
14 Electric Company.[5]
15 Moreover, in light of the recent agreement among environmental, gas
16 industry, and regulatory leadership, this Commission has an opportunity to
17 examine and respond to NARUC's recent suggestion that state commissions
18 consider mechanisms that decouple sales levels from the natural gas utility's core
19 revenues, thus aligning the interests of utility shareholders, customers, and society
20 as a whole. As such, by authorizing Southwest to implement its proposed

[4] See Stipulation Adopting Northwest Natural Gas Company Application for Public Purpose Funding and Distribution Margin Normalization, Oregon PUC Order No. 02-634, September 12, 2003.
[5] See Order No. 74047 in Case No. 8780 in which the Public Service Commission of Maryland approved the implementation of the "Monthly Revenue Adjustment" for Baltimore Gas & Electric Co.

1 conservation margin tracker (CMT), this Commission will become a leader in
2 natural gas utility regulation.

3 **Q. PLEASE EXPLAIN THE FRAMEWORK OF THE DECOUPLING**
4 **MECHANISM THAT SOUTHWEST HAS PROPOSED?**

5 A. I will leave the technical explanation of the mechanism to the testimony of
6 Southwest witness Edward B. Gieseking, but will say that, basically, this
7 mechanism will compensate the Company for any under-recovery due to loss of
8 margin caused by impacts such as conservation gains or impacts that are beyond
9 the control of the Company, such as weather aberrations. I note that the CMT
10 protects customer interests as well. The mechanism will also track those types of
11 financial impacts in the Company's favor and provide for a refund for any over-
12 recovery that results from those factors.

13 **Q. WHY DO YOU BELIEVE THAT SUCH A TRACKER WILL BENEFIT**
14 **SOUTHWEST AND SOUTHWEST'S CUSTOMERS?**

15 A. I believe that authorizing Southwest to implement the CMT will benefit
16 Southwest and Southwest's customers as follows: (1) by removing Southwest's
17 inherent disincentive to promote conservation and energy efficiency; (2) by
18 improving Southwest's financial condition over the long run; (3) by aligning the
19 interests of customers and shareholders; (4) by promoting good public policy; and
20 (5) by strengthening Southwest's credit rating.

21 **Q. HOW DOES THE TRACKER REMOVE SOUTHWEST'S INHERENT**
22 **DISINCENTIVE OF PROMOTING CONSERVATION AND ENERGY**
23 **EFFICIENCY?**

1 A. Under traditional ratemaking, a substantial portion of a local distribution
2 company's ("LDC") profit margin is tied to the volume of gas that the company
3 delivers. The tracker breaks the connection between reduced usage due to
4 conservation and energy efficiency, as well as weather, and an LDC's profit
5 margin. I note, however, that Southwest's earnings would continue to be
6 dependent upon Southwest's ability to efficiently manage its operations, including
7 controlling its expenditures.

8 **Q. HOW WILL THE IMPLEMENTATION OF THE TRACKER IMPROVE**
9 **SOUTHWEST'S FINANCIAL CONDITION?**

10 A. During the past several years, Southwest's return on equity has been well below
11 authorized levels due in large part to decreasing average residential usage and a
12 rate design heavily dependent on volumetric sales. The tracker would eliminate
13 negative financial harm from the effect of volumetric pricing and declining usage
14 levels.

15 **Q. HOW DOES THE TRACKER ALIGN THE INTERESTS OF**
16 **CUSTOMERS AND SHAREHOLDERS?**

17 A. The CMT is a symmetrical mechanism. I have described how it stabilizes
18 Company revenues when there is a shortfall. It is important to note that the
19 tracker would also operate to trim actual margins if usage were to exceed
20 forecasted levels, as a result of colder than normal weather, for example. Thus,
21 both investors in the Company and customers would experience margin results
22 tied to authorized levels, with less volatile revenue swings.

1 **Q. WHY DO YOU BELIEVE THAT IMPLEMENTING A CONSERVATION**
2 **MARGIN TRACKER MECHANISM PROMOTES GOOD PUBLIC**
3 **POLICY?**
4 A. I believe that the CMT is a major step in attempting to promote conservation and
5 energy efficiency by decoupling sales from revenues. This mechanism has broad-
6 based support and similar mechanisms are currently being utilized in other
7 relatively nearby jurisdictions. More importantly, it does so in a way that
8 encourages conservation gains, both those driven by customer initiative as well as
9 those where the Company can offer ideas for, or assistance with, promoting
10 greater efficiency in gas usage. This wide spectrum of expertise committed to
11 energy efficiency serves both the financial interests of customers and shareholders
12 as well as the broader national goal of energy independence.
13 **Q. DO YOU BELIEVE THAT IMPLEMENTATION OF THE**
14 **CONSERVATION MARGIN TRACKER WILL STRENGTHEN**
15 **SOUTHWEST'S CREDIT RATING?**
16 A. Yes I do. Southwest's cash flow and earnings have been subject to volatility and
17 weakness over the past decade. To the extent that these negative factors were the
18 result of margin loss due to efficiency gains or warmer than normal weather, the
19 tracker will operate to stabilize margin recovery at levels authorized by the
20 Commission. For this reason, the presence of a tracker will reduce a significant
21 amount of the uncertainty that is the bane of all investors. I believe adoption of
22 Southwest's proposed tracker would take a large and appropriate step toward
23 allowing Southwest to begin to strengthen its weak credit profile. Indeed, I

1 strongly believe that the Commission's adoption of this innovative mechanism
2 that has garnered widespread and diverse support would lead the financial
3 community to view Southwest as trending in a positive direction.

4 **IV. UTILITY CREDIT RATING ANALYSIS**

5 **Q. PLEASE DESCRIBE THE CREDIT RATING PROCESS?**

6 A. Credit ratings reflect a credit rating agency's independent judgment of the general
7 creditworthiness of an obligor or the creditworthiness of a specific debt
8 instrument. Determinations are made through a committee process involving
9 individuals with knowledge of the company, industry and regulatory environment.
10 Rating designations of both Fitch and Standard & Poor's ("S&P") have 'BBB-' as
11 the lowest investment-grade rating and 'BB+' as the highest non-investment-
12 grade rating. In comparison, Moody's Investors Service's ("Moody's") rating
13 designations are 'Baa3' and 'Ba1', respectively.

14 Corporate credit ratings analysis considers both qualitative and
15 quantitative factors to assess the financial and business risks of fixed-income
16 issuers. A rating is an indication of an issuer's ability to service its debt, both
17 principal and interest, on a timely basis. It also, at times, incorporates some
18 consideration of ultimate recovery of investment in case of default or insolvency.

19 Prior to the evolution to competition within both the gas and electric
20 sectors, the traditional credit rating process focused almost exclusively on
21 quantitative factors. Since the early 1990s, however, all three rating agencies
22 have elevated qualitative factors to almost equal status, with regulatory
23 environment leading the way in significance. These qualitative factors enter into

1 a credit rating agency's analysis and determination of the appropriate credit rating
2 to be assigned to a specific utility.

3 **Q. CAN YOU SHARE YOUR THOUGHTS ON THE IMPORTANCE OF**
4 **"REGULATION" WITHIN THE CREDIT RATING PROCESS?**

5 A. Yes. Regulation is a key factor in assessing the credit profile of a utility because
6 a state public utility commission determines rate levels (recoverable expenses
7 including depreciation and operations and maintenance, gas cost recovery, and
8 return on investment) and the terms and conditions of service.

9 While restructuring plans within the electric industry have drawn a
10 majority of the financial community's recent attention due to the California and
11 Enron debacles, the universe of natural gas distribution utilities presents differing
12 operating conditions and diverse financial profiles as well. Thus review of a LDC
13 for purposes of assigning credit ratings includes an assessment of the business
14 risks the company faces within its particular jurisdiction, with regulatory support
15 perhaps the most important factor.

16 The evolving competitive structures from state-to-state affect utility
17 investment decisions because, before major energy investors will be willing to put
18 forward substantial sums of money, they will want to gain comfort that regulators
19 understand the economic requirements and the financial and operational risks of
20 an evolving industry and that their decision-making will be fair and will have a
21 significant degree of predictability.

22 For these reasons, rating agencies look for the consistent application of
23 sound economic regulatory principles by the commissions. If a regulatory body

1 were to encourage a company to make investments based upon an expectation of
2 the opportunity to earn a reasonable return and/or appropriate recovery of funds
3 expended, and then did not apply regulatory principles in a manner consistent
4 with such expectations, investor interest in providing funds to such a utility would
5 decline, debt ratings would likely suffer, and the utility's cost of capital would
6 increase.

7 **Q. WHAT CREDIT RATINGS DOES SOUTHWEST CURRENTLY HOLD?**

8 A. S&P's current corporate credit rating and senior unsecured ratings for Southwest
9 are "BBB-", the lowest investment-grade rating. S&P rates the Company's
10 preferred stock at "BB." All of the S&P ratings have a Stable outlook. Moody's
11 senior unsecured credit ratings for Southwest are "Baa2", one notch above the
12 lowest investment-grade level. Moody's rating for preferred stock is at "Baa3."
13 Moody's has a Negative outlook on the Southwest ratings. Fitch's senior
14 unsecured ratings for Southwest are at "BBB" level with preferred stock rated at
15 "BBB-". Fitch's ratings outlook is Stable.

16 The ratings designations for Southwest equate to low to very low quality
17 investment-grade debt, with S&P's ratings on the threshold of going below
18 investment grade. As I will discuss, this is a precarious position for any regulated
19 electric or gas utility operating in the more uncertain industry environment we are
20 experiencing today, since one misstep or unforeseen negative occurrence could
21 push the utility down into below-investment-grade status.

22 **Q. IN YOUR OPINION, WILL SOUTHWEST'S CUSTOMERS BENEFIT IF**
23 **SOUTHWEST'S DEBT IS RATED AT A HIGHER LEVEL THAN THE**

1 **LOW TO VERY LOW QUALITY INVESTMENT-GRADE STATUS THAT**
2 **SOUTHWEST CURRENTLY POSSESSES?**
3 A. Yes. In the current U.S. investor-owned utility industry environment, within
4 which downgrades have overwhelmed the number of upgrades during the past
5 four years,[6] I believe Southwest is in a very difficult position, with little margin of
6 error for negative events which might occur, often through no fault of its own. At
7 a utility rated at (or above) the "BBB+" level, one to two notches higher than
8 Southwest, customers benefit because their utility is able to raise debt capital
9 when needed to fund infrastructure requirements necessary to meet growth in
10 customer demand easier than a lower credit quality utility, and can refinance
11 maturing debt on more reasonable terms. This is especially true when volatility in
12 the energy/utility sector (like has been experienced during the past few years) has
13 tightened up liquidity within the debt market.
14 Moreover, the ability to access the debt market on favorable terms even
15 when poor market conditions exist is important because if an LDC needs to
16 expand or upgrade its distribution infrastructure to maintain system reliability or
17 be responsive to growth demand, debt funding is an advantageous source of
18 capital as it is typically more economical than equity financing. As ratings trend
19 down to the lowest-quality investment-grade level of "BBB-", the utility
20 industry's current unsettled state neutralizes many of the benefits I have described
21 above.

[6] For example, in 2000, S&P downgraded 65 utility holding companies and subsidiaries, versus 20 upgrades. The trend continued in 2001 with 81 downgrades and 29 upgrades, and in 2002 with 182 and 15, respectively. In 2003, the numbers ran 139 downgrades to 8 upgrades. (See S&P Research: U.S. Utilities'

1 **Q. WHAT ARE SOME OF THE CONSEQUENCES OF SOUTHWEST'S**
2 **CREDIT RATING FALLING BELOW INVESTMENT-GRADE**
3 **QUALITY?**
4 A. There would be a marked change in the investor profile for Southwest. Major
5 utility investors such as insurance companies and pension funds operate under
6 legal restrictions that severely limit their ability to invest in below investment-
7 grade debt instruments, or "junk bonds." Mutual funds could also be affected
8 based upon what a particular fund has communicated to investors as to its
9 investment profile. Moreover, if Southwest were given a "junk bond" rating, the
10 Company would likely have to post bond or put up cash as collateral in various
11 contracts (such as for gas supply) or to meet certain regulatory commitments.
12 This, of course, would come at a time when access to Southwest's existing credit
13 facilities likely would be limited by the financial institutions previously providing
14 the assistance. Finally, if Southwest were given below investment-grade status, it
15 would be severely limited in its ability to access the commercial paper (short-term
16 debt) market, if it could access it at all. Commercial paper is a key source of
17 funding for utilities, most of which have revenues that vary substantially
18 depending upon the time of year, and loss of access to that market can severely
19 impair financial liquidity.
20 **Q. IS IT EASY FOR A COMPANY THAT HAS BEEN DOWNGRADED TO**
21 **REGAIN ITS PRIOR CREDIT RATING?**

Ratings Decline Continued in 2003, but Pace Slows, January 29, 2004.) I note that 2004 has begun to show a settling down of the prior negative movement for utility credit quality.

1 A. No, not at all. It is important to emphasize that within this more volatile
2 investment climate, it is far easier for a utility's ratings to slip down due to a
3 financial "ding" than for that same utility to regain its earlier status once the
4 deficiency has been remedied. For that reason, I do not believe that any
5 weakening of Southwest's credit profile could be easily remedied. My advice to
6 utility companies, investors and regulators alike is that nothing should be taken
7 for granted in the current investing environment.

8 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

9 A. Yes.

Exhibit No.___(SMF-1)

STEVEN M. FETTER

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732-741-2520
RegUnF@comcast.net

Education University of Michigan Law School, J.D. 1979
Bar Memberships: U.S. Supreme Court, New York, Michigan
University of Michigan, A.B. (Communications) 1974

April 2002 – Present
President – REGULATION UNFETTERED – Rumson, NJ

Founder of advisory firm providing regulatory, legislative, financial, legal and strategic planning advisory services for the energy and telecommunications sectors; federal and state testimony; credit rating advisory services; negotiation, arbitration and mediation services; and skills training in ethics, negotiation, and management efficiency.

- Service on Boards of Directors of: CH Energy Group (Chairman, Audit Committee; Member, Governance and Nominating, Compensation, and Executive Committees), National Regulatory Research Institute (at Ohio State University), Keystone Energy Board, and Regulatory Information Technology Consortium; Member, Wall Street Utility Group and American Public Power Association; Participant, Keystone Center Dialogue on Financial Trading and Energy Markets.

October 1993 – April 2002
Group Head and Managing Director; Senior Director -- Global Power Group, Fitch IBCA Duff & Phelps -- New York/Chicago

Manager of 18-employee ($15 million revenue) group responsible for credit research and rating of fixed income securities of U.S. and foreign electric and natural gas companies and project finance.

- Led an effort to restructure the global power group that in three years time resulted in 75% new personnel and over 100% increase in revenues, transforming a group operating at a substantial deficit into a team-oriented profit center through a combination of revenue growth and expense reduction.

- Achieved national recognition as a speaker and commentator evaluating the effects of regulatory developments on the financial condition of the utility sector and individual companies; Cited by Institutional Investor (9/97) as one of top utility analysts at rating agencies; Frequently quoted in national newspapers and trade publications including The New York Times, The Wall Street Journal, International Herald Tribune, Los Angeles Times, Atlanta Journal-Constitution, Forbes and Energy Daily; Featured speaker at conferences sponsored by Edison Electric Institute, Nuclear Energy Institute, American Gas Assn., Natural Gas Supply Assn., National Assn. of Regulatory Utility Commissioners (NARUC), Canadian Electricity Assn.; Frequent

invitations to testify before U.S. Senate (on C-Span) and House of Representatives, and state legislatures and utility commissions.

- Participant, Keystone Center Dialogue on Regional Transmission Organizations; Member, International Advisory Council, Eisenhower Fellowships; Author, "A Rating Agency's Perspective on Regulatory Reform," book chapter published by Public Utilities Reports, Summer 1995; Advisory Committee, Public Utilities Fortnightly.

March 1994 – April 2002
Consultant -- NYNEX -- New York, Ameritech -- Chicago, Weatherwise USA -- Pittsburgh

Provided testimony before the Federal Communications Commission and state public utility commissions; Formulated and taught specialized ethics and negotiation skills training program for employees in positions of a sensitive nature due to responsibilities involving interface with government officials, marketing, sales or purchasing; Developed amendments to NYNEX Code of Business Conduct.

October 1987 - October 1993
Chairman; Commissioner -- Michigan Public Service Commission -- Lansing

Administrator of $15-million agency responsible for regulating Michigan's public utilities, telecommunications services, and intrastate trucking, and establishing an effective state energy policy; Appointed by Democratic Governor James Blanchard; Promoted to Chairman by Republican Governor John Engler (1991) and reappointed (1993).

- Initiated case-handling guideline that eliminated agency backlog for first time in 23 years while reorganizing to downsize agency from 240 employees to 205 and eliminate top tier of management; MPSC received national recognition for fashioning incentive plans in all regulated industries based on performance, service quality, and infrastructure improvement.

- Closely involved in formulation and passage of regulatory reform law (Michigan Telecommunications Act of 1991) that has served as a model for other states; Rejuvenated dormant twelve-year effort and successfully lobbied the Michigan Legislature to exempt the Commission from the Open Meetings Act, a controversial step that shifted power from the career staff to the three commissioners.

- Elected Chairman of the Board of the National Regulatory Research Institute (at Ohio State University); Adjunct Professor of Legislation, American University's Washington College of Law and Thomas M. Cooley Law School; Member of NARUC Executive, Gas, and International Relations Committees, Steering Committee of U.S. Environmental Protection Agency/State of Michigan Relative Risk Analysis Project, and Federal Energy Regulatory Commission Task Force on Natural Gas Deliverability; Eisenhower Exchange Fellow to Japan and NARUC Fellow to the Kennedy School of Government; Ethics Lecturer for NARUC.

August 1985 - October 1987

Acting Associate Deputy Under Secretary of Labor; Executive Assistant to the Deputy Under Secretary -- U.S. Department of Labor -- Washington DC

Member of three-person management team directing the activities of 60-employee agency responsible for promoting use of labor-management cooperation programs. Supervised a legal team in a study of the effects of U.S. labor laws on labor-management cooperation that has received national recognition and been frequently cited in law reviews (U.S. Labor Law and the Future of Labor-Management Cooperation, w/S. Schlossberg, 1986).

January 1983 - August 1985
Senate Majority General Counsel; Chief Republican Counsel -- Michigan Senate -- Lansing

Legal Advisor to the Majority Republican Caucus and Secretary of the Senate; Created and directed 7-employee Office of Majority General Counsel; Counsel, Senate Rules and Ethics Committees; Appointed to the Michigan Criminal Justice Commission, Ann Arbor Human Rights Commission and Washtenaw County Consumer Mediation Committee.

March 1982 - January 1983
Assistant Legal Counsel -- Michigan Governor William Milliken -- Lansing

Legal and Labor Advisor (member of collective bargaining team); Director, Extradition and Clemency; Appointed to Michigan Supreme Court Sentencing Guidelines Committee, Prison Overcrowding Project, Coordination of Law Enforcement Services Task Force.

October 1979 - March 1982
Appellate Litigation Attorney -- National Labor Relations Board -- Washington DC

Other Significant Speeches and Publications

- Climate Change and the Electric Power Sector: What Role for the Global Financial Community (during Fourth Session of UN Framework Convention on Climate Change Conference of Parties, Buenos Aires, Argentina, November 3, 1998)(unpublished)
- Regulation UnFettered: The Fray By the Bay, Revisited (National Regulatory Research Institute Quarterly Bulletin, December 1997)
- The Feds Can Lead...By Getting Out of the Way (Public Utilities Fortnightly, June 1, 1996)
- Ethical Considerations Within Utility Regulation, w/M. Cummins (National Regulatory Research Institute Quarterly Bulletin, December 1993)
- Legal Challenges to Employee Participation Programs (American Bar Association, Atlanta, Georgia, August 1991) (unpublished)
- Proprietary Information, Confidentiality, and Regulation's Continuing Information Needs: A State Commissioner's Perspective (Washington Legal Foundation, July 1990)

Exhibit No.___(SMF-2)

Joint Statement of the American Gas Association and the Natural Resources Defense Council

Submitted to the National Association of Regulatory Utility Commissioners
July 2004

The American Gas Association (AGA) and the Natural Resources Defense Council (NRDC) recognize the many benefits of using clean-burning natural gas efficiently to provide high quality energy services in all sectors of the economy. This statement identifies ways to promote both economic and environmental progress by removing barriers to natural gas distribution companies' investments in urgently needed and cost-effective resources and infrastructure.

NRDC and AGA agree on the importance of state Public Utility Commissions' consideration of innovative programs that encourage increased total energy efficiency and conservation in ways that will align the interests of state regulators, natural gas utility company customers, utility shareholders, and other stakeholders. Cost-effective opportunities abound to improve the efficiency of buildings and equipment in ways that promote the interests of both individual customers and entire utility systems, while improving environmental quality. For example, when energy supply and delivery systems are under stress, even relatively modest reductions in use can yield significant additional cost savings for all customers by relieving strong upward pressures on short-term prices.

NRDC and AGA also encourage state Commissions to support gas distribution company efforts to manage volatility in energy prices and reduce volatility risks for customers.

The Energy Efficiency Problem: Regulated Natural Gas Utilities are Penalized for Aggressively Promoting Energy Efficiency

Local natural gas distribution companies (gas utilities) have very high fixed costs. These fixed costs include the costs of maintaining system safety and reliability throughout the year, staffing customer service telephone lines 24 hours a day and doing what it takes each day of the year to ensure the safe and reliable delivery of natural gas to homes, schools, hospitals, retailers, factories and other customers.

Natural gas utilities typically purchase natural gas on behalf of their customers, and pass through the cost without markup. This means that natural gas utilities do not profit from their acquisitions of natural gas to serve customer needs. The profit

(authorized level of rate of return) comes from the rates utilities charge for transporting the natural gas to customers' homes and businesses.

The vast majority of the non-commodity costs of running a gas distribution utility are fixed and do not vary significantly from month to month. However, traditional utility rates do not reflect this reality. Traditional utility rates are designed to capture most of approved revenue requirements for fixed costs through volumetric retail sales of natural gas, so that a utility can recover these costs fully only if its customers consume a certain minimum amount of natural gas (these amounts are normally calculated in rate cases and generally are based on what customers consumed in the past). Thus, many states' rate structures offer – quite unintentionally – a significant financial disincentive for natural gas utilities to aggressively encourage their customers to use less natural gas, such as by providing financial incentives and education to promote energy-efficiency and conservation techniques.

When customers use less natural gas, utility profitability almost always suffers, because recovery of fixed costs is reduced in proportion to the reduction in sales. Thus, conservation may prevent the utility from recovering its authorized fixed costs and earning its state-allowed rate of return. In this important respect, traditional utility rate practices fail to align the interests of utility shareholders with those of utility customers and society as a whole. This need not be the case. Public utility commissions should consider utility rate proposals and other innovative programs that reward utilities for encouraging conservation and managing customer bills to avoid certain negative impacts associated with colder-than-normal weather. There are a number of ways to do this, and NRDC and AGA join in supporting mechanisms that use modest automatic rate true-ups to ensure that a utility's opportunity to recover authorized fixed costs is not held hostage to fluctuations in retail gas sales.[1] We also support performance-based incentives designed to allow utilities to share in independently verified savings associated with cost-effective energy efficiency programs.

Many states' rate structures also place utilities at risk for variations in customer usage based on variations in weather from a normal pattern. This variation can be both positive and negative. Utilities' allowed rate of return is premised on the expectation that weather will be normal, on average, and that customer use of gas

[1]For example, in 2003 the Oregon Public Utility Commission approved a "conservation tariff" for Northwest Natural Gas Company (NW Natural) "to break the link between an energy utility's sales and its profitability, so that the utility can assist its customers with energy efficiency without conflict." The conservation tariff seeks to do that by using modest periodic rate adjustments to "decouple" recovery of the utility's authorized fixed costs from unexpected fluctuations in retail sales. *See* Oregon PUC Order No. 02-634, *Stipulation Adopting Northwest Natural Gas Company Application for Public Purpose Funding and Distribution Margin Normalization* (Sept. 12, 2003). In California, PG&E and other gas utilities have a long tradition of investment in energy efficiency services, including those targeting low-income households, and the PUC is now considering further expansion of these investments along with the creation of performance-based incentives tied to verified net savings. California also pioneered the use of modest periodic true-ups in rates to break the linkage between utilities' financial health and their retail gas sales, and has now restored this policy in the aftermath of an ill-fated industry restructuring experiment. Thus, in March 2004, Southwest Gas Company received an order that authorizes it to establish a margin tracker that will balance actual margin revenues to authorized levels.

will maintain a predictable pattern going forward. Proposals by utilities to decouple revenues from both conservation-induced usage changes and variations in weather from normal have sometimes been characterized as attempts to reduce utilities' risk of earning their authorized return. The result of these rate reforms, in this regulatory view, should be a lowered authorized return. But reducing authorized returns would penalize utilities for socially beneficial advocacy and action, including efforts to create mechanisms that minimize the volatility of customer bills.

Our shared objective is to give utilities real incentives to encourage conservation and energy efficiency. With properly designed programs, the benefits could be significant and widespread:

- Customers could save money by using less natural gas;
- Reduced overall use will help push down short-term prices at times when markets are under stress, reducing costs for all customers (whether or not they participate in the utility programs);
- Utilities would recover their costs and have a fair opportunity to earn their allowed return;
- State policies to encourage economic development could be enhanced by increased energy efficiency and lower business energy costs;
- State PUCs would be able to support larger state policy objectives as well as programs that reflect the public's desire to use energy efficiently and wisely.

In today's climate of rapidly changing natural gas prices, such reforms make good sense for consumers, shareholders, state governments, and the environment.

Natural Gas Consumers, Price Volatility and Resource Portfolio Management. Another area of concern shared by NRDC and AGA is the impact of natural gas price volatility on natural gas consumers, which can be exacerbated by limited diversification of utilities' resource portfolios. Today many of the nation's natural gas utilities find themselves relying on short-term markets for most of their gas needs, with either the encouragement or the acquiescence of their regulators. During much of the 1990's this approach was typically advantageous to consumers, as the market price of natural gas was generally low and did not fluctuate dramatically. As wholesale natural gas prices have risen since 2000 and become more volatile, however, many utilities and commissions are reconsidering this emphasis on short-term market purchases.

While purchasing practices based on short-term supply contracts may offer consumers relatively low-cost natural gas, those consumers are also exposed to more volatile prices and natural gas bills that may rise and fall unpredictably. Public Utility Commissions should favorably consider gas distribution company proposals to manage volatility, such as through hedging, fixed-price contracts of various durations, energy-efficiency improvements in customers' buildings and equipment, and other measures designed to provide greater certainty about both supply adequacy and price stability. Achieving these goals will sometimes require paying a premium over prevailing spot market prices. Like diversified investment portfolios that are designed to mitigate risk, prudent hedging plans should be encouraged as a way to help stabilize gas prices and ensure long-term access to affordable natural gas services.

Resolution on Gas and Electric Energy Efficiency

WHEREAS, The National Association of Regulatory Utility Commissioners (NARUC), at its July 2003 Summer Meetings, adopted a *Resolution on State Commission Responses to the Natural Gas Supply Situation* that encouraged State and Federal regulatory commissions to review and reconsider the level of support and incentives for existing gas and electric utility programs designed to promote and aggressively implement cost-effective conservation, energy efficiency, weatherization, and demand response in both gas and electricity markets; *and*

WHEREAS, The National Petroleum Council (NPC), in its September 25, 2003 report on *Balancing Natural Gas Policy – Fueling the Demands of a Growing Economy*, found that greater energy efficiency and conservation are vital near-term and long-term mechanisms for moderating price levels and reducing volatility and recommended all sectors of the economy work toward improving demand flexibility and efficiency; *and*

WHEREAS, The NPC, in its report, identified key elements of the effort to maintain and continue improvements in the efficient use of electricity and natural gas, including (but not limited to:

(i) enhanced and expanded public education programs for energy conservation, efficiency, and weatherization,

(ii) DOE identification of best practices utilized by States for low-income weatherization programs and to encourage nation-wide adoption of these practices,

(iii) a review and upgrade of the energy efficiency standards for buildings and appliances (to reflect current technology and relevant life-cycle cost analyses) to ensure these standards remain valid under potentially higher energy prices

(iv) promote the use of high-efficiency consumer products including advanced building materials, Energy Star appliances, energy "smart" metering and information control devices

(v) on-peak electricity conservation to minimize the use of gas-fired electric generating plants,

(vi) the use of combined-cycle gas-fired electric generating units instead of less-efficient gas-fired boilers, and

(vii) clear natural gas and power price signals; and

(viii) remove regulatory and rate structure incentives to inefficient use of natural gas and electricity; and

WHEREAS, The NARUC, at its November 2003 annual convention, adopted a *Resolution Adopting Natural Gas Information "Toolkit"* which encouraged the NARUC Natural Gas Task Force, to review (among other things) the findings and recommendations in the NPC report that have regulatory implications for State commissions for improving and promoting energy efficiency and conservation initiatives, including consumer outreach and education, review of regulatory throughput incentives; *and*

WHEREAS, The American Council for an Energy-Efficient Economy ("ACEEE"), in its December 2003 report on *Responding to the Natural Gas Crisis: America's Best Natural Gas Energy Efficiency Programs,* (i) identified States and utilities with programs that many would consider best practice or model programs for all types of natural gas customers and all principal natural gas end-use technologies, and (ii) found that these programs are concentrated in relatively few States and regions and could be expanded in other parts of the country to great benefit; *and*

WHEREAS, the National Resources Defense Council (NRDC), the American Gas Association (AGA) and the ACEEE have recently adopted a Joint Statement noting that traditional rate structures often act as disincentives for natural gas utilities to aggressively encourage their customers to use less gas. Therefore, the NRDC, AGA, and the ACEEE have urged public utility commissions to align the interests of consumers, utility shareholders, and society as a whole by encouraging conservation. Among the mechanisms supported by these groups are the use of automatic rate true-ups to ensure that a utility's opportunity to recover authorized fixed costs is not held hostage to fluctuations in retail gas sales; *now therefore be it*

RESOLVED, That the Board of Directors of the National Association of Regulatory Utility Commissioners (NARUC), convened in its 2004 Summer Meetings in Salt Lake City, Utah, encourages State commissions and other policy makers to support the expansion of natural gas energy efficiency programs and electric energy efficiency programs, including those designed to promote consumer education, weatherization, and the use of high-efficiency appliances, where economic, and to address regulatory incentives to address inefficient use of gas and electricity; *and be it further*

RESOLVED, That the Board of Directors of the NARUC, encourages State and Federal policy makers to: (i) review and upgrade the energy efficiency standards for buildings and appliances, where economic, to ensure these standards remain valid under potentially higher energy prices, and (ii) promote the use of high-efficiency consumer products, where economic, including advanced building materials, Energy Star appliances, and energy "smart" metering and information control devices; *and be it further*

RESOLVED, That Board of Directors of NARUC encourages State Commissions to review and consider the recommendations contained in the enclosed *Joint Statement of the American Gas Association, the Natural Resources Defense Council, and the American Council for an Energy-Efficient Economy; and be it further*

RESOLVED, That the Board of Directors of the NARUC recognizes that the best approach towards promoting gas energy efficiency programs and electric energy efficiency programs for any single utility, State or region may likely depend on local issues, preferences and conditions.

Sponsored by the NARUC Natural Gas Task Force, Committee on Gas, Committee on Consumer Affairs, Committee on Electricity, and Committee on Energy Resources and the Environment
Adopted by the NARUC Board of Directors July 14, 2004

Gieseking

Southwest Gas Corporation
Docket No. G-01551A-04-__

BEFORE THE ARIZONA CORPORATION COMMISSION

Prepared Direct Testimony
of
EDWARD B. GIESEKING

Q. 1 Please state your name and business address.

A. 1 My name is Edward B. Gieseking. My business address is 5241 Spring Mountain Road, Las Vegas, Nevada 89150-0002.

Q. 2 By whom are you employed and in what capacity?

A. 2 I am employed by Southwest Gas Corporation (Southwest or the Company) in the Pricing and Tariffs Department as Director/Pricing and Tariffs.

Q. 3 Please state your educational background and business experience.

A. 3 I received a Bachelor of Arts degree in Business Management from Sonoma State University in 1985 and a Master of Arts degree in Regulatory Economics from New Mexico State University in 1993.

From 1983 through 1993, I was employed by Pacific Gas and Electric Company in various capacities, including the position of Regulatory Analyst in the Revenue Requirements and Rates departments. My responsibilities as a Regulatory Analyst primarily involved the development of pricing structures and supporting rate requests before the California Public Utilities Commission.

In 1993, I began my career with Southwest as a Specialist in the Rates department. I was assigned responsibility for monitoring and participating in California regulatory activity and reporting impacts to Company management. In 1995 I was promoted to Senior Specialist in the Regulatory Affairs department and subsequently promoted to Manager of the department in 1998. In addition to the day-to-day management of the department, my responsibilities included the supervision of regulatory filings to ensure timely and accurate submittals, and serving as the Company liaison with state regulatory agency and state consumer advocate professionals.

In August 2002, I was promoted to the position of Senior Manager of the Pricing and Tariffs department and was subsequently promoted to my current position.

Q. 4 Please state briefly the nature of your present responsibilities and duties with Southwest.

A. 4 I report to the Vice President/Pricing and I am responsible for the development of rate design and tariff proposals for Southwest.

Q. 5 Have you previously testified before any regulatory commissions?

A. 5 Yes, I have testified before the Arizona Corporation Commission (Commission), the Public Utilities Commission of Nevada, and the California Public Utilities Commission.

SUMMARY

Q. 6 What is the purpose of your prepared direct testimony in this proceeding?

A. 6 I am the Company's rate design policy witness. I describe Southwest's rate design goals and explain how Southwest's proposed rate design will achieve those goals.

I am also sponsoring a proposal to implement a ratemaking mechanism to decouple Southwest's recovery of residential authorized non-gas revenue (margin) per customer from the level of sales. Southwest's residential rate design proposal is dependent on whether the Commission authorizes Southwest's residential margin decoupling proposal. Consequently, Southwest is presenting two residential rate design proposals. One proposal should be implemented in association with the proposed decoupling of margin from sales, and if the Commission does not authorize margin decoupling, an alternative proposal that recovers a greater amount of authorized margin from the basic service charge and first block commodity rate is proposed.

Q. 7 What is the overall objective of Southwest's rate design?

A. 7 Southwest's goal is to design rates that improve the Company's opportunity to realize the Commission-authorized margin level. This is accomplished by maximizing, to the extent possible given other rate design considerations, a movement toward cost-based pricing for its gas distribution services.

Q. 8 How does Southwest's existing rate design affect its ability to realize the Commission-authorized margin?

A. 8 To the extent that current rates are designed to recover a significant portion of Southwest's margin through commodity rate components, decreased sales associated with increased efficiency and conservation have prevented Southwest from recovering the Commission-authorized margin levels. This has hindered Southwest's ability to earn its authorized rate of return. In this rate case, Southwest is proposing implementation of a rate design aligned more closely with cost causation factors. This will provide Southwest with an increased opportunity to earn its authorized rate of return.

Q. 9 What relationship does the residential margin decoupling proposal have to Southwest's residential rate design proposal?

A. 9 Southwest's residential rate design proposal is dependent upon the Commission's approval of the residential margin decoupling mechanism. The proposed margin decoupling mechanism will accomplish Southwest's rate design objective of stabilizing margin recovery for the residential classes and allow a more gradual movement towards cost based rates for the residential classes.

Southwest recognizes that a movement to fully cost-based rates for residential customers might interfere with competing rate design considerations. Therefore, Southwest has developed a mechanism that will

accomplish the goal of stabilizing residential margin recovery while making a more gradual shift towards cost-based rates. This mechanism, referred to by Southwest as the Conservation Margin Tracker (CMT), will decouple Southwest's residential margin recovery from the volume of gas delivered in a given month and re-couple residential margin recovery to the number of customers served each month. The true-up of Southwest's actual margin recovery with the authorized per customer margin would lessen Southwest's need for a fully cost-based rate structure to recover its authorized margin.

Q. 10 Why is it appropriate to consider different rate design proposals contingent on the adoption of the CMT?

A. 10 If the Commission approves the proposed CMT, the need for residential margin stabilization through rate design is less urgent. As discussed in the testimonies of Southwest witnesses Messrs. Jeffrey W. Shaw, Theodore K. Wood and Robert A. Mashas, Southwest has been unable to attain its authorized rate of return over a considerable period of time. One of the primary contributing factors is that Southwest has not realized the Commission-authorized margin per customer for a number of general rate case cycles. Southwest has not recovered its authorized margin per customer because a significant portion of Southwest's margin recovery is dependent upon the gas sales volume, and Southwest has been experiencing a steady decline in average use per customer.

If Southwest is denied authority to address the problem of margin recovery through the proposed CMT, Southwest's rate design proposal that provides additional margin stabilization through greater movement toward cost of service rates should be considered.

RATE DESIGN

Q. 11 Why is the principle of cost-based pricing the focus of your rate design?

A. 11 Excluding the cost of gas, virtually all of Southwest's costs of service are "fixed" in nature and do not vary with changes in customer consumption. Because of the steady decline in consumption per customer, Southwest's current rate design has not provided the Company a reasonable opportunity to recover its distribution cost investment and related fixed costs of service. Southwest's proposed rate design, which more closely reflects the fixed nature of Southwest's costs, will provide a more reasonable opportunity for Southwest to recover its authorized margin and earn its authorized rate of return.

The cost of operating Southwest's gas distribution system is comparable, by way of analogy, to the cost associated with the ownership and operation of an automobile. When a consumer contemplates the purchase of an automobile, he or she knows that a large capital outlay will be required. The consumer must fund the fixed cost, whether or not the vehicle is driven one mile or

ten thousand miles. The customer also knows that there are other fixed costs of owning the vehicle, such as scheduled maintenance, insurance and taxes. What the consumer receives for this fixed cost of ownership is the availability of the automobile whenever it is needed. The consumer also knows there is a variable cost of ownership, i.e. the cost of gasoline, and the consumer takes this into consideration when deciding how and when to use the vehicle.

Similar to the concept that the fixed cost of automobile ownership is not a function of how many miles it is driven, Southwest's fixed cost of service is not dependent on how much natural gas is consumed. Southwest's proposed rate design recognizes that the Commission-authorized fixed costs of gas distribution service should be recovered from customers who have the availability of a safe and reliable gas distribution system.

Q. 12 Is there a conflict between conservation goals and your recommendation for a pricing structure that recovers more distribution costs in fixed charges and non-discretionary commodity components?

A. 12 No. Referring again to the automobile analogy, it has been demonstrated that increasing the variable cost of ownership, primarily gasoline prices, affects driving habits. Similarly, when natural gas commodity rates are set at or near the marginal cost of service, consumers

are provided a price signal that encourages the most efficient use of the resource. Even if none of Southwest's distribution costs were recovered in the commodity portion of Southwest's rates, the gas cost component of the commodity rate provides a significant incentive for customers to conserve.

Q. 13 Why doesn't the cost of gas distribution service decrease when gas consumption decreases?

A. 13 Unlike the electric industry, where a significant portion of the margin rate is composed of generation capacity costs, Southwest's gas margin rates only include the costs of distribution service (gas industry capacity costs are recovered as a component of gas cost rates on an equal-cents-per-therm commodity basis through the Purchased Gas Cost Adjustment mechanism). The majority of Southwest's non-gas costs are associated with the addition of customers to the distribution system, not the annual volume of gas consumed.

RESIDENTIAL GAS SERVICE RATE DESIGN

Q. 14 Please describe Southwest's proposed changes to the residential rate schedules.

A. 14 Southwest proposes changes to the residential rate schedules as follows: 1) that its current residential customer class be subdivided into single-family and multi-family classes; 2) that the first block volumes of the commodity rates for those schedules be set to capture approximately 50 percent of total seasonal volume;

3) that the low-income rate discount be incorporated into the residential schedules and the stand-alone low-income schedule be discontinued; and 4) that the Special Residential rate schedules for air-conditioning and electric generation be discontinued.

Q. 15 What is the purpose of subdividing the current residential rate schedule into single- and multi-family?

A. 15 Southwest has determined that there are considerable differences in the cost of service and consumption characteristics between these groups of residential customers. Establishing these classes will allow Southwest to more accurately establish rates that represent the cost of distribution service to these distinct groups.

Q. 16 Why has Southwest adjusted the first block volumes of the commodity rates?

A. 16 When rates were established in Southwest's last general rate case, the number of therms in the first block of residential commodity rates was set approximately equal to the arithmetic average seasonal use per customer. However, only 32 percent of residential customers' consumption exceeds the first block volume. Because a large number of customers' consumption does not exceed the first block volumes, there is a significant reduction in the margin stabilization that this rate design was intended to provide. Setting the first block volumes of the commodity rates for those schedules at a level that

captures approximately 50 percent of total seasonal volume creates a rate design that provides improved margin stabilization for Southwest and cold weather high bill mitigation for customers.

Q. 17 Why has Southwest proposed the change to the low-income residential gas service?

A. 17 Southwest has completed upgrades to its billing system that allows for the low income assistance discount to be calculated on each customer bill, eliminating the need to have a separate rate schedule for this customer class. Customers eligible for the rate discount will now have the total amount of their discount displayed on the bill.

Q. 18 Is Southwest proposing any other changes to the low income discount?

A. 18 Yes. Southwest is very concerned about the impact of a rate increase on financially disadvantaged customers. To mitigate the impact of a rate increase in this proceeding, Southwest proposes that the low income discount be adjusted such that eligible customers receive approximately 25 percent of the average residential rate increase. This mitigation has been accomplished by making adjustments to both the otherwise applicable residential basic service charge and the commodity rates.

Compared to the discount provided under the current Low Income Residential Gas Service rate schedule, eligible customers will receive a greater benefit. Under the current Low Income Residential Gas Service schedule,

customers receive a one-dollar discount on their basic service charge and a 20 percent discount on their commodity rates during the winter months on the first 150 therms. Southwest's proposed low-income rate retains the current low-income basic service charge of $7 and provides 15 percent discount on the commodity rates on all consumption year round.

The proposed discount recognizes that the cost to serve this customer segment has increased since rates were established in the last general rate case, but mitigates the impact of higher utility bills on eligible customers.

If Southwest's proposed increase in margin for the residential class is adjusted in this proceeding, Southwest recommends that the low-income commodity rate discount and low-income basic service charge be adjusted such that the margin increase to low-income customers results in low-income customers receiving approximately 25 percent of the average residential increase.

Q. 19 Why has Southwest discontinued the Special Residential Gas Service schedules?

A. 19 The only difference between the Residential Gas Service rate and the rates for these customers is a lower summer second block rate. This rate differential was designed to reflect expected off-peak use of these customer types and to provide Southwest with the opportunity to encourage off-peak consumption.

However, there are very few customers taking service under Schedule No. G-15, Special Residential Gas Service for Air-conditioning and currently no customers taking service under Schedule No. G-16, Special Residential Gas Service for Electric Generation. Furthermore, an analysis of the consumption characteristics of the few customers served under Schedule No. G-15 shows that there is little difference between these customers and other residential customers. Therefore, Southwest proposes to serve these groups under their otherwise applicable residential rate schedule.

Q. 20 What is the result of moving residential rates to reflect cost of service?

A. 20 Less margin is recovered in the second block commodity rate component. As a result, the basic service charge and the first block commodity rate increases.

Q. 21 You have previously explained the reason for Southwest's proposal for two residential rate designs. What are the similarities and differences between the alternative residential rate designs?

A. 21 Both partially decouple residential margin recovery from sales and re-couple margin recovery to the number of customers by moving to rates based on cost of service. Both proposals assign the same level of margin responsibility and, except for the level of the rates, contain the same tariff provisions. The only difference in the proposals is the extent to which they move toward

cost-based rates.

If the Commission approves the CMT, there is less need to stabilize margin recovery through rate design and, therefore, a more gradual adjustment in the current rate structure towards cost-based rates is appropriate. On the other hand, if the Commission does not authorize the CMT, the alternative rate design moves toward a cost-based structure more rapidly. Generally, a more rapid movement towards cost-based rates requires a greater percentage of cost recovery through fixed rate components and a corresponding reduction of cost recovery through usage sensitive rate components.

Q. 22 How does Southwest's request impact residential customers?

A. 22 If the Commission adopts the rate design that Southwest proposes in conjunction with the CMT, the single-family average summer bill would increase $5.09 and the average winter bill would increase $10.33. The multi-family average summer bill would increase $4.41 and the average winter bill would increase $6.81.

If the Commission adopts Southwest's alternative rate design, the single-family average summer bill would increase $6.86 and the average winter bill would increase $6.38. The multi-family average summer bill would increase $5.66 and the average winter bill would increase $5.40.

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GENERAL GAS SERVICE RATE DESIGN

Q. 23 What are Southwest's proposed changes to the general gas service rate schedules?

A. 23 Southwest is proposing an expansion of the general service sub-classes from three to four, and a realignment of the customers by annual consumption as shown in the following table.

Present Rate Schedule	Proposed Rate Schedule
Sm. General (0 - 7,200)	Sm. General (0 - 600)
	Med. General (601 - 7,200)
Med. General (7,201 - 180,000)	Lg. General (7,201 - 180,000)
Lg. General (7,201 - 180,000)	Transportation Eligible (TE) (over 180,000)

Southwest has also revised the billing determinant calculation for the Transportation Eligible General Gas Service customers.

Q. 24 Why has Southwest expanded the general service classes?

A. 24 Approximately 50 percent of the current Small General Gas Service customers use less than 600 therms per year, yet account for less than eight percent of the customer class total annual usage. The disparity in customer size between these smallest of the small and the remaining Small General Gas Service customers was an obstacle to adjusting rates to more closely reflect Southwest's fixed cost of providing service. For that reason, Southwest separated the current Small General Gas Service customers into small and medium classes.

Q. 25 What is the reason for the change in the demand billing determinant calculation?

A. 25 Southwest's current Large General Gas Service rate schedule features a three-part rate structure with approximately 50 percent of the customer class margin recovered through the demand component of the rate structure. An individual customer's monthly demand charge is equal to the product of the demand charge rate multiplied by each customer's coincident peak throughput during the month in which the utility's peak demand is established. This pricing structure is inconsistent with cost of service pricing.

To be consistent with cost of service pricing, these customers' demand billing should be determined on each customer's non-coincident peak throughput.

Q. 26 Why is a non-coincident demand rate more consistent with cost of service pricing?

A. 26 Unlike a gas transmission system, which is generally linear and must be sized to meet the coincident demand of its users, the distribution system is networked and portions of it may reach peak demand when other portions have unused capacity. This is recognized in Southwest's class cost of service study through the allocation of the demand portion of distribution mains on non-coincident peak volumes.

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OTHER RATE DESIGN AND TARIFF CHANGES

Q. 27 What other rate design and tariff changes is Southwest proposing in this filing?

A. 27 Southwest is proposing to: 1) establish a basic service charge for Air-Conditioning Gas Service, rather than charging the otherwise applicable basic service charge; 2) modify the applicability of Schedule No. G-60, Cogeneration Gas Service, to include all electric generation service and change the schedule name to Electric Generation Gas Service; 3) adjust the Service Establishment and Returned Item charges to reflect current costs; 4) incorporate language on Sheet No. 13 describing Southwest's pricing for transportation service and cancel Sheet No. 14, Effective Transportation Rates Applicable to Arizona Schedules; 5) close Schedule No. G-75, Small Essential Agricultural User Gas Service, to new customers, and reclassify current customers to the applicable general service schedule where it benefits the customer; 6) close Schedule No. G-35, Gas Service to Armed Forces, and reclassify current customers to the applicable general service schedule; and 7) make miscellaneous changes to Southwest's Rules to reflect proposed changes in rate schedules and conform Southwest's Arizona Gas Tariff language to current business practice.

Southwest witness A. Brooks Congdon describes these changes and the calculation of rates in his direct testimony.

CONSERVATION MARGIN TRACKER (CMT)

Q. 28 You have previously discussed Southwest's goal of decoupling residential margin recovery from sales. How can this be accomplished?

A. 28 One approach would be to use a straight-fixed-variable (SFV) rate design where fixed demand and customer-related costs are recovered from customers through fixed monthly charges and variable costs are recovered through a volumetric charge. Although this type of rate design is commonly employed by the Federal Energy Regulatory Commission in the setting of rates for natural gas interstate transmission pipelines, it is not widely used to establish local distribution rates. The State of Georgia is the only state that I am currently aware of that has adopted such a rate design. Georgia adopted this rate design in conjunction with its transition to retail competition.

Another approach, the one proposed by Southwest in this filing and previously identified as the Conservation Margin Tracker or CMT, is the establishment of a balancing account that balances actual billed residential margin per customer with the Commission-authorized residential margin per customer. The difference between the authorized margin per customer and the actual amount billed per customer will be recorded in a balancing account and any over-recoveries or under-recoveries will be returned to or recovered from customers through a rate true-up.

The mechanics of the CMT are described in the proposed tariff sheets filed as part of Southwest's Application.

Q. 29 Why has Southwest proposed the CMT over SFV rate design as a means to margin stabilization?

A. 29 Under full SFV rate design, where the annual fixed costs of service are recovered in equal monthly amounts, residential customers would be subject to a monthly charge of $27. Although simple to administer, Southwest recognizes that competing rate design objectives, such as rate change gradualism, limit the ability to adjust residential fixed charges to this degree. As such, Southwest researched the regulatory literature for an alternative methodology that would decouple margin recovery from sales and allow a more gradual movement toward cost-based rates.

Q. 30 What goals did Southwest set out to achieve with the CMT?

A. 30 Southwest identified two primary objectives it wanted its decoupling proposal to accomplish: (1) balance the interest of customers and shareholders by protecting customers from margin over-recovery and Southwest from margin under-recovery due to differences between adopted test year consumption per customer and actual consumption per customer; and (2) remove the inherent utility disincentive to promote energy efficiency and conservation.

Q. 31 How will the CMT achieve the objective of balancing the interest of customers and shareholders?

A. 31 The CMT will balance the interest of customers and shareholders by returning to customers any amounts received by the Company in excess of the authorized margin per customer or recover from customers amounts received that are less than the authorized margin per customer. As discussed in the testimony of Southwest witness Frank J. Hanley, Southwest has recognized the reduction in margin recovery risk through a decrease in the equity component of its proposed cost of capital.

Exhibit No.___(RAM-1), attached to the testimony of Mr. Mashas, shows that Southwest has been able to earn the Commission-authorized rate of return only one year (1998) for the period 1994 to present. It also shows what effect the CMT would have had on the rate of return if it had been in place over this period. Even though the CMT would have had a positive effect, Southwest still would not have achieved its authorized return. In fact, in the one year in which Southwest exceeded its rate of return, the CMT would have resulted in a return of over-recovered margin to customers and a resulting reduction in its realized rate of return.

Q. 32 How will the CMT achieve the objective of reducing disincentives to promote energy efficiency and conservation?

A. 32 The majority of the cost Southwest incurs in the provision of distribution service is incurred as a result of providing customers the availability of safe and

reliable natural gas service. These costs change very little with increases or decreases in customer consumption. When Southwest's costs are recovered in a volumetric pricing structure, Southwest's ability to recover its authorized margin per customer is dependent upon it realizing the sales volume per customer used in the development of rates.

As such, the incentive provided Southwest under this ratemaking scenario is to make every effort to retain the test period consumption levels; lower consumption results in lower margin, which contributes to a lower rate of return. The CMT will eliminate the shareholder penalty that has historically been associated with conservation and remove the inherent disincentive to promote energy efficiency.

Q. 33 Is Southwest active in the promotion of energy efficiency?

A. 33 Yes. In addition to the current Commission-authorized Demand Side Management (DSM) programs discussed by Southwest witness Vivian E. Scott in her prepared direct testimony, Southwest provides a steady stream of conservation and energy efficiency messages to its customers. Attached to my testimony is a sampling of the information Southwest distributes to the community. In the *News to Use* and *Easy Ways to Save Money* publications, periodically provided to customers in their bill statement, Southwest provides conservation tips prior to

each winter heating season.

In partnership with appliance manufacturers who offer rebates for the purchase of Energy Star-rated natural gas appliances, Southwest provides retailers with the rebate information that customers need to claim their rebates. Appliance rebate information is also provided through Southwest's Energy Services phone line or the Southwest Web site, www.swgas.com.

Southwest's Energy Services specialists receive approximately 60,000 calls each year, many concerning customer requests for information on energy efficiency. As a result, customers are provided with detailed energy conservation information, including the *Homeowner's Guide to Weatherization* and *Energy Savers Tips on Saving Energy & Money at Home*.

Q. 34 In your opinion, have these programs contributed to the declining average use?

A. 34 Yes. Southwest's average residential consumption per customer has steadily declined. Southwest firmly believes in the efficient use of natural gas and believes its conservation programs have contributed to those efforts. This is a further reason why the approval of Southwest's proposed CMT is appropriate.

Q. 35 What are the expectations for additional conservation subsequent to establishing rates in this proceeding?

A. 35 Southwest is requesting a substantial expansion to its current budget for purposes of funding expanded

conservation and energy efficiency programs. To the extent the Commission finds these programs in the interest of Southwest's customers and authorizes the funding request, these programs are expected to have a continued and increasing impact on declining average consumption per customer.

It would be unfair to expect Southwest to implement programs that have the potential for increased reductions in margin without some type of margin erosion protection such as the proposed CMT.

Q. 36 Has the concept of a margin true-up been addressed in a prior Commission proceeding?

A. 36 Yes. In Southwest's last general rate case it was suggested that one of the ways for Southwest to reduce variability in its revenue stream due to weather and changes in consumption would be to incorporate a mechanism that decouples margin recovery from sales. In particular, the recommendation was for the Commission to consider the concept of a balancing account to protect against fluctuations in margin due to weather and conservation.

Q. 37 Has there been any recent support for the concept of margin true-ups?

A. 37 Yes. At their recent summer meetings, the National Association of Regulatory Utility Commissioners issued a resolution urging state regulatory commissions to consider regulatory structures, like a margin true-up,

that would ensure that a utility's ability to recover its authorized fixed costs was not dependent upon the level of sales. The CMT will accomplish this.

Q. 38 Will the CMT guarantee Southwest's profitability?

A. 38 No. Southwest's profitability will continue to be dependent upon the difference between the authorized margin per customer and expenses incurred to provide service. The CMT will continue to provide incentive for Southwest to operate efficiently and operating efficiencies will continue to be reflected in Southwest's rates.

Q. 39 Will the adoption of the CMT affect the traditional rate case process?

A. 39 No.

Q. 40 Does this conclude your prepared direct testimony?

A. 40 Yes, it does.

Condon

Exhibit No.____(EBG-1)

HOMEOWNER'S GUIDE TO WEATHERIZATION

Start Smart.

Making the right choices for your home

START SMART BY WEATHERIZING YOUR HOME

The cold of winter and heat of summer can rob your home of comfort and increase the cost of your utility bills.

Whether you own or rent a house, apartment or manufactured home, weatherizing or weatherproofing can make a big difference. A small investment of time and supplies can add up to big savings and make your living space more comfortable, too.

Preparing your home for hot or cold weather offers three major benefits:

- Makes your home more comfortable by eliminating drafts and leaks
- Reduces utility costs for heating and cooling your home
- Helps conserve our precious energy resources

This booklet, created by **The Energy Specialists** at Southwest Gas, is a brief overview of weatherization information on the most often requested topics. Because there are so many variables in individual dwellings, specific questions about your particular home or requests for more detailed information should be referred to your state energy office. To learn how to contact them, call **The Energy Specialists** at 1-800-654-2765.

With all products purchased and installed, be sure to follow the manufacturer's recommendations and instructions carefully.

SOUTHWEST GAS
Right from the Start.®

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AIR LOSS OR GAIN IN YOUR HOME

The uncontrolled movement of air into and out of your house through cracks, around windows, doors, outlets, vents and other openings on the outside walls can cause your home's cooling and heating system to work harder than it should. This air movement can be caused by wind and differences in interior and exterior temperatures.

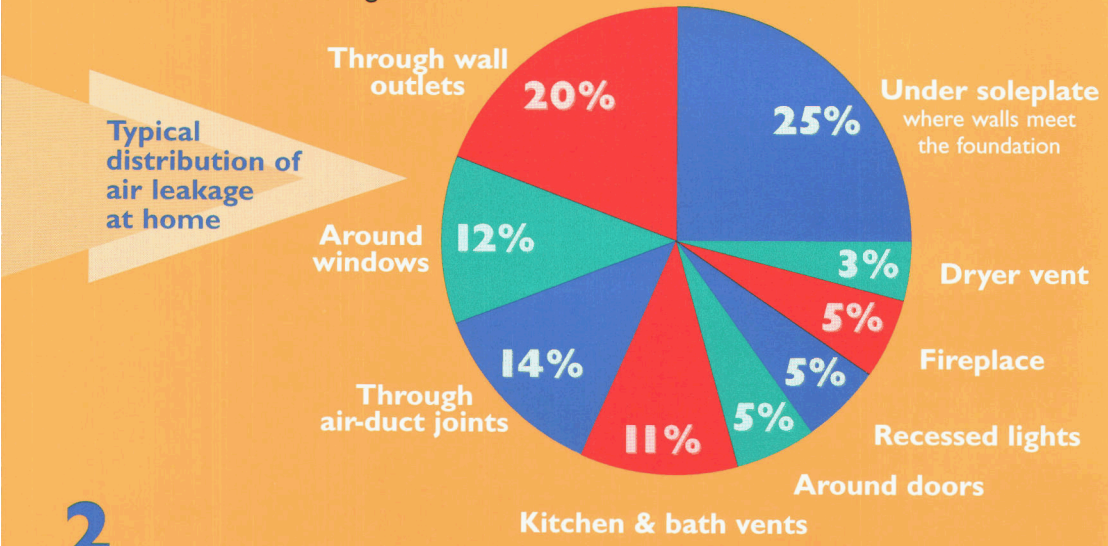
Some basic definitions you should know:

- ***Air Gain*** = Movement of air from the outside to the inside of your home.
- ***Air Loss*** = Movement of air from the inside to the outside of your home.

Good insulation is not enough. Even a home with adequate wall and ceiling insulation can suffer year-round from air loss and gain. For example, in the summer the cool air inside your home can escape (or leak) to the outside. In the winter, cool air may enter your home, displacing the comfortable warm air your heating system worked hard to supply.

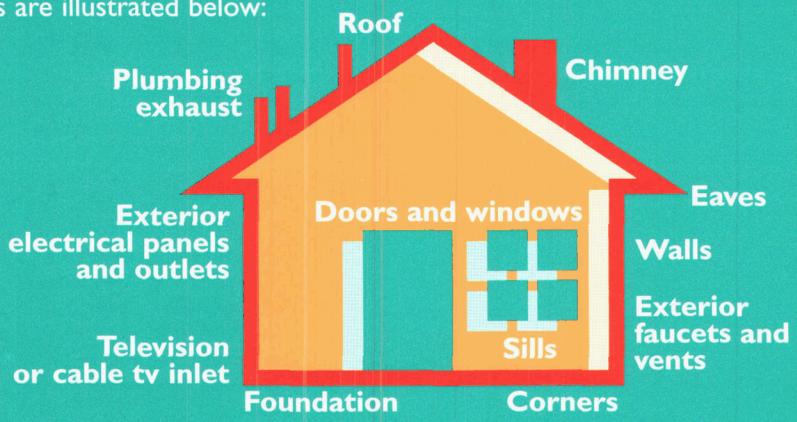
The location and amount of air loss or gain in your home will depend on several factors, including: age of your home, placement of your home on the lot, type of construction, amount and type of insulation, duct losses and outside environment.

In dollars and cents… you may be paying much more on your utility bills because of air loss or gain!



WHERE DOES AIR LOSS OR GAIN OCCUR?

Typically there are two categories of air loss or gain (leaks) in your home, ***DIRECT*** and ***INDIRECT***. ***Direct*** air leaks are caused when air can pass directly through your home's walls or ceiling. Common sources of direct air leaks are illustrated below:



Indirect air leaks refer to areas in your home that are not connected to an outside wall. For example, interior partitions or walls, stairwells, interior holes drilled for electrical wiring or outlets, or under your sink where pipes enter an interior wall.

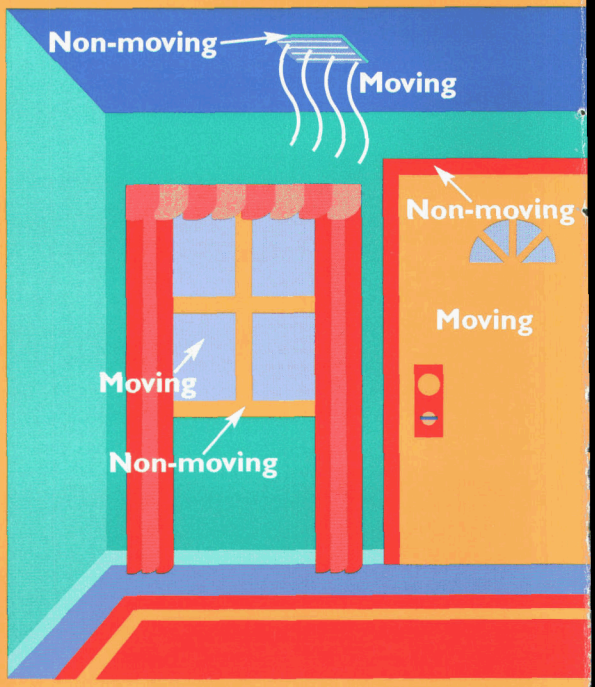
As your home grows older, its weight can cause the foundation to shift and settle. Doors and windows that were once airtight may begin to leak. Ceilings and walls may develop cracks, and corners or joints may pull apart. As a result of settling, air leaks can occur through cracks in stucco, bricks, mortar or siding. Even your chimney and fireplace can pull away from the walls or roof.

Common sources of air leaks:

- Improperly installed or adjusted doors
- Broken windows
- Holes in exterior walls
- Aged, weathered or termite-infested wood
- Large cracks in stucco or foundation
- Missing bricks or mortar

GIVE YOUR HOME A THOROUGH INSPECTION

Most signs of settling can be found by taking a careful look at your home both inside and out. Be sure to check in all corners. An easy way to start is to check for leaks where a moving part comes into contact with a non-moving part; for example, the entrance panel to your attic.



Testing for air leaks around doors and windows

Leaks are most commonly found around doors and windows. Here are three simple tests that will detect any air loss or gain through leaks in these areas.

TEST 1: *Place a crisp dollar bill or piece of paper between the door and the door frame (jamb) or between the window sash and frame (sill). With the door or window closed, try to pull out the dollar bill. If it slides out easily, there's a good chance your home is losing energy.*

TEST 2: *At night, have someone stand outside your door. Shine a flashlight around the edges of the door. If light can be seen on the other side, your door does not have an air-tight seal and you may be losing energy.*

TEST 3: *This test works best on cold or windy days. Stand on the inside of your door. Moisten your hand and pass it around the edges of your door and windows. Wherever you feel a draft, air can pass in and out of your home.*

Some good news… if you detect drafts around your doors or windows there are several easy weatherization repairs you can do yourself, so read on!

ABOUT CAULKING

Caulking is an excellent way to seal cracks and small openings. This widely-used sealing compound is available in these forms:

- Small and medium-sized tubes
- Simple-to-use rope form
- Large cartridges for use in caulking guns

Types of Caulking Materials

Choosing the right caulking material for the job at hand requires some thought, as there are a wide variety available, such as:

Oil-Based & Resin-Based Caulks — These low performance caulks last about two years and bond well to most surfaces.

Latex Caulks — Latex caulks will last from three to ten years and are excellent for light-duty work. They bond to most surfaces, but should not be used to seal concrete or metal surfaces.

Butyl Caulks — Butyl caulks are designed to last four to ten years. Butyl caulks are the most difficult to apply, but will adhere to almost any building material.

Polysulfides, Polyurethane and Silicone Caulks — These caulking materials are the most flexible, as they bond easily to most surfaces. Extremely durable, these high performance caulks work very well around joints that receive mild shock or movement, such as doors and windows. They are designed to last for 15 to 20 years.

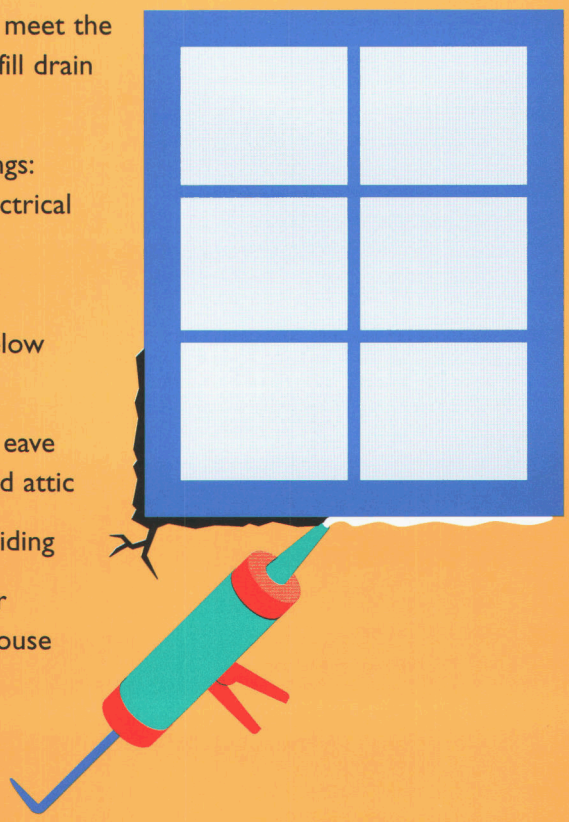
Products may vary. Please read directions for proper selection and application.

Specialty Caulks & Fillers — There are several products on the market that are designed to fill larger cracks and holes, offering an alternative to tube or cartridge caulk:

- Caulking Cotton
- Fiberglass
- Plastic Pressurized Foams
- Rope Caulk
- Sponge Rubber

IMPORTANT AREAS TO CAULK

- Between window & door frames and exterior siding or stucco, etc.
- Under doors & window sills where wood structures meet the foundation
- Where storm windows meet the window frame (do not fill drain holes at window sill)
- Around exterior openings: pipes, water faucets, electrical wiring & conduit
- Where pipes & wires penetrate the ceiling below an unheated attic
- Where a wall meets an eave at gable ends in a heated attic
- At corners formed by siding
- Between porch, deck or balcony and the main house



INSULATING SWITCH & OUTLET PLATES

Air loss or gain can happen in unlikely places, like around electrical outlets and light switch plates. As much as 20 percent of heat loss in your home can occur through switch plates and outlets. Foam insulating gaskets are an inexpensive fix. These pre-cut gaskets can be purchased in packaged quantities from most hardware or home improvement stores, and install easily behind outlets and switch plates.

It is important to use gaskets on outlets and switch plates that are found on a wall adjacent to the exterior of your home. If your home is older (10+ years), weatherization experts recommend you use gaskets on interior walls as well. While you're at it, child-proofing plugs are recommended for outlets that are unused. After installing gaskets, caulk any areas around switch plates and outlets that show gaps or may not be flush with the wall.

Tips on Installing Gaskets

- Count the number of gaskets you will need before purchasing
- Turn off electricity at the circuit breaker
- Work on one room or area at a time, removing screws that hold the outlet or switch plates
- Place the insulating gasket behind the outlet or switch plate
- Reinsert screws (Be careful not to over-tighten, as plates may crack.)
- When finished, turn the power back on

Caution: Do not install if your home has aluminum wiring.

WEATHER-STRIPPING YOUR HOME

If you find air leaks around your windows or doors, weather-stripping may be an excellent way to solve the problem. Weather-stripping is usually purchased in prepackaged units or by the foot. Special window weather-stripping kits are also available.

Types of Weather-Stripping

Weather-stripping is available in a wide array of choices. Take a careful inventory of your home's needs and compare with this basic overview:

Adhesive-Backed Foam

- Adhesive-backed foam weather-stripping is extremely easy to install.
- Non-moving window frames are an ideal place for this product.

V-Shaped Adhesive-Backed Foam

- V-shaped plastic strips are a newer form of weather-stripping. Similar to spring metal weather-stripping, this product is easy to install.

Spring Metal

- This type of weather-stripping, made of thin spring metal, is good for double-hung windows and some doors.

Door & Threshold Sweep

If your door does not have a threshold, a sweep is an excellent choice. Sweeps install at the bottom of your door and seal gaps. They are durable and made with several combinations of materials. Typical sweeps are made of metal, aluminum or plastic with a rubber or soft plastic edge.

Door Threshold

A vinyl bulb threshold is useful if you do not have a threshold or if the wooden gasket on your threshold is worn out. (*Note: Most wooden threshold gaskets can be adjusted up or down with the turn of a screwdriver. Be sure to check on this possibility before investing in a new gasket or threshold kit.*)

Door Shoe Assembly

Located on the underside of your door, a door shoe has a floating gasket seal that fits into a metal bracket. It is designed to make contact with your door's threshold gasket. Installing a new door shoe or gasket seal may eliminate air leaks. If you choose to install a new shoe assembly, the bottom of your door may need to be cut to accommodate the new size.

Tips on Weather-Stripping

- Locate the air leaks you want to seal with weather-stripping
- Determine the type of weather-stripping you will need
- With a tape measure estimate the amount of material you will need
- Buy 10-15% more weather-stripping than your measurements to allow for waste
- Gather the tools you will need to do the job (tape measure, screwdriver, hammer & nails, heavy-duty staple gun, heavy-duty shears or utility knife & tin snips)
- Follow the installation instructions that come with weather-stripping materials
- Allow plenty of time to do the job right
- Always work safely

ABOUT YOUR HOME'S INSULATION

Although you never see it, insulation is your primary defense against air loss or gain. Insulation is found inside your walls and above your ceiling, and is a permanent way to reduce energy use and make your home comfortable. It is typically installed during the construction of your home… so, adding insulation after your house is completed is very difficult and expensive. If your home is relatively new, don't worry: insulation is required to meet specific building codes. If your home is older AND if your energy utility bills are excessively high, your home may not have been constructed with insulation or with sufficient insulation.

An easy way to check is to remove an outlet or switch plate located on a wall adjacent to the exterior of your home and peer into the wall cavity. If you find your home is not insulated, start your weatherization process by caulking, using gaskets and sealing windows and doors FIRST. See how much of a difference these steps make before you make a major investment in adding wall and ceiling insulation.

What Does Insulation Do?

Insulation blocks the transfer of heat, which travels from areas of higher temperature to lower temperature. In cold months, valuable heated air can be lost from your living space to the outdoors through surfaces such as windows, doors, walls and ceilings. Insulation reduces these losses by creating an extra barrier to heat flow. During the hot summer months, outside heat can enter your home through the same surfaces. Simply put, a well insulated house will stay cooler in the summer and warmer in the winter.

Types of Insulation

R-value refers to the ability of any material to resist conducting heat. The effectiveness of insulation is measured by its R-value. The higher (greater) the R-value, the more heat-resistant the insulation is… the better it insulates your home. Generally, R-values range from R-11 to R-38.

Depending on where you live, the age and type of construction of your home, chances are, your home was built using one of more of these types of insulation:

Batts & Blanket Insulation

This type of insulation is usually made of fiberglass, rock wool, cellulose or vermiculite and is available in rolls or long pieces. It is commonly used in hard-to-fit places with irregular joist spacing. The R-value of this type of insulation varies with the type of construction used when your home was built.

Cellulose Insulation

This type of insulation can be added to an existing home's un-insulated walls or attic by a contractor. A special machine mixes cellulose insulation and forces it through a hose. An operator blows the insulation inside your walls. As the insulation exits the hose, glue is added to keep the insulation from sinking to the bottom of the wall cavity.

Rigid Board Insulation

Urethane, polystyrene, fiberglass and polyisocyanurate are typical types of rigid board insulation which are used to insulate walls.

More About Insulation...

- All wall insulation in your home must be covered with 5/8-inch gypsum wallboard to ensure fire-resistance.
- If your ceiling is not insulated, it may be cost-effective to install batt insulation with an R-30 value. If your ceiling is already insulated, it may not be cost-effective to install additional insulation.
- Adding more insulation will not always save you energy. For example, adding twice the insulation will not save you twice the money. Each additional layer has a declining benefit.
- Moisture can greatly reduce the effectiveness of insulation. In cold, wet climates, add a moisture barrier (such as foil) before installing insulation. Also, check for roof leaks and make any necessary repairs before installing insulation in your attic.

DUCT INSULATION

Your home's HVAC (Heating, Ventilation and Air Conditioning) system is designed with an intricate network of ducts that efficiently distribute air inside of your home. Exposed ducts in your attic, garage or any other non-cooled or unheated space should be insulated. Recent studies show that up to 40 percent of your home's heating and cooling can be lost due to leaking air ducts.

Usually available in blankets, the thickness of duct insulation varies from one-inch to two-inches. If your system is used to cool your home, be sure to buy insulation that has a vapor barrier. The vapor barrier should be installed away from the duct. If any joints in your ducts show gaps, cover tightly with mastic tape made for this purpose. Other leaks in the ducts can be sealed with silicone-latex caulk. Be sure to use mastic tape or caulk before installing duct insulation blankets.

ATTIC VENTILATION

Extreme heat can easily build up in an attic or crawl space that is not properly ventilated. This cancels out some of the benefits of insulation and substantially increases heat gain. Improper attic ventilation also promotes moisture build-up.

Homes are usually built with adequate vents positioned to let off heat. Inspect your attic or crawl space to make sure nothing is blocking side or top vents. An unventilated attic could reach a temperature of 160°F and above!

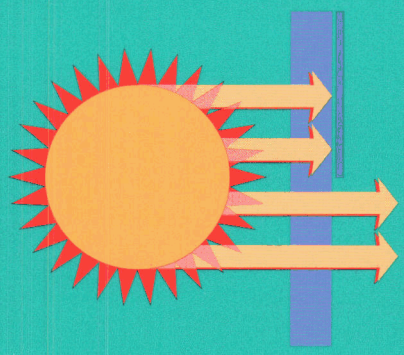
HOW YOUR WINDOWS WORK

Understanding how energy flows through windows will help explain how windows affect heating and cooling costs. To help you understand more about windows and how they conduct heat, there are three basic terms to know:

Sunlight or solar radiation is an important source of heat that is transmitted directly through windows.

Radiant heat is transferred from warmer objects to colder objects. Things warmed by sunlight are stronger sources of radiant heat. Radiant heat is blocked by glazing found on most windows.

Conduction is the process of heat transfer through contact. Heat conducts from the warmer to the cooler side of a window. Conduction happens through solid materials (window glass and frame), and also through the air space between the two layers of glass (dual pane window).



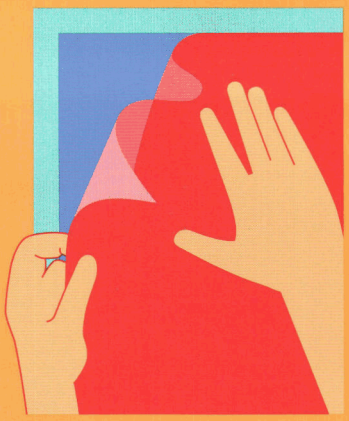
Insulating Windows

All windows are assigned a **U-value** which is based on the amount of heat that is transmitted through the window due to temperature differences. The smaller the U-value, the less heat is transmitted. Your windows are more energy efficient if they have a small U-value. (EXAMPLE: U= 0.87 is less efficient than U=0.54)

There are several ways you can limit the sunlight and heat from entering your home, greatly increasing your windows' performance and your comfort. Here are some alternatives to consider:

Inside

Often referred to as window tinting, insulating windows from the inside with special film is one of the most popular choices.



Shrink Film Insulation

This long-term method of window insulation is much like the window tinting you may have installed on your vehicle windows. It is available in many sizes, colors and performance ratings. With window film, the higher the performance rating, the better the film will block sunlight and heat. For example, a film with a 90 rating will perform better than one with a 70 rating. Although film is removable, it should be considered a permanent addition to your windows. Shrink window film can be purchased in complete kits or in individual rolls.

Reusable Indoor Window Film

The advantage of this film or vinyl sheeting is that it is easy to remove from windows. It is installed with weather-seal tape or self-adhesive channels and press-in retainer strips.

Outside

If you'd prefer to insulate your windows from the outside, there are several ways to go.

Stretch Film Insulation Kits

Available in kits, a crystal clear film is stretched into place, tight and wrinkle-free and adheres to your window frame using double-face tape. (Recommended for ground floor windows only.)

Solar Screens

Especially popular in the hot southwest climate, solar screens are chosen by many homeowners. They are custom fit to each window. Available in several colors and styles, they are extremely effective for blocking heat. Solar screen contractors can manufacture and install these screens for you. In addition, you may do it yourself by purchasing kits from home improvement stores.

SHADING

The concept of "shading" is one of the most effective ways of blocking sun light and heat from entering your home while adding some unique landscaping. Simply put, shading allows you to stop sunlight before it reaches the exterior of your home. Effective shading can reduce up to 40 percent of all heat gain in your home through windows, walls and ceiling.

Effective Ways to Block the Sun

Trees

Plant trees in locations where the sun is the strongest (south, east and west facing walls). Deciduous trees are a good choice because they shed their leaves in the winter, allowing sunlight to enter and help warm your home. They also provide excellent shade in the hot months of summer when in full bloom.

Trellises

Installing a trellis covered with climbing plants is an inexpensive, effective and decorative way of shading. It should be placed on south, east and west facing locations, about 12 to 18 inches from your exterior wall.

10 EASY WAYS TO SAVE ON YOUR UTILITY BILLS

1) *Adjust your thermostat or use automatic set-backs.*

Just a few degrees in temperature can make a big difference in the amount of energy you use. Set your thermostat at 66°F to 70°F in the winter and 76°F to 78°F in the summer and notice the savings.

2) *Make temperature changes gradually.*

Give your body time to adjust by making temperature changes at your thermostat 1°F or 2°F per week.

3) *Check filters regularly.*

Each month when you receive your utility bills, change your HVAC system air filters. Dirty or clogged filters waste energy and make your system work harder than necessary.

4) *Keep window coverings closed in summer.*

If shading is not possible, be sure to close your drapes, shutters or blinds to help prevent excessive heating inside your home.

5) *Let Mother Nature help.*

When it is cold outside, open your window coverings and take advantage of the sun's warmth. Be sure to close window coverings before the sun goes down to keep the heat in.

6) *Carefully observe.*

Take the advice of this guide and carefully assess your home. Look for cracks and gaps in walls, ceiling, around windows and doors. Weather-strip and caulk as needed. Check for insulation in walls and install outlet and switch plate insulating gaskets. Check all accessible air ducts for leaks. Use a good quality mastic and caulk to seal leaks and install insulating blankets.

7) *Dress for the weather.*

Match your clothing to your thermometer reading. This will save energy and increase your comfort. Wear light, loose fitting clothes in the summer and layered clothing in the winter.

8) *Use household appliances wisely.*

Make sure you have a "full load" when using your dishwasher or washing machine. Try cool and cold water laundry detergents, and if you have a smaller load, make sure to set the water level accordingly.

9) *Use a little common sense in the kitchen.*

Give some thought to how you use your appliances. Select burners that match your pan sizes. Don't use the oven if your toaster will do the job. When warming food use your microwave, or group several food items when using your oven.

10) *Turn it off.*

Be careful to use appliances only when necessary. For example, if no one is watching your TV, turn it off. Turn off lights in unoccupied rooms and when your clothes are dry… turn your dryer off.
You can do lots to cut your energy costs by remembering to "turn it off."

ENERGY ECONOMICS

The economics of your improvements (or pay back on investment) will depend on several factors including: where you live, how large your home is, and how much you pay for energy. Most of the techniques in this guide will pay for themselves in five years or less. Do-it-yourself energy improvements pay for themselves very quickly because the cost of paying someone else for labor is eliminated. So have fun weatherizing your home, always read the manufacturer's instructions and work safely!

FOR MORE INFORMATION

If you have any questions about weatherizing your home, or should you need assistance with your heating or cooling system, Southwest Gas can recommend licensed, qualified professionals who can help.

Call
The Energy Specialists
at Southwest Gas

1-800-654-2765

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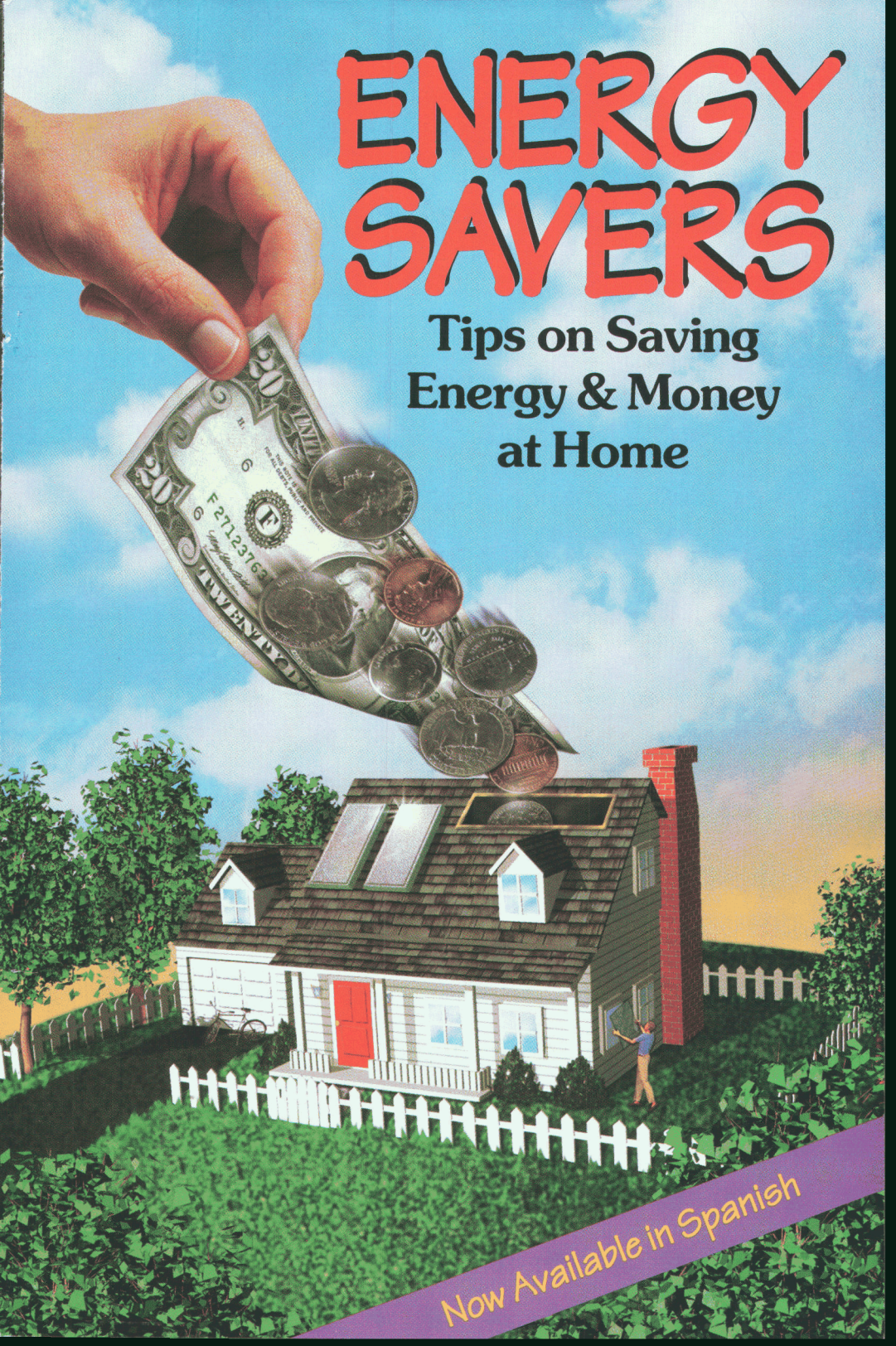
ENERGY SAVERS

Tips on Saving Energy & Money at Home



Now Available in Spanish

The U.S. Department of Energy works to ensure secure, reliable, and affordable energy supplies that support a growing economy and protect the environment. Energy efficiency improvements and tips are easy ways for Americans to help preserve our global environment, reduce air pollution, and conserve our natural resources for future generations to come.

By making just a few energy-efficiency improvements outlined in this Energy Savers booklet, you can make your home more comfortable and yield long-term financial rewards. For example, you can save up 10 to 50 percent on your energy bills, increase the resale value of your home, and qualify for energy-efficiency mortgages.

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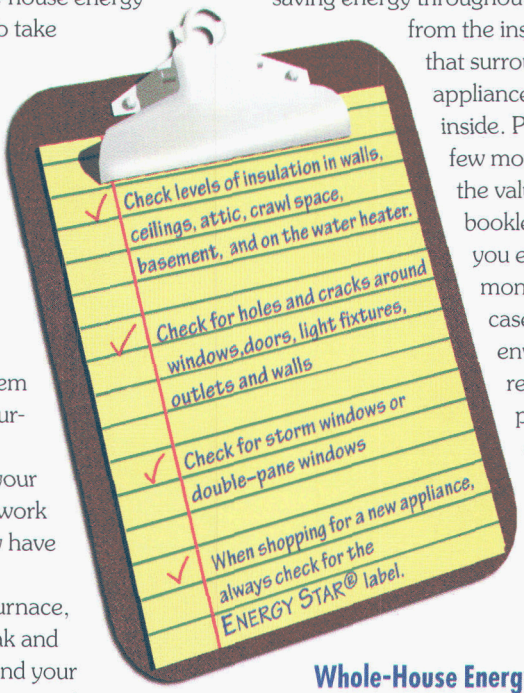
To learn more about DOE programs that promote energy efficiency and renewable energy, visit the Office of Building Technology, State and Community Program's web site at: www.eren.doe.gov/buildings

A special thank you to Owens Corning for printing this award-winning booklet and for participating in DOE's Energy Awareness Month Campaign.

Introduction

Did you know that the typical U.S. family spends close to $1,300 a year on their home's utility bills? Unfortunately, a large portion of that energy is wasted. The amount of energy wasted just through poorly insulated windows and doors is about as much energy as we get from the Alaskan pipeline each year. And electricity generated by fossil fuels for a single home puts more carbon dioxide into the air than two average cars. By using a few inexpensive energy-efficient measures, you can reduce your energy bills by 10% to 50%, and at the same time, help reduce air pollution.

The key to achieving these savings is a whole-house energy efficiency plan. To take a whole-house approach, view your home as an energy system with interdependent parts. For example, your heating system is not just a furnace—it's a heat-delivery system that starts at the furnace and delivers heat throughout your home using a network of ducts. You may have a top-of-the-line, energy-efficient furnace, but if the ducts leak and are uninsulated, and your walls, attic, windows, and doors are uninsulated, your energy bills will remain high. Taking a whole-house approach to saving energy ensures that dollars you invest in energy efficiency are wisely spent.



Energy-efficient improvements not only make your home more comfortable, they can yield long-term financial rewards. Reduced operating costs more than make up for the higher price of energy-efficient appliances and improvements over their lifetimes. Improvements may also qualify you for an energy efficiency mortgage, which allows lenders to use a higher-than-normal debt-to-income ratio to calculate loan potential. In addition, your home will likely have a higher resale value.

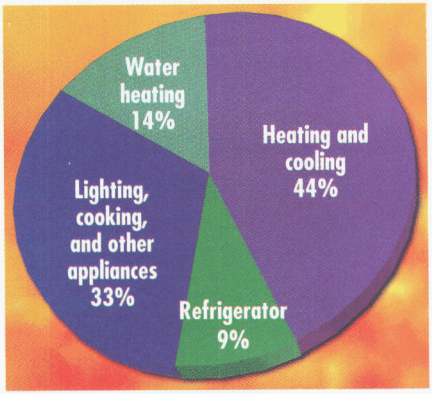
This booklet shows you how easy it is to reduce your home energy use. It is a guide to easy, practical solutions for saving energy throughout your home, from the insulating system that surrounds it to the appliances and lights inside. Please, take a few moments to read the valuable tips in this booklet that will save you energy and money and, in many cases, help the environment by reducing pollution and conserving our natural resources.

Whole-House Energy Plan

Prioritize your whole-house plan by viewing your home as an energy system with interdependent parts.

Your Home's Energy Use

The first step to taking a whole-house energy efficiency approach is to find out which parts of your house use the most energy. A home energy audit will show you where these are and suggest the most effective measures for reducing your energy costs. You can conduct a simple home energy audit yourself, you can contact your local utility, or you can call an independent energy auditor for a more comprehensive examination.



How We Use Energy In Our Homes (based on national averages)

The largest portion of a utility bill for a typical house is for heating and cooling.

Energy Auditing Tips

- Check the level of insulation in your exterior and basement walls, ceilings, attic, floors, and crawl spaces. Contact your local contractor for advice on how to check your insulation levels.
- Check for holes or cracks around your walls, ceilings, windows, doors, light and plumbing fixtures, switches, and electrical outlets that can leak air into or out of your home.
- Check for open fireplace dampers.
- Make sure your appliances and heating and cooling systems are properly maintained.
- Study your family's lighting needs and use patterns, paying special attention to high-use areas such as the living room, kitchen, and exterior lighting. Look for ways to use daylighting, reduce the time the lights are on, and replace incandescent bulbs and fixtures with compact or standard fluorescent lamps.

Formulating Your Plan

After you have identified places where your home is losing energy, assign priorities to your energy needs by asking yourself a few important questions:

- How much money do you spend on energy?
- Where are your greatest energy losses?
- How long will it take for an investment in energy efficiency to pay for itself in energy savings?
- Can you do the job yourself, or will you need to hire a contractor?
- What is your budget and how much time do you have to spend on maintenance and repair?

Once you assign priorities to your energy needs, you can form a whole-house efficiency plan. Your plan will provide you with a strategy for making smart purchases and home improvements that maximize energy efficiency and save the most money.

Another option is to get the advice of a professional. Many utilities conduct energy audits for free or for a nominal charge. For a fee, a professional contractor will analyze how your home's energy

systems work together as a system and compare the analysis against your utility bills. He or she will use a variety of equipment such as blower doors, infrared cameras, and surface thermometers to find inefficiencies that cannot be detected by a visual inspection. Finally, they will give you a list of recommendations for cost-effective energy improvements and enhanced comfort and safety. A good contractor will also calculate the return on your investment in high efficiency equipment vs. standard equipment.

For more information about home energy audits, contact:

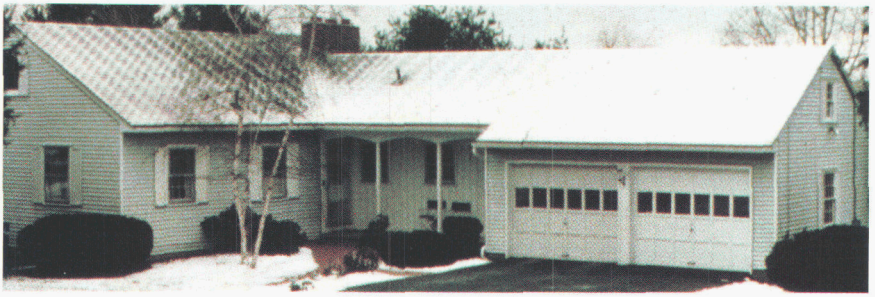
U.S. Department of Energy's (DOE's) Energy Efficiency and Renewable Energy Clearinghouse (EREC), (800) DOE-3732
www.eren.doe.gov/askanenergyexpert/

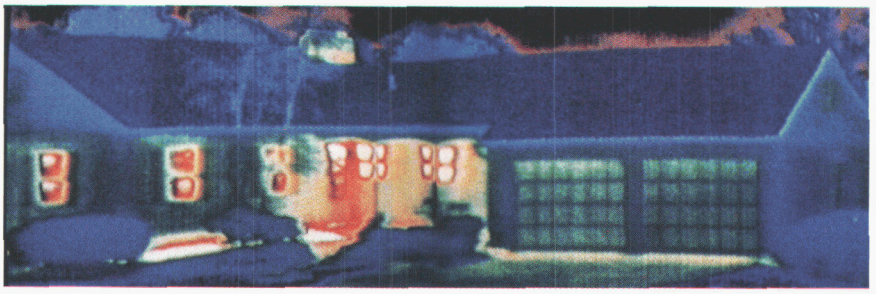
Finding a contractor

When searching for a contractor, you should:

- Ask neighbors and friends if they have worked with a contractor they would recommend
- Look in the Yellow Pages
- Focus on local companies
- Look for licensed, insured contractors
- Get three bids with details in writing
- Ask about previous experience
- Check references
- Inquire with the Better Business Bureau.

Owens Corning Customer Service Hotline, (800) GET-PINK (800-438-7465),
www.owenscorning.com





Cool Hot

Heat Loss from a House

A picture is worth..., in this case, lost heating dollars. This thermal photograph shows heat leaking from a house during those expensive winter heating months. The white, yellow, and red colors show where the heat escapes. The red represents the area of the greatest heat loss.

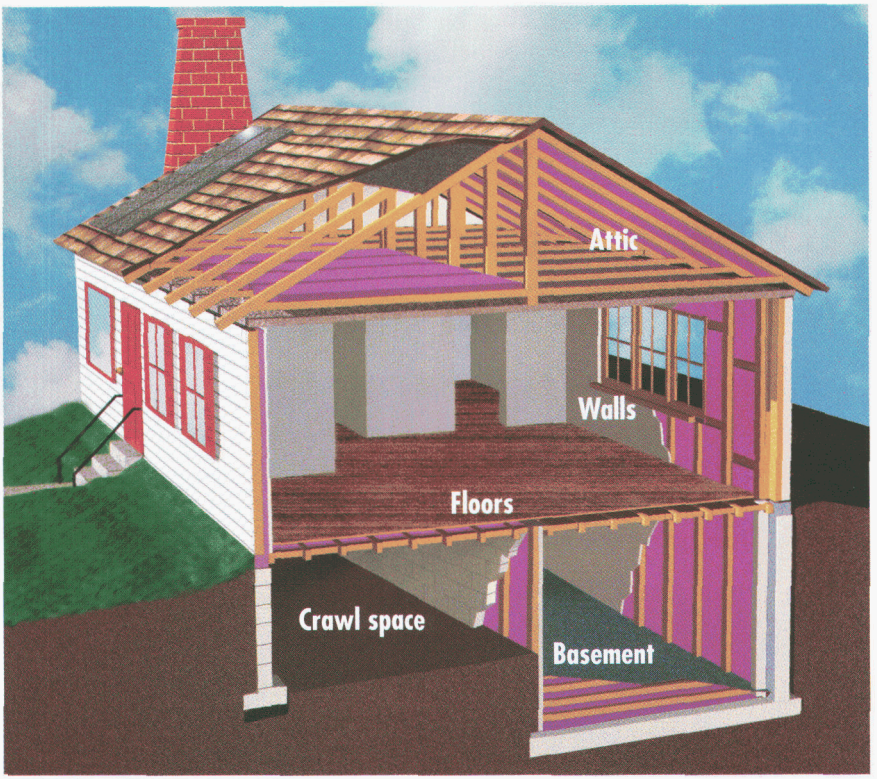
Thermogram/photograph copyright 1997, Infraspection Institute, Inc., Shelburne, VT

Insulation and Weatherization

Checking your home's insulating system is one of the fastest and most cost-efficient ways to use a whole-house approach to reduce energy waste and maximize your energy dollars. A good insulating system includes a combination of products and construction techniques that provide a home with thermal performance, protect it against air infiltration, and control moisture. You can increase the comfort of your home while reducing your heating and cooling needs by up to 30% by investing just a few hundred dollars in proper insulation and weatherization products.

Insulation

First, check the insulation in your attic, ceilings, exterior and basement walls, floors, and crawl spaces to see if it meets the levels recommended for your area. Insulation is measured in R-values—the higher the R-value, the better your walls and roof will resist the transfer of heat. The U.S. Department of Energy (DOE) recommends ranges of R-values based on local heating and cooling costs and climate conditions in different areas of the nation. The map and chart on pages 6 and 7 show the DOE recommendations for your area. State and local codes in



Where to Insulate

Adding insulation in the areas shown here may be the best way to improve your home's energy efficiency.

some parts of the country may require lower R-values than the DOE recommendations, which are based on cost-effectiveness. For more customized insulation recommendations, visit the U.S. Department of Energy's insulation page at www.eren.doe.gov/buildings/wthr_insulating.html. The Zip-Code Insulation Program can tell you the most economic insulation level for your new or existing home.

Although insulation can be made from a variety of materials, it usually comes in four types—batts, rolls, loose-fill, and rigid foam boards. Each type is made to fit in a different part of your house. Batts are made to fit between the studs in your walls or between the joists of your ceilings or floors. Batts are usually made of fiber glass or rock wool. Fiber glass is manufactured from sand and recycled glass, and rock wool is made from basaltic rock and recycled material from steel mill wastes. Rolls or blankets are also usually made of fiber glass and can be laid over the floor in the attic. Loose-fill insulation (usually made of fiber glass, rock wool, or cellulose) is blown into the attic or walls. Cellulose is usually made from recycled newsprint treated with fire-retardant chemicals.

Rigid foam boards are made of polyisocyanurate, extruded polystyrene (XPS or blueboard), expanded polystyrene (EPS or beadboard), or other materials. These boards are lightweight, provide structural support, and generally have an R-value of 4 to 7 per inch. Rigid board insulation is made to be used in confined spaces such as exterior walls, basements, foundation and crawl space walls, concrete slabs, and cathedral ceilings.

Insulation Tips

- Consider factors such as your climate, building design, and budget when selecting insulation R-value for your home.

Should I insulate my home?

The answer is probably "yes" if you:

- Have an older home and haven't added insulation: in a recent survey, only 20% of homes built before 1980 were well insulated
- Are uncomfortably cold in the winter or hot in the summer—adding insulation creates a more uniform temperature and increases comfort
- Build a new house or addition, or install new siding or roofing
- Pay excessive energy bills
- Are bothered by noise from the outdoors—insulation helps to muffle sound
- Are concerned about the effect of energy use on the environment.

- Use higher density insulation, such as rigid foam boards, in cathedral ceilings and on exterior walls.
- Ventilation plays a large role in providing moisture control and reducing summer cooling bills. Attic vents can be installed along the entire ceiling cavity to help ensure proper airflow from the soffit to the attic to make a home more comfortable and energy efficient.
- Recessed light fixtures can be a major source of heat loss, but you need to be careful how close you place insulation next to a fixture unless it is marked "I.C."—designed for direct insulation contact. Check your local building codes for recommendations.
- As specified on the product packaging, follow the product instructions on installation and wear the proper protective gear when installing insulation.

The easiest and most cost-effective way to insulate your home is to add insulation in the attic. To find out if you have enough attic insulation, measure the thickness of insulation. If there is less

than R-22 (7 inches of fiber glass or rock wool or 6 inches of cellulose) you could probably benefit by adding more. Most U.S. homes should have between R-22 and R-49 insulation in the attic.

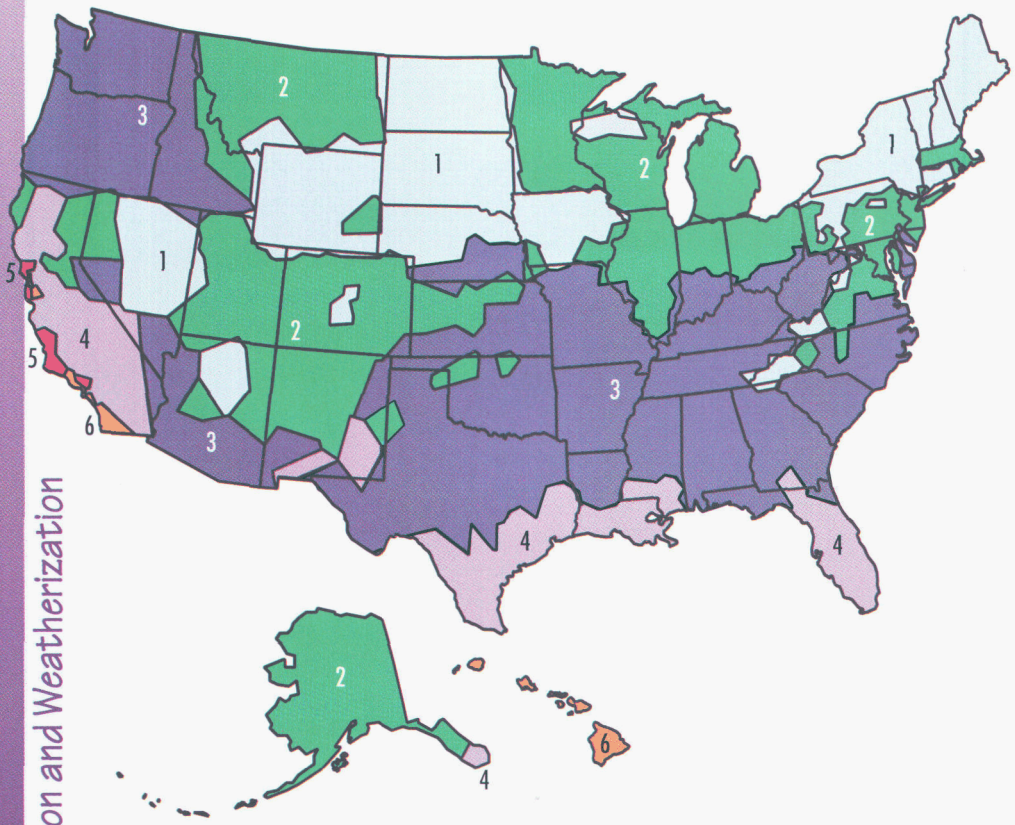
If your attic has ample insulation and your home still feels drafty and cold in the winter or too warm in the summer, chances are you need to add insulation to the exterior walls as well. This is a more expensive measure that usually requires a contractor, but it may be worth the cost if you live in a very hot or cold climate.

You may also need to add insulation to your crawl space. Either the walls or the floor above the crawl space should be insulated.

New Construction

For new construction or home additions, R-11 to R-28 insulation is recommended for exterior walls depending on location (see map below). To meet this recommendation, most homes and additions constructed with 2 in x 4 in walls require a combination of wall cavity

U.S. Department of Energy Recommended* Total R-Values for New Construction Houses in Six Insulation Zones



*These recommendations are cost-effective levels of insulation based on the best available information on local fuel and materials costs and weather conditions. Consequently, the levels may differ from current local building codes. In addition, the apparent fragmentation of the recommendations is an artifact of these data and should not be considered absolute minimum requirements.

insulation, such as batts and insulating sheathing or rigid foam boards. If you live in an area with an insulation recommendation that is greater than R-20, you may want to consider building with 2 in x 6 in framing instead of 2 in x 4 in framing to allow room for thicker wall cavity insulation—R-19 to R-21.

When shopping for insulation watch for the ENERGY STAR® label.

Weatherization

Warm air leaking into your home during the summer and out of your home during the winter can waste a substantial portion of your energy dollars. One of the quickest dollar-saving tasks you can do is caulk, seal, and weatherstrip all seams, cracks, and openings to the outside. You can save 10% or more on your energy bill by reducing the air leaks in your home.

					Ceiling						Basement	
Zone	Gas	Heat pump	Fuel oil	Electric furnace	Attic	Cathedral	Wall (A)	Floor	Crawl space (B)	Slab edge	Interior	Exterior
1	✔	✔	✔		R-49	R-38	R-18	R-25	R-19	R-8	R-11	R-10
1				✔	R-49	R-60	R-28	R-25	R-19	R-8	R-19	R-15
2	✔	✔	✔		R-49	R-38	R-18	R-25	R-19	R-8	R-11	R-10
2				✔	R-49	R-38	R-22	R-25	R-19	R-8	R-19	R-15
3	✔	✔	✔	✔	R-49	R-38	R-18	R-25	R-19	R-8	R-11	R-10
4	✔	✔	✔		R-38	R-38	R-13	R-13	R-19	R-4	R-11	R-4
4				✔	R-49	R-38	R-18	R-25	R-19	R-8	R-11	R-10
5	✔				R-38	R-30	R-13	R-11	R-13	R-4	R-11	R-4
5		✔	✔		R-38	R-38	R-13	R-13	R-19	R-4	R-11	R-4
5				✔	R-49	R-38	R-18	R-25	R-19	R-8	R-11	R-10
6	✔				R-22	R-22	R-11	R-11	R-11	(C)	R-11	R-4
6		✔	✔		R-38	R-30	R-13	R-11	R-13	R-4	R-11	R-4
6				✔	R-49	R-38	R-18	R-25	R-19	R-8	R-11	R-10

(**A**) R-18, R-22, and R-28 exterior wall systems can be achieved by either cavity insulation or cavity insulation with insulating sheathing.
For 2 in x 4 in walls, use either 3-1/2-in thick R-15 or 3-1/2-in thick R-13 fiber glass insulation with insulating sheathing.
For 2 in x 6 in walls, use either 5-1/2-in thick R-21 or 6-1/4-in thick R-19 fiber glass insulation.

(**B**) Insulate crawl space walls only if the crawl space is dry all year, the floor above is not insulated, and all ventilation to the crawl space is blocked. A vapor retarder (e.g., 4- or 6-mil polyethylene film) should be installed on the ground to reduce moisture migration into the crawl space.

(**C**) No slab edge insulation is recommended.

NOTE: For more information, see: Department of Energy Insulation Fact Sheet (D.O.E./CE-0180). Energy Efficiency and Renewable Energy Clearinghouse, P.O. Box 3048, Merrifield, VA 22116; phone: (800) 363-3732; www.ornl.gov/roofs+walls/insulation/ins_11.html or contact Owens Corning, (800) GET-PINK (800-438-7465), www.owenscorning.com

Sources of Air Leaks in Your Home

Areas that leak air into and out of your home cost you lots of money. Check the culprit areas listed here:

1 Dropped ceiling
2 Recessed light
3 Attic entrance
4 Electric wires and box
5 Plumbing utilities and penetration
6 Water and furnace flues
7 All ducts
8 Door sashes and frames
9 Chimney penetration
10 Warm air register
11 Window sashes and frames
12 Baseboards, coves, and interior trim
13 Plumbing access panel
14 Electrical outlets and switches
15 Light fixtures
16 Sill plates

Weatherization Tips

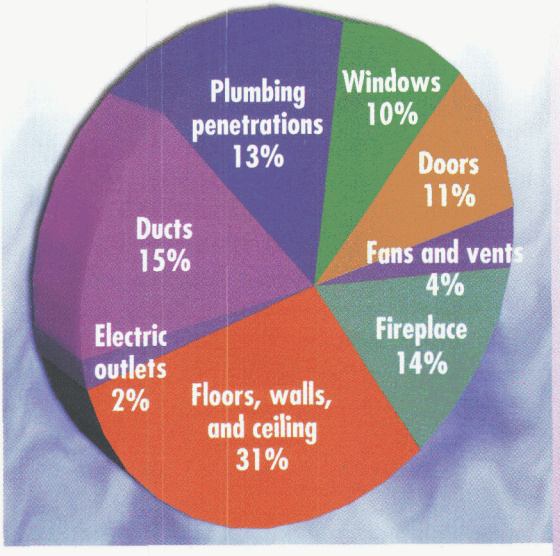
- First, test your home for air tightness. On a windy day, hold a lit incense stick next to your windows, doors, electrical boxes, plumbing fixtures, electrical outlets, ceiling fixtures, attic hatches, and other locations where there is a possible air path to the outside. If the smoke stream travels horizontally, you have located an air leak that may need caulking, sealing, or weatherstripping.
- Caulk and weatherstrip doors and windows that leak air.
- Caulk and seal air leaks where plumbing, ducting, or electrical wiring penetrates through exterior walls, floors, ceilings, and soffits over cabinets.

- Install rubber gaskets behind outlet and switch plates on exterior walls.
- Look for dirty spots in your insulation, which often indicate holes where air leaks into and out of your house. You can seal the holes by stapling sheets of plastic over the holes and caulking the edges of the plastic.
- Install storm windows over single-pane windows or replace them with double-pane windows. Storm windows as much as double the R-value of single-pane windows and they can help reduce drafts, water condensation, and frost formation. As a less costly and less permanent alternative, you can use a heavy-duty, clear plastic sheet on a frame or tape clear plastic film to the inside of your window frames during the cold winter months. Remember, the plastic must be sealed tightly to the frame to help reduce infiltration.
- When the fireplace is not in use, keep the flue damper tightly closed. A chimney is designed specifically for smoke to escape, so until you close it, warm air escapes— 24 hours a day!
- For new construction, reduce exterior wall leaks by either installing house wrap, taping the joints of exterior sheathing, or comprehensively caulking and sealing the exterior walls.

For more information on insulation, weatherization, and ventilation, contact:

Cellulose Insulation Manufacturers Association (CIMA), (937) 222-2462, www.cellulose.org

ENERGY STAR®, (888) STAR-YES (888-782-7937), www.energystar.gov



How Does the Air Escape?

Air infiltrates in and out of your home through every hole, nook, and cranny. About one-third of this air infiltrates through openings in your ceilings, walls, and floors.

Insulation Contractors Association of America (ICAA), (703) 739-0356, www.insulate.org

National Association of Home Builders (NAHB), (800) 368-5242, www.nahb.org

North American Insulation Manufacturers Association (NAIMA), (703) 684-0084, www.naima.org

Owens Corning Customer Service Hotline, (800) GET-PINK (800-438-7465), www.owenscorning.com

Polyisocyanurate Insulation Manufacturers Association (PIMA), (202) 628-6558, www.pima.org

U.S. Department of Energy's Energy Efficiency and Renewable Energy Clearinghouse (EREC), (800) DOE-3732 www.eren.doe.gov/askanenergyexpert/

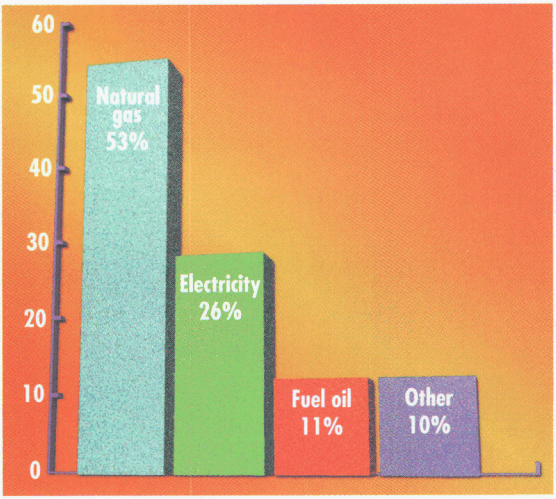
Heating and Cooling

Heating and cooling your home uses more energy and drains more energy dollars than any other system in your home. Typically, 44% of your utility bill goes for heating and cooling. What's more, heating and cooling systems in the United States together emit over a half billion tons of carbon dioxide into the atmosphere each year, adding to global warming. They also generate about 24% of the nation's sulfur dioxide and 12% of the nitrogen oxides, the chief ingredients in acid rain.

No matter what kind of heating, ventilation, and air-conditioning system you have in your house, you can save money and increase comfort by properly maintaining and upgrading your equipment. But remember, an energy-efficient furnace alone will not have as great an impact on your energy bills as using the whole-house approach. By combining proper equipment maintenance and upgrades with appropriate insulation, weatherization, and thermostat settings, you can cut your energy bills and your pollution output in half.

Heating and Cooling Tips

- Set your thermostat as low as is comfortable in the winter and as high as is comfortable in the summer.
- Clean or replace filters on furnaces once a month or as needed.
- Clean warm-air registers, baseboard heaters, and radiators as needed; make sure they're not blocked by furniture, carpeting, or drapes.
- Bleed trapped air from hot-water radiators once or twice a season; if in doubt about how to perform this task, call a professional.



Household Heating Systems

Although there are several different types of fuels available to heat our homes, about half of us use natural gas.

- Place heat-resistant radiator reflectors between exterior walls and the radiators.
- Use kitchen, bath, and other ventilating fans wisely; in just 1 hour, these fans can pull out a houseful of warmed or cooled air. Turn fans off as soon as they have done the job.
- During the heating season, keep the draperies and shades on your south-facing windows open during the day to allow the sunlight to enter your home and closed at night to reduce the chill you may feel from cold windows.

During the cooling season, keep the window coverings closed during the day to prevent solar gain.

- Close an unoccupied room that is isolated from the rest of the house, such as in a corner, and turn down the thermostat or turn off the heating for that room or zone. However, do not turn the heating off if it adversely affects the rest of your system. For example, if you heat your house with a heat pump, do not close the vents—closing the vents could harm the heat pump.
- Select energy-efficient equipment when you buy new heating and cooling equipment. Your contractor should be able to give you energy fact sheets for different types, models, and designs to help you compare energy usage. Look for high Annual Fuel Utilization Efficiency (AFUE) ratings and the Seasonal Energy Efficiency Ratio (SEER). The national minimums are 78% AFUE and 10 SEER.
- Look for the ENERGY STAR® and EnergyGuide labels. ENERGY STAR® is a program of the U.S. Department of Energy (DOE) and the Environmental Protection Agency (EPA) designed to help consumers identify energy-efficient appliances and products.

Ducts

One of the most important systems in your home, though it's hidden beneath your feet and over your head, may be wasting a lot of your energy dollars. Your home's duct system, a branching network of tubes in the walls, floors, and ceilings, carries the air from your home's furnace and central air conditioner to each room. Ducts are made of sheet metal, fiber glass, or other materials.

Unfortunately, many duct systems are poorly insulated or not insulated properly. Ducts that leak heated air into unheated spaces can add hundreds of dollars a year to your heating and cooling bills. Insulating ducts that are in unconditioned spaces is usually very cost-effective. If you are buying a new duct system, consider one that comes with insulation already installed.

Sealing your ducts to prevent leaks is even more important if the ducts are located in an unconditioned area such as an attic or vented crawl space. If the supply ducts are leaking, heated or cooled air can be forced out unsealed joints and lost. In addition, unconditioned air can also be drawn into return ducts through unsealed joints. In the summer, hot attic air can be drawn in, increasing the load on the air conditioner. In the winter, your furnace will have to work longer to keep your house comfortable. Either way, your energy losses cost you money.

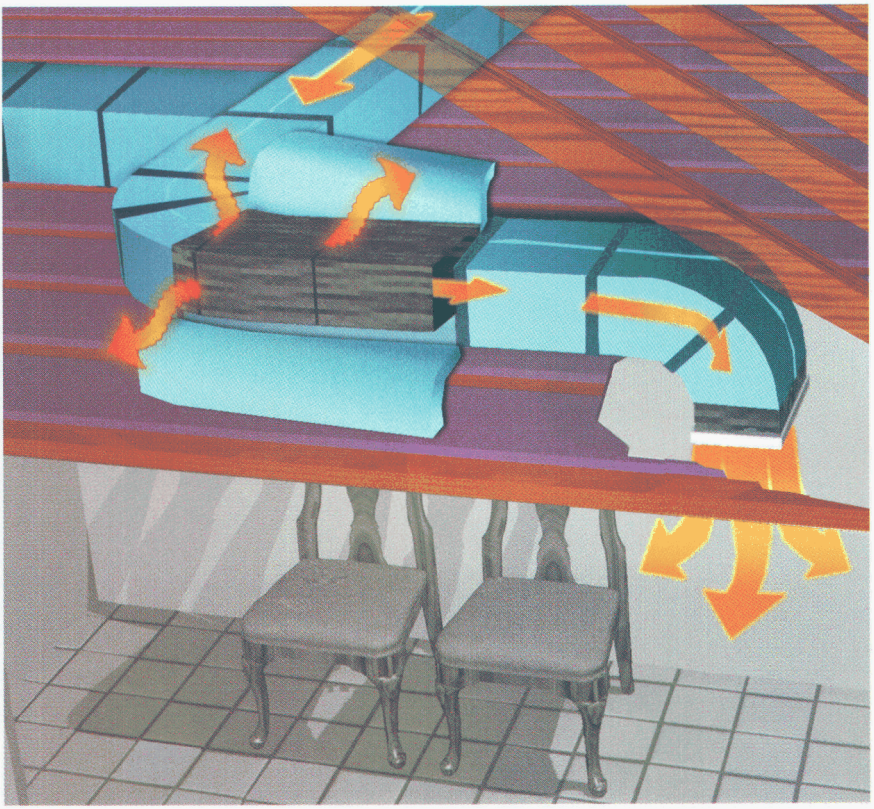
Although minor duct repairs are easy to accomplish, ducts in unconditioned spaces should be sealed and insulated by qualified professionals using the appropriate sealing materials. Here are a few simple tips to help with minor duct repairs.

Duct Tips

- Check your ducts for air leaks. First look for sections that should be joined but have separated and then look for obvious holes.
- If you use duct tape to repair and seal your ducts, look for tape with the Underwriters Laboratories (UL) logo

What's a Btu?

One Btu, or British thermal unit, is roughly equivalent to burning one kitchen match. That may not sound like much, but a typical home consumes about 100 million Btu per year. Approximately 44% of the total is used for space heating.



Ducts—Out-of-Sight, Out-of-Mind

The unsealed ducts in your attics and crawl spaces lose air — uninsulated ducts lose heat, wasting energy and money.

to avoid tape that degrades, cracks, and loses its bond with age.

- Remember that insulating ducts in the basement will make the basement colder. If both the ducts and the basement walls are uninsulated, consider insulating both.*
- If your basement has been converted to a living area, install both supply and return registers in the basement rooms.

* Note: Water pipes and drains in unconditioned spaces could freeze and burst in the space if the heat ducts are fully insulated, because there would be no heat source to prevent the space from freezing in cold weather. However, using an electric heating tape wrap on the pipes can prevent this.

- Be sure a well-sealed vapor barrier exists on the outside of the insulation on cooling ducts to prevent moisture buildup.
- Get a professional to help you insulate and repair all ducts.

Heat Pumps

If you use electricity to heat your home, consider installing an energy-efficient heat pump system. Heat pumps are the most efficient form of electric heating in moderate climates, providing three times more heating than the equivalent amount of energy they consume in electricity. There are three types

of heat pumps: air-to-air, water source, and ground source. They collect heat from the air, water, or ground outside your home and concentrate it for use inside. Heat pumps do double duty as a central air conditioner. They can also cool your home by collecting the heat inside your house and effectively pumping it outside. A heat pump can trim the amount of electricity you use for heating by as much as 30% to 40%.

Heat Pump Tips

- Do not set back the heat pump's thermostat manually if it causes the electric resistance heating to come on. This type of heating, which is often used as a backup to the heat pump, is more expensive.
- Clean or change filters once a month or as needed, and maintain the system according to manufacturer's instructions.

Solar Heating and Cooling

Using passive solar design techniques to heat and cool your home can be both environmentally friendly and cost effective. Passive solar heating techniques include placing larger, insulated windows on south-facing walls and locating thermal mass, such as a concrete slab floor or a heat-absorbing wall, close to the windows. In many cases, you can cut your heating costs by more than 50% compared to the cost of heating the same house that does not include passive solar design.

Passive solar design can also help reduce your cooling costs. Passive solar cooling techniques include carefully designed overhangs, windows with reflective coatings, and the use of reflective coatings on exterior walls and the roof.

However, a passive solar house also requires careful design and site orientation, which depend on the local climate. So, if you are considering passive solar design for new construction or a major remodeling, you should consult an architect familiar with passive solar techniques.

Solar Tips

- Keep all south-facing glass clean.
- Make sure that objects do not block the sunlight shining on concrete slab floors or heat-absorbing walls.
- Consider using insulating curtains to reduce excessive heat loss from large windows at night.

Fireplaces

When you cozy up next to a crackling fire on a cold winter day, you probably don't realize that your fireplace is one of the most inefficient heat sources you can possibly use. It literally sends your energy dollars right up the chimney along with volumes of warm air. A roaring fire can exhaust as much as 24,000 cubic feet of air per hour to the outside, which must be replaced by cold air coming into the house from the outside. Your heating system must warm up this air, which is then exhausted through your chimney. If you use your conventional fireplace while your central heating system is on, these tips can help reduce energy losses.

Fireplace Tips

- If you never use your fireplace, plug and seal the chimney flue.
- Keep your fireplace damper closed unless a fire is going. Keeping the damper open is like keeping a 48-inch window wide open during the winter; it allows warm air to go right up the chimney.
- When you use the fireplace, reduce heat loss by opening dampers in the bottom of the firebox (if provided) or open the nearest window slightly—approximately 1 inch—and close doors leading into the room. Lower

the thermostat setting to between 50° and 55°F.

- Install tempered glass doors and a heat-air exchange system that blows warmed air back into the room.
- Check the seal on the flue damper and make it as snug as possible.
- Add caulking around the fireplace hearth.
- Use grates made of C-shaped metal tubes to draw cool room air into the fireplace and circulate warm air back into the room.

Gas and Oil Heating Systems

If you plan to buy a new heating system, ask your local utility or state energy office for information about the latest technologies available to consumers (for a list of state energy offices visit the National Association of State Energy Officials [NASEO] web site at www.naseo.org/members/states.htm). They can advise you about more efficient systems on the market today. For example, many newer models incorporate designs for burners and heat exchangers that result in higher efficiencies during operation and reduce heat loss when the equipment is off. Check the Shopping Guide in the back of this booklet for additional information on how to understand heating system ratings.

Look for the ENERGY STAR® and Energy Guide labels.

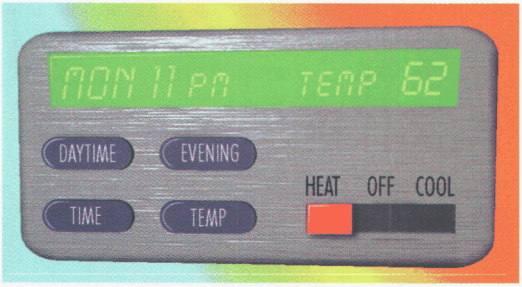
Air Conditioners

It might surprise you to know that buying a bigger room air-conditioning unit won't necessarily make you feel more comfortable during the hot summer months. In fact, a room air conditioner that's too big for the area it is supposed to cool will perform less efficiently and less effectively than a smaller, properly sized unit. This is because room units work better if they run for relatively long periods of time than if they are continually switching off and on. Longer run times allow air conditioners to maintain a more constant room temperature.

Sizing is equally important for central air-conditioning systems, which need to be sized by professionals. If you have a central air system in your home, set the fan to shut off at the same time as the cooling unit (compressor). In other words, don't use the system's central fan to provide circulation, but instead use circulating fans in individual rooms.

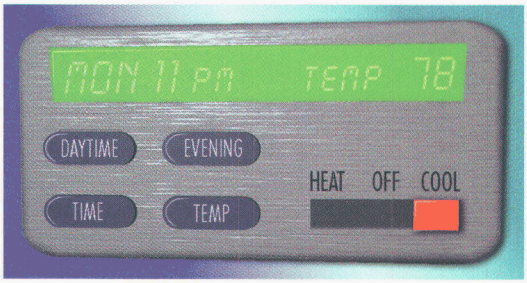
Cooling Tips

- Whole-house fans help cool your home by pulling cool air through the house and exhausting warm air through the attic. They are effective when operated at night and when the outside air is cooler than the inside.
- Set your thermostat as high as comfortably possible in the summer. The less difference between the indoor and outdoor temperatures, the lower your overall cooling bill will be.
- Don't set your thermostat at a colder setting than normal when you turn on your air conditioner. It will not cool your home any faster and could result in excessive cooling and, therefore, unnecessary expense.
- Consider using an interior fan in conjunction with your window air conditioner to spread the cooled air more effectively through your home without greatly increasing your power use.
- Don't place lamps or TV sets near your air-conditioning thermostat. The thermostat senses heat from these appliances, which can cause the air conditioner to run longer than necessary.
- Plant trees or shrubs to shade air-conditioning units but not to block the airflow. A unit operating in the shade



Nighttime Heating

Using a programmable thermostat, you can automatically turn down your heat at night or when you are not at home.



Nighttime Cooling

In the summer, you can save money by automatically turning your air-conditioning up at night.

uses as much as 10% less electricity than the same one operating in the sun.

- Look for the ENERGY STAR® and EnergyGuide labels.

The shopping guide in the back of this booklet will help you find the right size unit for your needs.

Programmable Thermostats

You can save as much as 10% a year on your heating and cooling bills by simply turning your thermostat back 10% to 15% for 8 hours. You can do this automatically without sacrificing comfort by installing an automatic setback or programmable thermostat.

Using a programmable thermostat, you can adjust the times you turn on the heating or air-conditioning according to a pre-set schedule. As a result, you don't operate the equipment as much when you are asleep or when the house or part of the house is not occupied. Programmable thermostats can store and repeat multiple daily settings (six or more temperature settings a day) that you can manually override without affecting the rest of the daily or weekly program. When shopping for a programmable thermostat, be sure to look for the ENERGY STAR® label.

For more information on heating and cooling, contact:

Air Conditioning and Refrigeration Institute (ACRI), (703) 524-8800, www.ari.org

ENERGY STAR®, (888) STAR-YES (888-782-7937), www.energystar.gov

Gas Appliance Manufacturers Association, (703) 525-7060, www.gamanet.org

Owens Corning Customer Service Hotline, (800) GET-PINK (800-438-7465), www.owenscorning.com

U.S. Department of Energy's Energy Efficiency and Renewable Energy Clearinghouse (EREC), (800) DOE-3732 www.eren.doe.gov/askanenergyexpert/

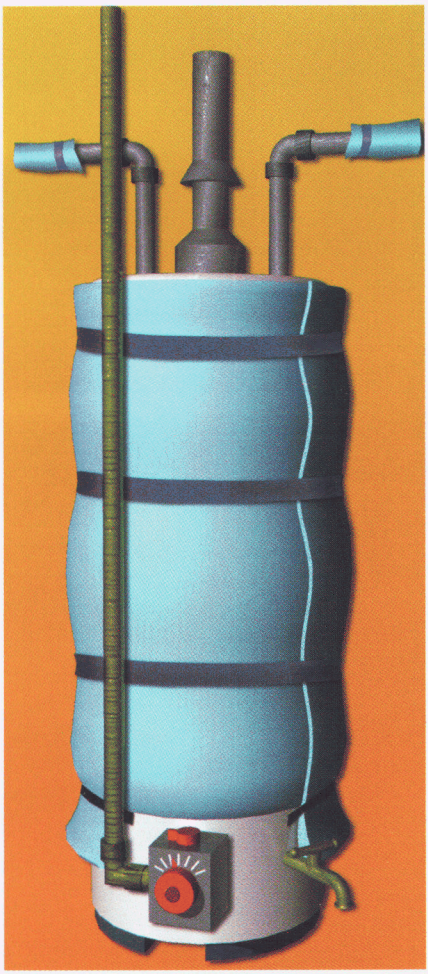
Water Heating

Water heating is the third largest energy expense in your home. It typically accounts for about 14% of your utility bill.

There are four ways to cut your water heating bills: use less hot water, turn down the thermostat on your water heater, insulate your water heater, or buy a new, more efficient water heater. A family of four, each showering for 5 minutes a day, uses 700 gallons of water a week; this is enough for a 3-year supply of drinking water for one person. You can cut that amount in half simply by using low-flow nonaerating showerheads and faucets.

Water Heating Tips

- Repair leaky faucets promptly; a leaky faucet wastes gallons of water in a short period.
- Insulate your electric hot-water storage tank and pipes, but be careful not to cover the thermostat.
- Insulate your gas or oil hot-water storage tank and pipes, but be careful not to cover the water heater's top, bottom, thermostat, or burner compartment; when in doubt, get professional help.
- Install nonaerating, low-flow faucets and showerheads.
- Buy a new energy-efficient water heater. While it may cost more initially than a standard water heater, the energy savings will continue during the lifetime of the appliance.
- Although most water heaters last 10–15 years, it's best to start shopping for a new one if yours is more than 7 years old. Doing some research before your heater fails will enable you to select one that most appropriately meets your needs.
- Lower the thermostat on your water heater; water heaters sometimes come from the factory with high temperature settings, but a setting of 115°F provides comfortable hot water for most uses.



Water Heater

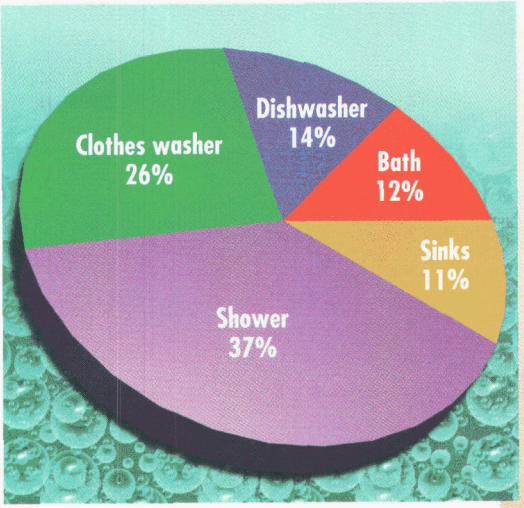
Insulate your water heater to save energy and money.

- Drain a quart of water from your water tank every 3 months to remove sediment that impedes heat transfer and lowers the efficiency of your heater. The type of water tank you have determines the steps to take, so follow the manufacturer's advice.
- If you heat with electricity and live in a warm and sunny climate, consider installing a solar water heater. The solar units are environmentally friendly and can now be installed on your roof to blend with the architecture of your house.
- Take more showers than baths. Bathing uses the most hot water in the average household. You use 15–25 gallons of hot water for a bath, but less than 10 gallons during a 5-minute shower.
- Consider the installation of a drain water waste heat recovery system.
- Look for the FTC EnergyGuide label.

Solar Water Heaters

If you heat with electricity and you have an unshaded, south-facing location (such as a roof) on your property, consider installing a solar water heater. More than 1.5 million homes and businesses in the United States have invested in solar water heating systems and over 94% of these customers consider the systems a good investment. Solar water heating systems are also good for the environment. Solar water heaters avoid the harmful greenhouse gas emissions associated with electricity production. During a 20 year period, one solar water heater can avoid over 50 tons of carbon dioxide emissions.

When shopping for a solar water heater, watch for systems certified by the Solar Rating and Certification Corporation (SRCC) or the Florida Solar Energy Center (FSEC).



Hot Water Usage (based on national averages)
The typical U.S. homeowner's water consumption by place of use.

For more information on how you can save money on your water heating bill, contact:

American Solar Energy Society (ASES), (303) 443-3130, www.ases.org

Florida Solar Energy Center (FSEC), (321) 638-1000, www.fsec.ucf.edu

Gas Appliance Manufacturers Association, (703) 525-7060, www.gamanet.org

Owens Corning Customer Service Hotline, (800) GET-PINK (800-438-7465), www.owenscorning.com

Solar Energy Industries Association (SEIA), (202) 628-7745, www.seia.org

Solar Rating and Certification Corporation (SRCC), (321) 638-1537, www.solar-rating.org

U.S. Department of Energy's Energy Efficiency and Renewable Energy Clearinghouse (EREC), (800) DOE-3732 www.eren.doe.gov/askanenergyexpert/

Windows

Windows can be one of your home's most attractive features. Windows provide views, daylighting, ventilation, and solar heating in the winter. Unfortunately, they can also account for 10% to 25% of your heating bill. During the summer, sunny windows make your air conditioner work two to three times harder. If you live in the Sun Belt, look into new solar control spectrally selective windows, which can cut the cooling load by more than half.

If your home has single-pane windows, as almost half of U.S. homes do, consider replacing them. New double-pane windows with high-performance glass (e.g., low-e or spectrally selective) are available on the market. In colder climates, select windows that are gas filled with low-emissivity (low-e) coatings on the glass to reduce heat loss. In warmer climates, select windows with spectrally selective coatings to reduce heat gain. If you are building a new home, you can offset some of the cost of installing more efficient windows because doing so allows you to buy smaller, less expensive heating and cooling equipment.

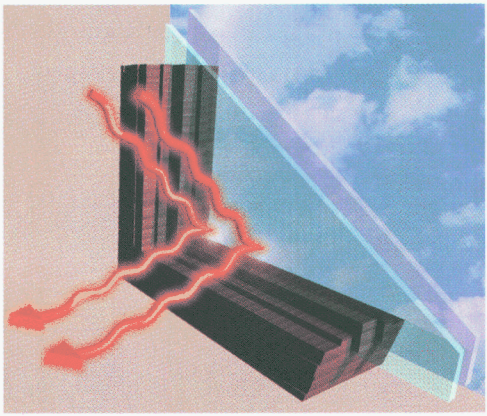
If you decide not to replace your windows, the simpler, less costly measures listed below can improve the performance of your windows.

Cold-Climate Window Tips

- Install exterior or interior storm windows; storm windows can reduce your heat loss through the windows by 25% to 50%. Storm windows should have weather-stripping at all moveable joints; be made of strong, durable materials; and have interlocking or overlapping joints. Low-e storm windows save even more energy.
- Repair and weatherize your current storm windows, if necessary.
- Install tight-fitting, insulating window shades on windows that feel drafty after weatherizing.
- Close your curtains and shades at night; open them during the day.
- Keep windows on the south side of your house clean to maximize solar gain.

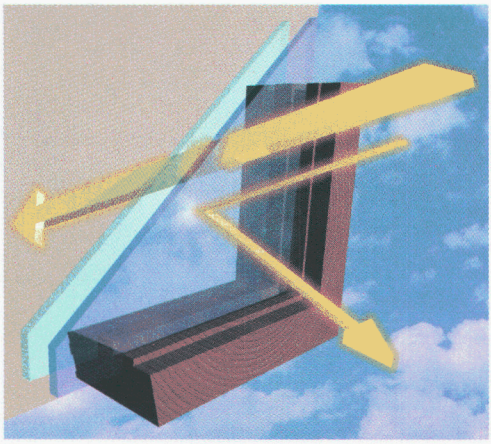
Warm-Climate Window Tips

- Install white window shades, drapes, or blinds to reflect heat away from the house.
- Close curtains on south- and west-facing windows during the day.
- Install awnings on south- and west-facing windows.
- Apply sun-control or other reflective films on south-facing windows to reduce solar gain.



Cold-Climate Windows

Double-pane windows with low-e coating on the glass reflect heat back into the room during the winter months.



Warm-Climate Windows

In the summertime, the sun shining through your windows heats up the room. Windows with spectrally selective coatings on the glass reflect some of the sunlight, keeping your rooms cooler.

Buying New Windows

New windows are long-term investments that have a large impact on your home's energy system. Today, there are many new window technologies available that are worth considering. Glazing materials now come with a variety of selective coatings and other features; frames are available in aluminum, wood, vinyl, fiber glass, or combinations of these materials. Each type of glazing material and frame has advantages and disadvantages.

Shopping Tips

- When you're shopping for new windows, look for the National Fenestration Rating Council (NFRC) label; it means the window's performance is certified.
- Remember, the lower the U-value, the better the insulation. In colder climates, a U-value of 0.35 or below is recommended. These windows have at least double glazing and low-e coating.
- In warm climates, where summertime heat gain is the main concern, look for windows with double glazing and spectrally selective coatings that reduce heat gain.
- Select windows with air leakage ratings of 0.3 cubic feet per minute or less.
- In temperate climates with both heating and cooling seasons, select windows with both low U-values and low solar heat gain coefficiency (SHGC) to maximize energy benefits.
- Look for the ENERGY STAR® and EnergyGuide labels.

For more information about windows, contact:

American Architectural Manufacturers Association (AAMA), (847) 303-5664, www.aamanet.org

Efficient Windows Collaborative (202) 530-2231, www.efficientwindows.org

ENERGY STAR®, (888) STAR-YES (888-782-7937), www.energystar.gov

National Wood Window and Door Association, (800) 223-2301, www.nwwda.org

Owens Corning Customer Service Hotline, (800) GET-PINK (800-438-7465), www.owenscorning.com

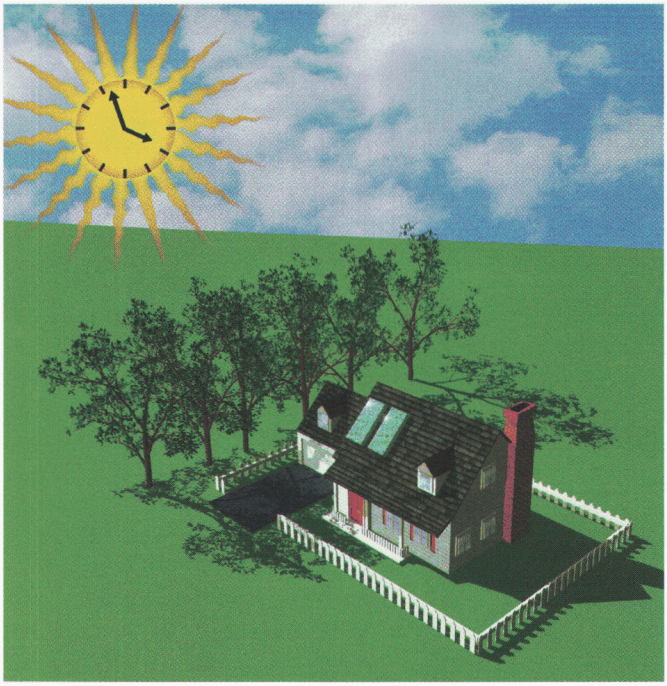
U.S. Department of Energy's Energy Efficiency and Renewable Energy Clearinghouse (EREC), (800) DOE-3732 www.eren.doe.gov/askanenergyexpert/

Landscaping

Landscaping is a natural and beautiful way to keep your home more comfortable and reduce your energy bills. In addition to adding aesthetic value and environmental quality to your home, a well-placed tree, shrub, or vine can deliver effective shade, act as a windbreak, and reduce overall energy bills.

Carefully positioned trees can save up to 25% of a typical household's energy used for heating and cooling. Computer models from DOE predict that just three trees, properly placed around the house, can save an average household between $100 and $250 in heating and cooling energy costs annually. During the summer months, the most effective way to keep your home cool is to prevent the heat from building up in the first place. A primary source of heat buildup is sunlight absorbed by your home's roof, walls, and windows. Dark-colored home exteriors absorb 70% to 90% of the radiant energy from the sun that strikes the home's surfaces. Some of this absorbed energy is then transferred into your home by way of conduction, resulting in heat gain inside the house. In contrast, light-colored surfaces effectively reflect most of the heat away from your home. Landscaping can also help block and absorb the sun's energy to help decrease heat buildup in your home by providing shade and evaporative cooling.

Shading and evaporative cooling from trees can reduce the air temperature around your home. Studies conducted by the Lawrence Berkeley National Laboratory found summer daytime air temperatures to be 3° to 6°F cooler in



Buildings and Trees—Natural Partners

Deciduous trees planted on the south and on the west sides will help keep your house cool in the summer and allow sun to shine in the windows in the winter.

tree-shaded neighborhoods than in treeless areas. The energy-conserving landscape strategies you should use for your home depend on the type of climate in which you live.

Landscaping Tips—Dependent on Geographic Area

- Trees that lose their leaves in the fall (i.e., deciduous) are the most effective at reducing heating and cooling energy costs. When selectively placed around a house, they provide excellent protection from the summer sun but permit winter sunlight to reach and warm your house. The height, growth rate, branch spread, and shape are all factors to consider in choosing a tree.
- Vines provide shading and cooling. Grown on trellises, vines can shade windows or the whole side of a house.
- Deflect winter winds by planting evergreen trees and shrubs on the north and west sides of your house; deflect summer winds by planting them on the south and west sides of your house.

Orientation of the house and surrounding landscaping has a large effect on energy consumption. A well-oriented, well-designed home admits low-angle winter sun to reduce heating bills; rejects overhead summer sun to reduce cooling bills; and minimizes the chill effect of winter winds. Fences, walls, other nearby buildings, and rows of trees or shrubs block or channel the wind. Bodies of water moderate temperature but increase humidity and produce glare. Trees provide shade, windbreaks, and wind channels. Pavement reflects or absorbs heat, depending on whether it is light or dark in color.

White Roofs

Just as wearing white clothes reflects the sun's heat from your body, a white or light-colored roof will help reflect the sun's heat away from your home. This strategy works particularly well when trees are located next to the reflecting surface. Not only do trees provide shade, they absorb the reflected sunlight for photosynthesis. In the process, water evaporates from the tree, cooling the air around the house.

Contact your county extension agents, public libraries, local nurseries, landscape architects, landscape contractors, and state and local energy offices for additional information on energy-efficient landscaping and regional plants and their maintenance requirements.

For more information on landscaping for energy efficiency, contact:

American Society of Landscape Architects (ASLA), (202) 898-2444, www.asla.org

National Arbor Day Foundation (NADF), (402) 474-5655, www.arborday.org

U.S. Department of Energy's Energy Efficiency and Renewable Energy Clearinghouse (EREC), (800) DOE-3732 www.eren.doe.gov/askanenergyexpert/

Lighting

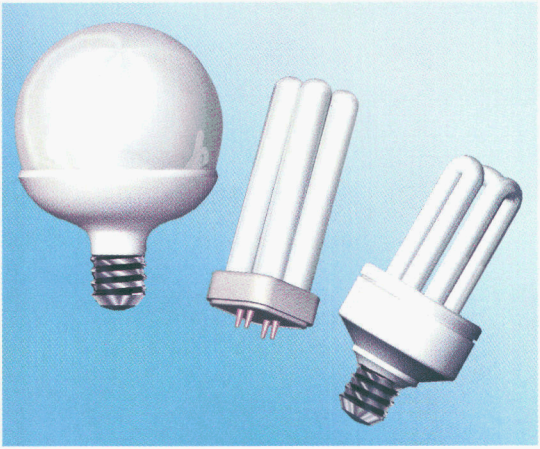
Increasing your lighting efficiency is one of the fastest ways to decrease your energy bills. If you replace 25% of your lights in high-use areas with fluorescents, you can save about 50% of your lighting energy bill.

Indoor Lighting

Use linear fluorescent and energy-efficient compact fluorescent lamps (CFLs) in fixtures throughout your home to provide high-quality and high-efficiency lighting. Fluorescent lamps are much more efficient than incandescent bulbs and last 6 to 10 times longer. Although fluorescent and compact fluorescent lamps are more expensive than incandescent bulbs, they pay for themselves by saving energy over their lifetime.

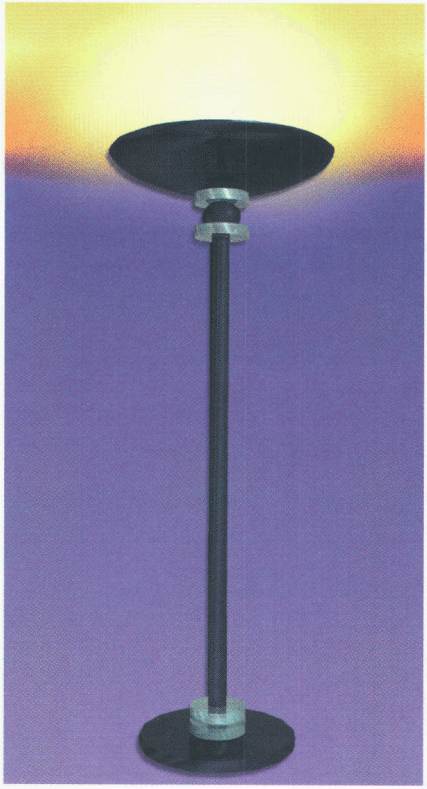
Indoor Lighting Tips

- Turn off the lights in any room you're not using, or consider installing timers, photo cells, or occupancy sensors to reduce the amount of time your lights are on.
- Use task lighting; instead of brightly lighting an entire room, focus the light where you need it. For example, use fluorescent under-cabinet lighting for kitchen sinks and countertops under cabinets.
- Consider three-way lamps; they make it easier to keep lighting levels low when brighter light is not necessary.
- Use 4-foot fluorescent fixtures with reflective backing and electronic ballasts for your workroom, garage, and laundry areas.
- Consider using 4-watt mini-fluorescent or electro-luminescent night lights. Both lights are much more efficient than their incandescent counterparts. The luminescent lights are cool to the touch.
- Use CFLs in all the portable table and floor lamps in your home. Consider carefully the size and fit of these systems when you select them. Some home fixtures may not accommodate some of the larger CFLs.
- When shopping for new light fixtures, consider buying dedicated compact fluorescent fixtures with built-in ballasts that use pin-based replacement bulbs.
- For spot lighting, consider CFLs with reflectors. The lamps range in wattage from 13-watt to 32-watt and provide a very directed light using a reflector and lens system.
- Take advantage of daylight by using light-colored, loose-weave curtains on your windows to allow daylight to penetrate the room while preserving



Compact Fluorescent Bulbs

These compact fluorescent bulbs are four times more energy efficient than incandescent bulbs and provide the same lighting.

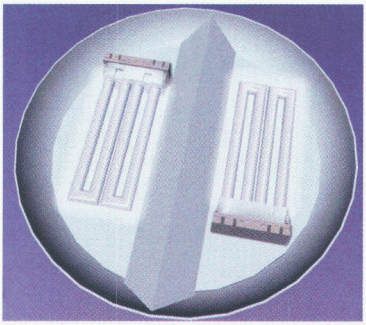


privacy. Also, decorate with lighter colors that reflect daylight.

- If you have torchiere fixtures with halogen lamps, consider replacing them with compact fluorescent torchieres. Compact fluorescent torchieres use 60% to 80% less energy, can produce more light (lumens), and do not get as hot as the halogen torchieres.
- Look for the ENERGY STAR® label when purchasing these products.

Outdoor Lighting

Many homeowners use outdoor lighting for decoration and security. When shopping for outdoor lights, you will find a variety of products, from low-voltage pathway lighting to motion-detector floodlights. Some stores also carry lights powered by small photovoltaic (PV) modules that convert sunlight directly into electricity; consider PV-powered lights for areas that are not close to an existing power supply line.



Torchiere Lamp

Halogen lamps generate excessive heat that can create fire hazards. Use compact fluorescent lamps in your torchiere fixtures. They are safer and use much less energy.

Outdoor Lighting Tips

- Use outdoor lights with a photocell unit or a timer so they will turn off during the day.
- Turn off decorative outdoor gas lamps; just eight gas lamps burning year-round use as much natural gas as it takes to heat an average-size home during an entire winter.
- Exterior lighting is one of the best places to use CFLs because of their long life. If you live in a cold climate, be sure to buy a lamp with a cold-weather ballast.

For more information on energy-efficient lighting, contact:

ENERGY STAR®, (888) STAR-YES (888-782-7937), www.energystar.gov

U.S. Department of Energy's Energy Efficiency and Renewable Energy Clearinghouse (EREC), (800) DOE-3732 www.eren.doe.gov/askanenergyexpert/

Appliances

Appliances account for about 20% of your household's energy consumption, with refrigerators, clothes washers, and clothes dryers at the top of the consumption list.

What's the Real Cost

Every appliance has two price tags—a purchase price and the operating cost.

When you're shopping for appliances, you can think of two price tags. The first one covers the purchase price—think of it as a down payment. The second price tag is the cost of operating the appliance during its lifetime. You'll be paying on that second price tag every month with your utility bill for the next 10 to 20 years, depending on the appliance. Refrigerators last an average of 20 years; room air conditioners and dishwashers, about 10 years each; clothes washers, about 14 years.

When you do have to shop for a new appliance, look for the ENERGY STAR® label. ENERGY STAR® appliances have been identified by the U.S. Environmental Protection Agency and DOE as being the most energy-efficient products in their classes. They usually exceed minimum federal standards by a substantial amount. The appliance shopping guide on pages 29 and 30 lists some of the major appliances that carry the ENERGY STAR® label and provides helpful information on what to look for when shopping for an appliance.

To help you figure out whether an appliance is energy efficient, the federal government requires most appliances to display the bright yellow and black EnergyGuide label. Although these labels will not tell you which appliance is the most efficient, they will tell you the annual energy consumption and operating cost for each appliance so you can compare them yourself.

Dishwashers

Most of the energy used by a dishwasher is for water heating. The EnergyGuide label estimates how much power is needed per year to run the appliance and to heat the water based on the yearly cost of gas and electric water heating.

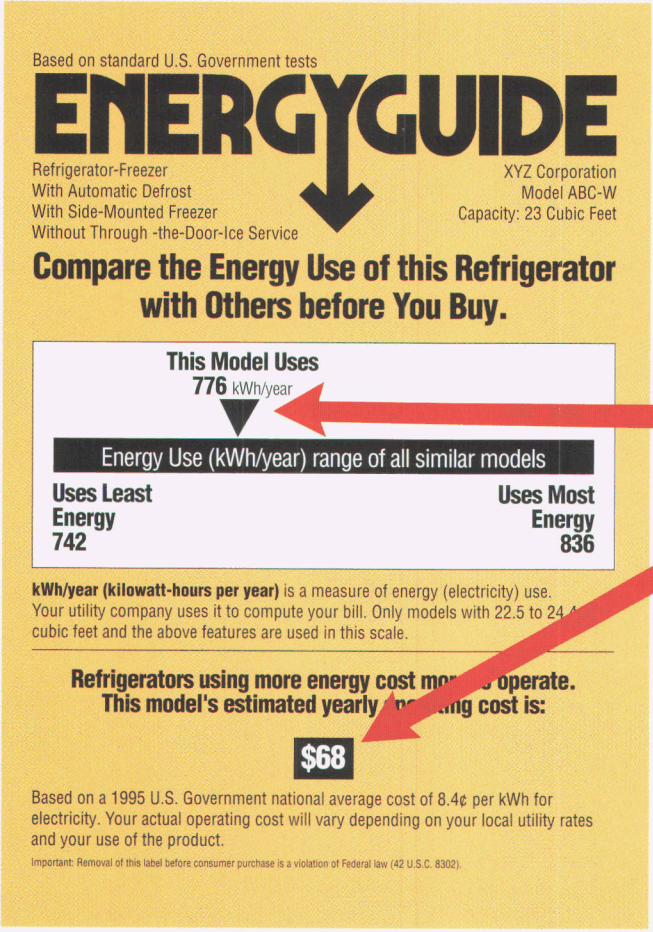
Dishwasher Tips

- Check the manual that came with your dishwasher for the manufacturer's recommendations on water temperature; many have internal heating elements that allow you to set the water heater in your home to a lower temperature (115°F).
- Scrape, don't rinse, off large food pieces and bones. Soaking or prewashing is generally only recommended in cases of burned-on or dried-on food.
- Be sure your dishwasher is full, but not overloaded.
- Don't use the "rinse hold" on your machine for just a few soiled dishes. It uses 3 to 7 gallons of hot water each time you use it.

- Let your dishes air dry; if you don't have an automatic air-dry switch, turn off the control knob after the final rinse and prop the door open a little so the dishes will dry faster.
- When shopping for a new dishwasher, look for the ENERGY STAR® label. ENERGY STAR® dishwashers use less water and energy and must exceed minimum federal standards by at least 13%.

What's a kilowatt?

When you cook a pot of rice for 1 hour, you use 1000 watt hours of electricity! One thousand watt hours equals 1 kilowatt-hour, or 1 kWh. Your utility bill usually shows what you are charged for the kilowatt-hours you use. The average residential rate is 8.3 cents per kWh. A typical U.S. household consumes about 10,000 kWh per year, costing an average of $830 annually.



How to Read the EnergyGuide Label

The EnergyGuide label gives you two important pieces of information you can use for comparison of different brands and models when shopping for a new refrigerator:

- Estimated energy consumption on a scale showing a range for similar models
- Estimated yearly operating cost based on the national average cost of electricity.

Refrigerator Choices

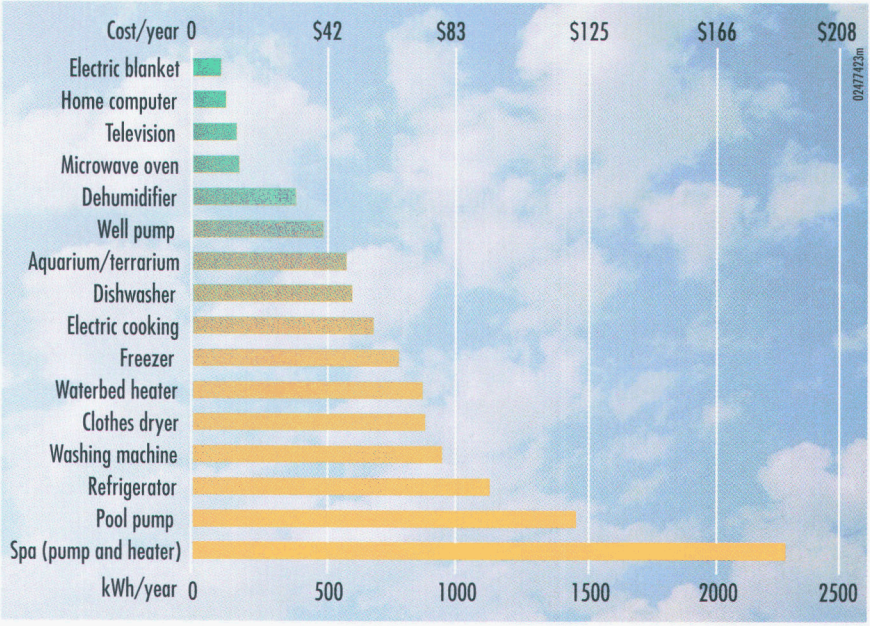
Refrigerators with the freezer on top are more efficient than those with freezers on the side.

Refrigerators

The EnergyGuide label on new refrigerators will tell you how much electricity in kilowatt-hours (kWh) a particular model uses in one year. The smaller the number, the less energy the refrigerator uses and the less it will cost you to operate. In addition to the EnergyGuide label, don't forget to look for the ENERGY STAR® label. A new refrigerator with an ENERGY STAR® label will save you between $35 and $70 a year compared to the models designed 15 years ago. This adds up to between $525 and $1,050 during the average 15-year life of the unit.

Refrigerator/Freezer Energy Tips

- Look for a refrigerator with automatic moisture control. Models with this feature have been engineered to prevent moisture accumulation on the cabinet exterior without the addition of a heater. This is not the same thing as an "anti-sweat" heater. Models with an anti-sweat heater will consume 5% to 10% more energy than models without this feature.
- Don't keep your refrigerator or freezer too cold. Recommended temperatures are 37° to 40°F for the fresh food compartment of the refrigerator and 5°F for the freezer section. If you have a separate freezer for long-term storage, it should be kept at 0°F.
- To check refrigerator temperature, place an appliance thermometer in a glass of water in the center of the refrigerator. Read it after 24 hours. To check the freezer temperature, place a thermometer between frozen packages. Read it after 24 hours.
- Regularly defrost manual-defrost refrigerators and freezers; frost buildup decreases the energy efficiency of the unit. Don't allow frost to build up more than one-quarter of an inch.
- Make sure your refrigerator door seals are airtight. Test them by closing the door over a piece of paper or a dollar bill so it is half in and half out of the refrigerator. If you can pull the paper or bill out easily, the latch may need adjustment or the seal may need replacing.



How Much Electricity Do Appliances Use?

This chart shows how much energy a typical appliance uses per year and its corresponding cost based on national averages. For example, a refrigerator uses almost five times the electricity the average television uses.

- Cover liquids and wrap foods stored in the refrigerator. Uncovered foods release moisture and make the compressor work harder.
- Move your refrigerator out from the wall and vacuum its condenser coils once a year unless you have a no-clean condenser model. Your refrigerator will run for shorter periods with clean coils.

Other Energy-Saving Kitchen Tips

- Be sure to place the faucet lever on the kitchen sink in the cold position when using small amounts of water; placing the lever in the hot position uses energy to heat the water even though it may never reach the faucet.
- If you need to purchase a gas oven or range, look for one with an automatic, electric ignition system. An electric ignition saves gas because a pilot light is not burning continuously.
- In gas appliances, look for blue flames; yellow flames indicate the gas is burning inefficiently and an adjustment may be needed. Consult the manufacturer or your local utility.
- Keep range-top burners and reflectors clean; they will reflect the heat better, and you will save energy.
- Use a covered kettle or pan to boil water; it's faster and it uses less energy.
- Match the size of the pan to the heating element.
- If you cook with electricity, turn the stovetop burners off several minutes before the allotted cooking time. The

heating element will stay hot long enough to finish the cooking without using more electricity. The same principle applies to oven cooking.

- Use small electric pans or toaster ovens for small meals rather than your large stove or oven. A toaster oven uses a third to half as much energy as a full-sized oven.
- Use pressure cookers and microwave ovens whenever it is convenient to do so. They can save energy by significantly reducing cooking time.

Laundry

About 80% to 85% of the energy used for washing clothes is for heating the water. There are two ways to reduce the amount of energy used for washing clothes—use less water and use cooler water. Unless you're dealing with oily stains, the warm or cold water setting on your machine will generally do a good job of cleaning your clothes. Switching your temperature setting from hot to warm can cut a load's energy use in half.

When shopping for a new washer, look for an ENERGY STAR® machine. These machines may cost more to buy but use about a third of the energy and less water than typical machines. You'll also save more on clothes drying, because most remove more water from your clothes during the spin cycle.

When shopping for a new clothes dryer, look for one with a moisture sensor that automatically shuts off the machine when your clothes are dry. Not only will this save energy, it will save wear and tear on your clothes caused by over-drying. Keep in mind that gas dryers are less expensive to operate than electric dryers. The cost of drying a typical load of laundry in an electric dryer is 30 to 40 cents compared to 15 to 25 cents in a gas dryer.

Laundry Tips

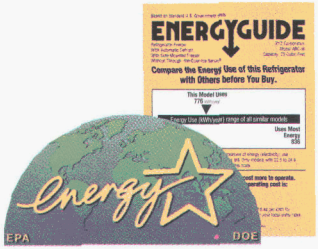
- Wash your clothes in cold water using cold-water detergents whenever possible.
- Wash and dry full loads. If you are washing a small load, use the appropriate water-level setting.
- Dry towels and heavier cottons in a separate load from lighter-weight clothes.
- Don't over-dry your clothes. If your machine has a moisture sensor, use it.
- Clean the lint filter in the dryer after every load to improve air circulation.
- Use the cool-down cycle to allow the clothes to finish drying with the residual heat in the dryer.
- Periodically inspect your dryer vent to ensure it is not blocked. This will save energy and may prevent a fire. Manufacturers recommend using rigid venting material, not plastic vents that may collapse and cause blockages.
- Look for the ENERGY STAR® and EnergyGuide labels.

For more information on energy-efficient appliances, contact:

Association of Home Appliance Manufacturers, (202) 872-5955, www.aham.org

ENERGY STAR®, (888) STAR-YES (888-782-7937), www.energystar.gov

U.S. Department of Energy's Energy Efficiency and Renewable Energy Clearinghouse (EREC), (800) DOE-3732 www.eren.doe.gov/askanenergyexpert/



Major Appliance Shopping Guide

This easy-to-read guide may help you understand how appliances are rated for efficiency, what the ratings mean, and what to look for while shopping for new appliances.

Appliances	Rating	Special Considerations
Natural Gas and Oil Systems	Look for the **FTC** (Federal Trade Commission) EnergyGuide label with an **AFUE** (Annual Fuel Utilization Efficiency) rating for gas- and oil-fired furnaces and boilers. The AFUE measures the seasonal or annual efficiency. ENERGY STAR® furnaces have a 90 AFUE or greater.	Bigger is not always better! Too large a system costs more and operates inefficiently. Have a professional assess your needs and recommend the type and size of system you should purchase.
Air-Source Heat Pumps	Look for the EnergyGuide label that contains the **SEER** (Seasonal Energy Efficiency Ratio) and **HSPF** (Heating Seasonal Performance Factor) for heat pumps. The SEER measures the energy efficiency during the cooling season and HSPF measures the efficiency during the heating season. The ENERGY STAR® minimum efficiency level is 12 SEER or higher.	If you live in a cool climate, look for a heat pump with a high HSPF. If you purchase an ENERGY STAR® heat pump, you are getting a product that is in the top 25% for efficiency. Contact a professional for advice on purchasing a heat pump.
Central Air Conditioners	Look for the EnergyGuide label with a **SEER** for central air conditioners. The ENERGY STAR® minimum efficiency level is 12 SEER. ENERGY STAR® central air conditioners exceed federal standards by at least 20%.	Air conditioners that bear the ENERGY STAR® label may be twice as efficient as some existing systems. Contact a professional for advice on sizing a central air system.
Room Air Conditioners	Look for the EnergyGuide label with an **EER** (Energy Efficiency Ratio) for room air conditioners. The higher the EER, the more efficient the unit is. ENERGY STAR® units exceed federal standards by at least 10%.	**What size to buy?** Area in square feet / Btu/hour 100 to 150 / 5,000 150 to 250 / 6,000 250 to 350 / 7,000 350 to 400 / 9,000 400 to 450 / 10,000 450 to 550 / 12,000 550 to 700 / 14,000 700 to 1,000 / 18,000 Two major decisions should guide your purchase. Buy a correctly sized unit. Buy an energy-efficient unit. If the room is very sunny, increase capacity by 10%. If the unit is for a kitchen, increase the capacity by 4,000 Btu per hour.

The ENERGY STAR® label is the government's seal of approval. It was created by the U.S. Department of Energy and the U.S. Environmental Protection Agency. These agencies set the criteria to help shoppers for large and small home appliances identify the most energy-efficient products on the market. ENERGY STAR®-labeled appliances exceed existing federal efficiency standards, typically, by 13% to 20%, and as much as 110% for some appliances. Customers can be assured that the appliance being purchased is a high-performance product which will reduce the operating cost of that appliance or product every month during the course of its lifetime.

Appliances	Rating	Special Considerations
Programmable Thermostats	For minimum ENERGY STAR® efficiency, thermostats should have at least two programs, four temperature settings each, a hold feature that allows users to temporarily override settings, and the ability to maintain room temperature within 2°F of desired temperature.	Look for a thermostat that allows you to easily use two separate programs; an "advanced recovery" feature that can be programmed to reach the desired temperature at a specific time; a hold feature that temporarily overrides the setting without deleting preset programs; and the ENERGY STAR® label.
Water Heaters	Look for the EnergyGuide label that tells how much energy the water heater uses in one year. Also, look for the **FHR** (First Hour Rating) of the water heater, which measures the maximum hot water the heater will deliver in the first hour of use.	If you typically need a lot of hot water at once, the FHR will be important to you. Sizing is important—call your local utility for advice.
Windows	Look for the **NFRC** (National Fenestration Rating Council) label that provides U-values and **SHGC** (solar heat gain coefficient) values. The lower the U-value, the better the insulation.	Look at the Climate Region Map on the ENERGY STAR® label to be sure that the window, door, or skylight you have selected is appropriate for where you live.
Refrigerators and Freezers	Look for the EnergyGuide label that tells how much electricity, in kilowatt-hours (kWh), the refrigerator or freezer will use in one year. The smaller the number, the less energy it uses. ENERGY STAR® labeled units exceed July 1, 2001, federal standards by at least 10%.	Look for energy-efficient refrigerators and freezers. Refrigerators with freezers on top are more efficient than those with freezers on the side. Also look for heavy door hinges that create a good door seal.
Dishwashers	Look for the EnergyGuide label that tells how much electricity, in kilowatt-hours (kWh), the dishwasher will use in one year. The smaller the number, the less energy it uses. ENERGY STAR® dishwashers exceed federal standards by at least 25%.	Look for features that will reduce water use, such as booster heaters and smart controls. Ask how many gallons of water the dishwasher uses during different cycles. Dishwashers that use the least amount of water will cost the least to operate.
Clothes Washers	Look for the EnergyGuide label that tells how much electricity, in kilowatt-hours (kWh), the clothes washer will use in one year. The smaller the number, the less energy it uses. ENERGY STAR® clothes washers use less than 50% of the energy used by standard washers.	Look for the following design features that help clothes washers cut water usage: water level controls, "suds-saver" features, spin cycle adjustment, and large capacity. For double the efficiency, buy an ENERGY STAR® unit.

Source List

Air Conditioning and Refrigeration Institute
4100 North Fairfax Drive, Suite 200
Arlington, VA 22203
Phone: (703) 524-8800
Fax: (703) 528-3816
E-mail: ari@ari.org
www.ari.org

The Alliance to Save Energy
1200 18th Street, NW, Suite 900
Washington, DC 20036
Phone: (202) 857-0666
Fax: (202) 331-9588
E-mail: info@ase.org
www.ase.org

American Architectural Manufacturers Association (AAMA)
1827 Walden Office Square, Suite 104
Schaumburg, IL 60173-4628
Phone: (847) 303-5664
Fax: (847) 303-5774
www.aamanet.org

American Council for an Energy-Efficient Economy (ACEEE)
1001 Connecticut Avenue, NW, Suite 801
Washington, DC 20036
Phone (Research and Conferences): (202) 429-8873
Publications: (202) 429-0063
E-mail: info@aceee.org
www.aceee.org

American Society of Landscape Architects (ASLA)
636 Eye Street, NW
Washington, DC 20001-3736
Phone: (202) 898-2444
Fax: (202) 898-1185
www.asla.org

American Solar Energy Society (ASES)
2400 Central Avenue, Unit G-1
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www.ases.org

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Cellulose Insulation Manufacturers Association (CIMA)
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E-mail: info@cellulose.org
www.cellulose.org

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Alliance to Save Energy
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E-mail: ewc@ase.org
www.efficientwindows.org

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www.energystar.gov

Federal Trade Commission
Bureau of Consumer Protection
CRC-240
Washington, DC 20580
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www.ftc.gov

Florida Solar Energy Center (FSEC)
1679 Clearlake Road
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www.fsec.ucf.edu

Gas Appliance Manufacturers Association
2107 Wilson Blvd, Ste 600
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Fax: (703) 525-6790
www.gamanet.org

Insulation Contractors Association of America (ICAA)
1321 Duke Street, Suite 303
Alexandria, VA 22314
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E-mail: icaa@insulate.org
www.insulate.org

National Arbor Day Foundation (NADF)
100 Arbor Avenue
Nebraska City, NE 68410
Phone: (402) 474-5655
www.arborday.org

National Association of Home Builders (NAHB)
1201 15th Street, NW
Washington, DC 20005
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E-mail: info@nahb.com
www.nahb.org

National Association of State Energy Officials (NASEO)
1414 Prince Street, Suite 200
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Phone: (703) 299-8800
Fax: (703) 299-6208
E-mail: information@naseo.org
www.naseo.org

National Insulation Association
99 Canal Center Plaza, Suite 222,
Alexandria, VA 22314-1538
Phone: (703) 683-6422
Fax: (703) 549-4838
www.insulation.org

National Wood Window and Door Association
1400 East Touhy Avenue, Suite 470
Des Plaines, IL 60018
Phone: (800) 223-2301
Fax: (847) 299-1286
www.nwwda.org

North American Insulation Manufacturers Association (NAIMA)
44 Canal Center Plaza, Suite 310
Alexandria, VA 22314
Phone: (703) 684-0084
Fax: (703) 684-0427
E-mail: insulation@naima.org
www.naima.org

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One Owens Corning Parkway
Toledo, OH 43659
Customer Service Hotline:
(800) GET PINK (800-438-7465)
E-mail: answers@owenscorning.com
www.owenscorning.com

Polyisocyanurate Insulation Manufacturers Association (PIMA)
1331 F Street, NW, Suite 975
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www.pima.org

Rocky Mountain Institute
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E-mail: outreach@rmi.org
www.rmi.org

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E-mail: info@seia.org
www.seia.org

Solar Rating and Certification Corporation (SRCC)
C/O FSEC, 1679 Clearlake Road
Cocoa, FL 32922-5703
Phone: (321) 638-1537
E-mail: srcc@fsec.ucf.edu
Fax: (407) 638-1010
www.solar-rating.org

References

U.S. Department of Energy's
Energy Efficiency and Renewable
Energy Clearinghouse (EREC)
P.O. Box 3048
Merrifield, VA 22116
Fax: (703) 893-0400
(800) DOE-3732 (800-363-3732)
E-mail: doe.erec@nciinc.com
www.eren.doe.gov/askanenergyexpert/

U.S. Department of Energy's
Building Technologies Program, EE41
1000 Independence Ave. SW
Washington, D.C. 20585
www.eren.doe.gov/buildings

Association of Home Appliance Manufacturers, 1111 19th St., NW, Ste. 402 Washington, DC 20036 (202) 872-5955

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U.S. Department of Energy's
Energy Efficiency and Renewable
Energy Clearinghouse Fact Sheets,
P.O. Box 3048, Merrifield, VA 22116,
(800) DOE-EREC (800-363-3732).
www.eren.doe.gov/askanenergyexpert/
www.ornl.gov/roofs+walls/insulation/ins_11.html

U.S. Department of Energy Office of Building Technology, State and Community Programs, *Core Databook*, May, 1997

Wilson, Alex, and Morrill, John. *Consumer Guide to Home Energy Savings*. American Council for an Energy-Efficient Economy (ACEEE), 1001 Connecticut Avenue, NW, Suite 801, Washington, D.C. 20036

Energy Savers: Tips on Saving Energy & Money at Home is available online at www.eren.doe.gov/consumerinfo/energy_savers

Sign up for the free monthly Quick Tip newsletter: www.eren.doe.gov/energy_savers_partners/quick_tip.html

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Produced for the
U.S. Department of Energy (DOE)
by the National Renewable Energy Laboratory,
a DOE national laboratory

Funding and technical preparation provided by
DOE's Office of Energy Efficiency and Renewable Energy

DOE/GO-102002-1652
October 2002

Printed on paper containing at least 50% wastepaper, including 10% postconsumer waste

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Easy ways to...

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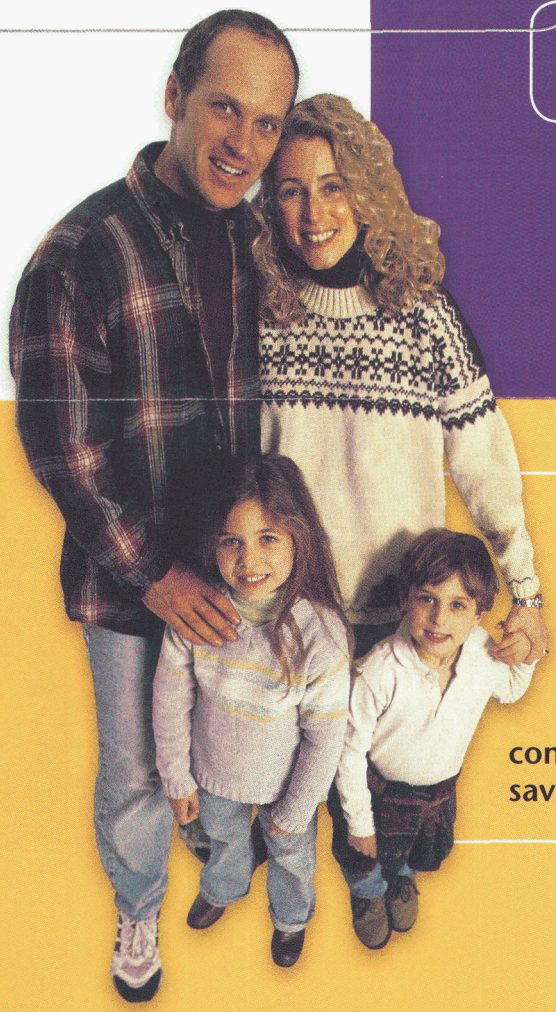

Making a few energy-efficient improvements in your home can make it more comfortable and save you money.

Tips...

1. Adjust the Thermostat

During the heating season, set your thermostat between 68 and 70 degrees, unless otherwise directed by your doctor. If you are away from home for more than eight hours, setting the thermostat four to six degrees lower in the winter or higher in the summer can save you about 7 to 10 percent in heating/cooling costs. Installing an automatic setback thermostat can also help regulate the temperature in your home more efficiently.

2. Replace Filters Regularly

Make it a habit to clean or replace furnace or air conditioning filters monthly. Clogged filters waste energy and make your heating and cooling system work harder than necessary.

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www.swgas.com

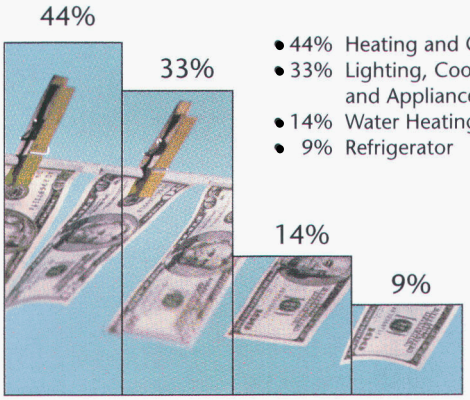
Continued on back...

Tips *(continued)...*

3. Routine Furnace Inspections
Southwest Gas recommends that qualified contractors inspect your natural gas furnace annually to help ensure that it is operating safely and efficiently. The company's Energy Specialists can refer you to qualified contractors to perform this inspection.

4. Seal the Gaps
Caulking and weather stripping spaces around doors and windows, or installing inexpensive switch-plate gaskets between the outlet and an exterior wall will prevent the loss of precious energy dollars. About 2 percent of the heat loss in your home can occur through switch and plug outlets on exterior walls.

How We Use Energy in Our Homes*



- 44% Heating and Cooling
- 33% Lighting, Cooking, and Appliances
- 14% Water Heating
- 9% Refrigerator

Sources:
**Department of Energy, "Consumer Guide to Home Energy Savings"*

5. Let Nature Help
During the heating season, open shades, blinds, and draperies in rooms that receive direct sunlight to take advantage of the sun's warmth. Be sure to close them before the sun sets to preserve the heat.

6. Close Fireplace Damper When Not In Use
When you're not using your fireplace, make sure you close the damper to keep the warmth of your home from escaping up the chimney. Since most building codes now require damper stops for natural gas fireplaces to prevent them from being fully closed, keep the glass doors on your fireplace closed when it's not in use.

7. Use Household Appliances Efficiently
Washing full loads when using your dishwasher and washing machine saves time, detergent and energy. (An automatic dishwasher uses the same amount of hot water for both small and full loads.) Drying laundry loads one after another dries clothes faster because the dryer doesn't have to reheat after each load. Make sure you clean the lint filter after every load to save energy and speed drying time.

8. Conserve Heat In Your Oven
Preheat your oven only when needed — and never for more than 10 minutes. Arrange the oven racks before you turn on the oven, because an oven loses about 20 percent of its heat every time the door is opened. Using a timer instead of frequently opening the oven door to check on food will also save energy.

9. Conserve Hot Water
Installing low-flow showerheads and faucets will keep your energy dollars from going down the drain. Using cold-water laundry detergents, along with a warm wash/cool rinse setting, can help you save energy and reduce costs. It's the detergent that brightens whites and kills germs.

10. Limit Use Of Exhaust Fans
In just one hour, exhaust fans in your kitchen or bathroom can pull out a house full of warm or cooled air. Turn fans off as soon as they have completed their job.

11. Repair Leaky Faucets
Leaky faucets can waste gallons of water in a short period of time. Repairing leaky faucets saves energy and a precious resource, too.

12. Don't Forget Your Natural Gas Water Heater
Water heating is the third largest energy user in your home. To reduce your water-heating costs, turn the dial on your water heater and set it to "low" (120˚F), use an approved water heater insulated blanket (unless manufacturer indicates otherwise), and insulate the water pipes at the top of the water heater. If no one is going to be at home for one week or more, turning down the dial of your water heater to the lowest setting can also save energy dollars.

For more information on home energy efficiency or high-efficiency natural gas appliances, please contact the Energy Specialists at 1-800-OK-GAS-OK (654-2765), visit the EnergyStar Web site at *www.energystar.gov*, or call 1-888-STAR-YES (782-7937).

Form 530.1 (10/2003)

NEWS TO USE
December 2004

WINTER

Bill to Reflect Higher Natural Gas Prices

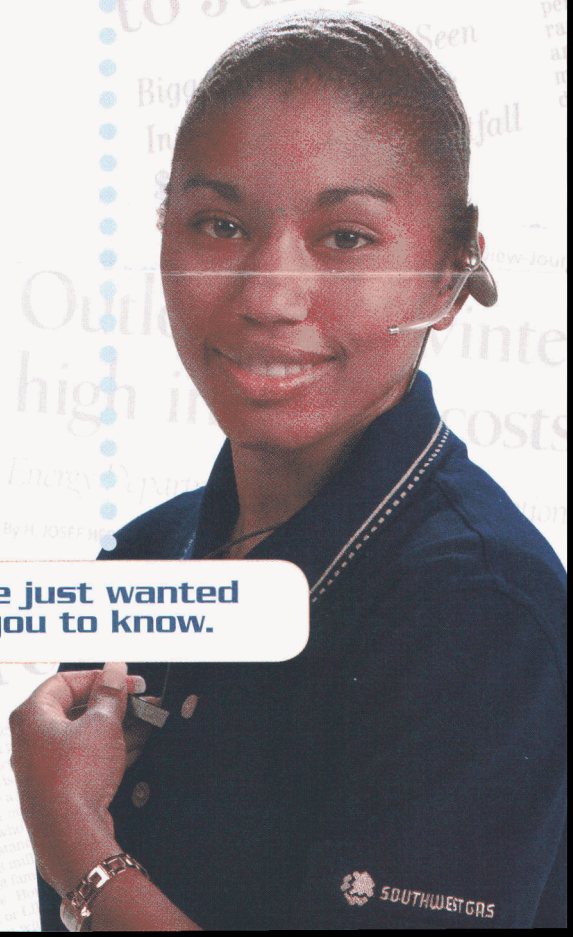
For more than a year, there has been a constant barrage of news about higher energy prices, including the cost of natural gas.

As a Southwest Gas customer, you have already experienced some of these increases through the Purchased Gas Adjustments that appear on your monthly bill. With colder weather, winter bills will reflect not only an increase in usage, but also the higher cost of natural gas.

The natural gas industry started experiencing more volatility in pricing several years ago. To minimize the impact of these price fluctuations, the company purchased about half of its gas supplies for this winter with fixed-priced contracts. Prices for the remainder of the supplies will be determined by the marketplace on a monthly or daily basis.

The reasons for higher prices boil down to one fact: demand for natural gas is increasing faster than supply. We want to reassure customers that we have secured ample supplies of natural gas for this winter. However, the price we paid was higher than last winter.

The price Southwest Gas pays for natural gas is passed on to customers dollar for dollar with no profit allowed.



SOUTHWEST GAS
www.swgas.com

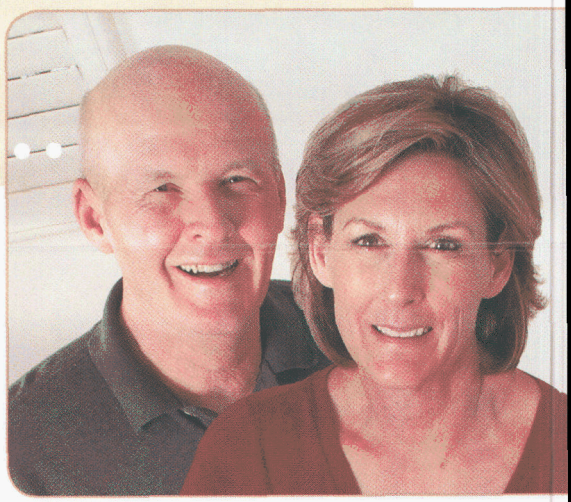
HAVING TROUBLE Paying Your Bills?

We realize that with higher winter heating bills, it may be difficult for some customers to pay their bills. There is help available.

At the first indication that you may have a bill-payment problem, we encourage you to call your local Southwest Gas office. Often times, we can help you make extended payment arrangements.

We're also encouraging customers to enroll in the company's Equal Payment Plan. The program equalizes your gas bill into 12 monthly payments. In addition, Southwest Gas has established a special program, Energy Share, to help customers who have exhausted other forms of financial help. The program is administered by the Salvation Army throughout our service territories.

Southwest Gas representatives can also provide the names and telephone numbers of state agencies that provide energy payment assistance.



PREPARING YOUR HOME For Cold Weather

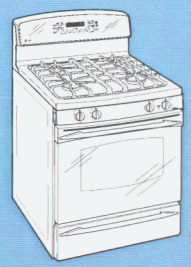
Get a furnace checkup.
The most important thing you can do for your home is to have your gas furnace checked out by a professional. It can prolong the life of the furnace and decrease energy usage. You may even uncover a potentially dangerous situation such as a cracked heat exchanger or a blocked vent pipe.

You can also call the Southwest Gas Energy Specialists toll-free at **1-800-654-2765**, or visit the Southwest Gas Web site, **www.swgas.com**, for information on how to reduce your energy bills and the names of local contractors who can inspect your furnace.

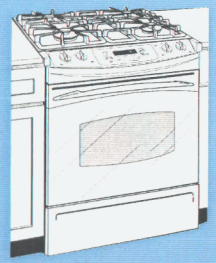
- **Buy foam gaskets for all of your exterior wall outlets.**
  To keep cool air from entering your home from exterior outlets, install foam gaskets on all light switches and external electric receptacles. Be sure to shut off the electricity at the breaker box during installation.
- **Caulk and weatherstrip.**
  Concentrate on areas around windows and doors where outside air can enter the home. Seal up the larger air leaks in your home – the ones that whistle on windy days.
- **Repair faucets.**
  Save water, fuel, and money by replacing leaking water faucets.
- **Install a programmable thermostat.**
  A programmable thermostat can automatically reduce the temperature setting at night as well as when you are away from home.
- **Use the warmth of the sun.**
  Blinds and drapes can serve as additional insulation in your home. Open them during the day to let the sun help warm your home. And be sure to close them at night to help keep the warmth from escaping through the windows.
- **Insulate pipes and hot air ducts.**
  Insulate any hot water pipes or heating ducts which run through crawlspaces and attics.

SOUTHWEST GAS
www.swgas.com

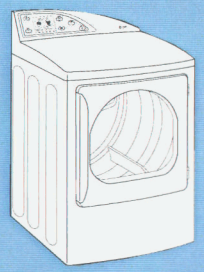
How to find the model and serial numbers on your appliance:



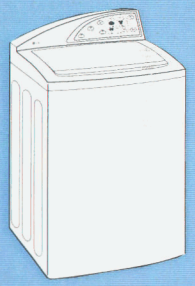
Free-Standing Gas Ranges
Lower left corner
(Open drawer/panel)



Slide-in Gas Ranges
Lower left corner
(Open door)



GE Profile Harmony™ Dryer
Upper right corner
(Open door)



GE Profile Harmony™ Washer
Right center on back

Sample model and serial number tag

Any questions locating your model and serial number, please call the Energy Specialists **1-800-654-2765**

$100 Rebate

Gas cooking...ultimate temperature control meets classy style.

$100 Rebate
available on selected Profile™ free-standing and slide-in gas ranges.

$100 Rebate
GE Profile Harmony™ Washer/ Dryer offers ultimate clothing care and ultimate savings.

- Energy Star® rated
- 40% less water
- 20% faster drying
- Less drying cost *(according to a leading consumer magazine.)*

Advantage Gas!

$100 Rebate

SOUTHWEST GAS
www.swgas.com

$100 Rebate

Now through February 2, 2004, you can receive $100 cash back from GE when you purchase eligible GE Profile™ appliances from an authorized retail dealer.

The EPA's Energy Star® rating on the Harmony™ washer/dryer pair means high energy efficiency. You'll also **save water** - up to 40% less than a traditional topload machine. And compared to electric drying, the gas dryer will **save time** - about 20% faster drying, and **save money,** an average of 25 cents per load, according to a leading consumer magazine. Your clothing will receive the best of care because the washer communicates directly with the dryer to automatically determine the proper setting. Your clothes will last longer and look better than ever.

Simply have your appliance dealer fill out the **To Be Completed by Retail Dealer** on the next panel. You fill out the **To Be Completed by Consumer** section on the last panel, following the instructions that appear there.

For more information call Southwest Gas Energy Services at **1-800-654-2765** or visit **www.swgas.com** and click on "Special Offers."

SOUTHWEST GAS
www.swgas.com

Receive $100 cash back from GE when you purchase eligible GE Profile™ appliances September 10, 2003, through February 2, 2004 from an authorized retail dealer.

To Be Completed By Retail Dealer **Please Print Or Type**

3017-ZA2-SWG

Store Name

Address

City

State Zip

I represent that on Month Day, a new GE Profile™ appliance (check model number below) was sold to the consumer listed at right for personal use and not for resale, and this is the only GE consumer incentive offer certificate that will be submitted in connection with the purchase of the GE appliance indicated.

Free-Standing Gas Ranges

- ○ JGB920 ..... $100
- ○ JGB915 ..... $100
- ○ JGB905 ..... $100
- ○ JGB900 ..... $100
- ○ J2B915 ..... $100

Slide-In Gas Ranges

- ○ JGSP48 ..... $100
- ○ JGS968 ..... $100
- ○ J2S968 ..... $100

GE Profile Harmony™ Washer and Dryer

- ○ WPGT9350C and DPGT750GC....$100

$100 Rebate

to obtain your $100 cash back, remember to:

- Have the dealer fill out the retailer section of the form
- Complete the consumer section of the form
- Include the serial number(s)
- Include a copy of the invoice or sales receipt showing the model number(s) and date
- Sign the redemption certificate
- Mail the entire form to GE by March 1, 2004

To Be Completed By Consumer

Serial Number

Here's how to get your cash back from GE...

- **Fill in all information on this form.** Incomplete certificates will be returned to the consumer.
- **YOU MUST FILL IN PRODUCT SERIAL NUMBER.**
- Include the **RETAIL INVOICE** or **SALES SLIP** (photocopy acceptable) from the retail dealer, showing the model number and the date purchased.
- Mail no later than March 1, 2004, to: **GE Cash Back Rebate Offer, P.O. Box 7700, Louisville, KY 40257-0700**
- **Allow eight to ten weeks for delivery.** Keep a record of when you mailed this certificate and the 800# to call. If not received after ten weeks, call this toll-free number Monday through Friday from 9:00 AM to 5:00 PM Eastern Time: **1-800-436-6838.**

Consumer's Name

Address

City

State County Zip

Phone

E-Mail Address*

* Please provide your email address to receive, via email, discounts, special offers and other important communications from GE Appliances (GEA).

__ Check here if you do not want to receive communications from GEA's carefully selected partners.

This offer is limited to one rebate on each listed eligible model purchased from an authorized retail dealer September 10, 2003, through February 2, 2004. Offer void where prohibited, taxed, or restricted by law. **CERTIFICATE MUST BE POSTMARKED NO LATER THAN MARCH 1, 2004.**
LATE SUBMISSIONS WILL NOT BE ACCEPTED! This certificate must accompany your request. Omission of sales receipt or any other information will delay processing; we will return all materials to be resubmitted with complete documentation. Please allow eight to ten weeks from the time the redemption form is received for delivery of Cash Back check.

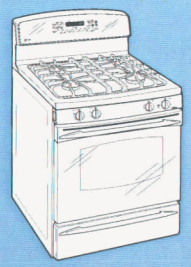
THIS OFFER IS NO LONGER VALID IF CHECK IS NOT CASHED WITHIN 11 MONTHS OF DATE OF CHECK. I/we hereby understand and accept the above requirements for receipt of this Cash Rebate.

Customer Signature _____

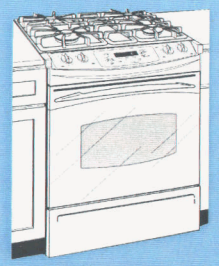
Date _____

© 2003 General Electric Company
PC36989

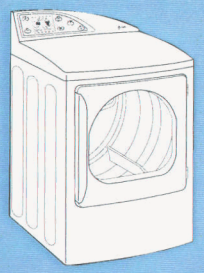
How to find the model and serial numbers on your appliance:



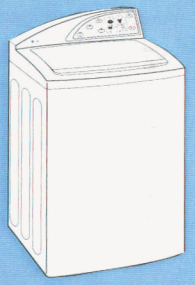
Free-Standing Gas Ranges
Lower left corner
(Open drawer/panel)



Slide-in Gas Ranges
Lower left corner
(Open door)

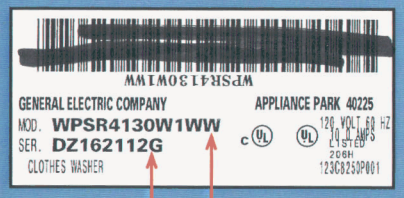


GE Profile Harmony™ Dryer
Upper right corner
(Open door)



GE Profile Harmony™ Washer
Right center on back

Sample model and serial number tag



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To Be Completed By Consumer

Serial Number

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Consumer's Name

Address

City

State County Zip

Phone

E-Mail Address*

* Please provide your email address to receive, via email, discounts, special offers and other important communications from GE Appliances (GEA).

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Customer Signature _____

Date _____

© 2003 General Electric Company
PC36989

Southwest Gas Corporation
Docket No. G-01551A-04-__

BEFORE THE ARIZONA CORPORATION COMMISSION

Prepared Direct Testimony
of
A. BROOKS CONGDON

Q. 1 Please state your name and business address.

A. 1 My name is A. Brooks Congdon. My business address is 5241 Spring Mountain Road, Las Vegas, Nevada 89150-0002.

Q. 2 By whom are you employed and in what capacity?

A. 2 I am employed by Southwest Gas Corporation (Southwest or the Company) as Manager/Pricing and Tariffs.

Q. 3 Please state your educational background and business experience.

A. 3 I received a Bachelor of Science degree in Economics from Iowa State University in 1975.

In 1976, I began working as a Forecasting Analyst for General Telephone of the Midwest. My responsibilities there primarily involved projecting growth in demand for telephone service in eastern Nebraska and western Iowa.

In 1980, I began working as a Rate Analyst in the Rate department of Pacific Power and Light Company in Portland, Oregon, involved primarily in performing cost-of-service studies and designing rates for electric and water utilities.

In 1984, I accepted a position at Kansas Electric Power Cooperative in Topeka, Kansas where my primary

responsibilities included coordination of intervention in wholesale power rate cases at the Federal Energy Regulatory Commission and preparation of the cooperatives' rate case activity before the Kansas Corporation Commission.

I began my employment with Southwest in 1987 in the Rate department (now the Pricing and Tariffs department) as a Rate Specialist. Since that time, I have held positions of increasing responsibility. My present position is Manager/Pricing and Tariffs.

Q. 4 Briefly state the nature of your present responsibilities and duties with Southwest.

A. 4 I report to the Director/Pricing and Tariffs. I am responsible for the development of rate design and tariff proposals for Southwest in its three-state retail rate jurisdictions.

Q. 5 Have you previously testified before any regulatory commission?

A. 5 Yes. I have submitted testimony and testified before the Arizona Corporation Commission (Commission), the Public Utilities Commission of Nevada, the California Public Utilities Commission, and the Kansas Corporation Commission.

Q. 6 Briefly describe the purpose of your prepared direct testimony and the schedules you are sponsoring in this proceeding?

A. 6 The purpose of my testimony is to sponsor Southwest's adjustments to customer bills and volumes for ratemaking

purposes, the calculation of revenues at present and proposed rates, the utilization of Southwest's embedded customer class cost of service study (ECCOSS) to allocate Southwest's proposed margin revenue requirement to customer classes, and the development of Southwest's proposed rates and Southwest's proposed changes to tariff schedules. I am sponsoring Schedule C-2, Adjustment Nos. 1 and 2 and Schedules H-1 through H-8.

VOLUME AND CUSTOMER ADJUSTMENTS

Q. 7 Please describe the methodology Southwest utilized to develop the annualized number of bills and volumes for the test period under present rate schedules.

A. 7 The development of the billing determinants began with the compilation of the monthly recorded number of bills and therms by rate schedule for the 12-month test year ended August 31, 2004. A number of adjustments were made to the recorded information to derive the adjusted test period billing determinants.

Q. 8 Please describe the adjustments to Southwest's recorded test year billing determinants.

A. 8 After compiling the recorded billing determinants for the test year, Southwest made the following adjustments to the recorded number of bills and therms: (1) billing adjustments, (2) volume annualizations, (3) customer reclassifications, (4) weather normalization, (5) customer annualizations, and (6) reclassification of full margin transportation customers to present rate schedules. These

adjustments are reflected individually by rate schedule in Schedule H-2, Sheets 14 and 15. The adjustments to Southwest's recorded test year number of bills and therms produce the annualized test period number of bills and therms at present rate schedules.

Q. 9 Why have you made these adjustments to the recorded number of bills and therms for the test period?

A. 9 The purpose of the six adjustments is to ensure that Southwest's test period number of bills and volumes accurately reflect a full 12 months of consumption under normal weather conditions for each active customer billed at the end of the test year.

Q. 10 Please explain the purpose of Southwest's proposed billing adjustments.

A. 10 After compiling recorded test year billing determinants, significant billing anomalies were investigated to ensure that the correct consumption level is reflected for each month in the test period. A majority of the corrections for billing adjustments involved restating monthly consumption levels of the impacted accounts, with no impact upon the total test period sales. This was necessary to ensure that the monthly adjusted volumes reflect an accurate portrayal of actual test period consumption. Otherwise, distorted monthly values would affect the reliability of the regression analyses associated with Southwest's weather normalization adjustments, which are discussed in detail by Southwest

witness James L. Cattanach. The impacts of the billing adjustments are summarized by rate schedule in Schedule H-2, Sheet 15, columns (c) and (d).

Q. 11 Please explain Southwest's volume annualization adjustments.

A. 11 Upon completion of the process of correcting for billing adjustments, customer-specific volume annualization adjustments were performed to reflect a full year of consumption for each active customer billed (excluding residential and small commercial customer classes) during August 2004 (the end of the test year). This process involves estimating consumption for months in the test year for which new customers had not been receiving service or were clearly in a start-up phase, as well as removing consumption attributable to specific customers that discontinued service. Volume annualization adjustments are summarized by rate schedule in Schedule H-2, Sheet 15, columns (e) and (f).

Q. 12 Please explain the purpose of Southwest's customer reclassification adjustments.

A. 12 Customer reclassification adjustments move customers and volumes between tariff schedules to the proper schedule based on the end of the test year customer composition. Reclassification adjustments do not impact the overall number of bills or volumes, as shown in Schedule H-2, Sheet 15, line 22, columns (g) and (h).

Q. 13 Earlier in your testimony you referred to weather

normalization adjustments. Please explain the purpose of these adjustments.

A. 13 Weather normalization adjustments were performed for the purpose of providing an accurate depiction of monthly volumes under normal weather conditions. To the extent that weather deviates from normal (average) weather conditions, heat-sensitive consumption per customer is adjusted to provide an accurate representation of monthly volumes under normal weather conditions.

Mr. Cattanach discusses the mechanics of Southwest's weather normalization process in detail in his direct testimony. The net result of Southwest's weather normalization adjustment was a decrease in volumes for the test period of 566,341 therms. The effect of Southwest's weather normalization adjustment by customer class is shown in Schedule H-2, Sheet 14, line 22, column (d).

Q. 14 Were there any other adjustments made to the number of test year bills or volumes under present rate schedules?

A. 14 Yes, there were. Customer annualization adjustments, using the same methodology adopted by the Commission in Decision Nos. 60352 and 64172, were computed for the residential rate schedule and small commercial customers within the general service rate schedules. This method captures the seasonal nature of test year customer growth by comparing the number of customers in the last month of the test year (August 2004), to the same month of the prior year (August 2003). The growth in customers is then

prorated across the test period in declining intervals with 11/12ths of the adjustment in the first month of the test period (September 2003), 10/12ths in the second month, and so forth. Adjustments to annualize volumes were made by multiplying the monthly customer additions by the respective monthly weather-adjusted average use per customer. Customer and volume adjustments are then added to the weather-normalized monthly bills and volumes to produce annualized test period monthly bills and volumes. Customer annualization adjustments are shown in Schedule H-2, Sheet 14, columns (e) and (f).

Q. 15 Why were customer annualization adjustments only performed for the residential schedule and small commercial customers?

A. 15 With the exception of the residential rate schedule and the small commercial customers within the general service rate schedules, all rate schedules have been annualized by individual customer, based upon customer-specific information. These customer-specific annualization adjustments were covered under the volume annualization adjustments previously discussed in my testimony. Because of the sheer magnitude of the residential and small commercial customers, tracking each individual's billing history to perform customer-specific billing or annualization adjustments is impractical. For that reason, annualization adjustments were performed using the number of customers at the end of the test year and

the weather normalized average consumption per customer for the residential and small commercial customers.

Q. 16 Please describe the final adjustment reflected on Schedule H-2, Sheet 14, columns (e) and (f), Reclassification of Full Margin Transportation Customers to Present Rate Schedules.

A. 16 This adjustment reclassifies bills and volumes for full-margin transportation customers to their applicable sales rate schedules to reflect pricing for these customers at present rate schedules.

Q. 17 Did Southwest make any other adjustments to test year bills and volumes at present rate schedules?

A. 17 No. The adjustments I just described complete Southwest's adjustments to test year bills and volumes at present rate schedules. The total of these adjustments are reflected for each rate schedule on Schedule H-2, Sheet 14, columns (g) and (h). Schedule H-2, Sheet 13 displays the recorded test year bills and volumes by rate schedule, the total of Southwest's adjustments from Schedule H-2, Sheet 14 and the resulting adjusted total bills and volumes for each of Southwest's presently effective rate schedules. Revenues at present rates and rate schedules, based on Schedule H-2, Sheet 13 are developed in Schedule H-2, Sheets 1-3.

PROPOSED RATE SCHEDULE RECLASSIFCATION

Q. 18 Please explain the adjustments reflected on Schedule H-2, Sheet 12.

A. 18 Schedule H-2, Sheet 12 contains adjustments to: 1) reclassify customers served under Southwest's current Residential and Small General Gas Service rate schedules to newly proposed rate schedules; 2) reclassify Small Essential Agricultural customers to the proposed Small, Medium and Transportation Eligible General Service rate schedules; and 3) reclassify Armed Forces customers to the appropriate Medium, Large and Transportation Eligible General Service rate schedules. The adjusted total bills and volumes for Southwest's proposed rate schedules reflected on Schedule H-2, Sheet 12, columns (f) and (i) are used in the development of Southwest's proposed rates. Revenues at present rates and proposed rate schedules, based on Schedule H-2, Sheet 12 are developed in Schedule H-2, Sheets 4-8, and revenues at proposed rates and proposed rate schedules are developed in Schedule H-2, Sheets 9-11.

ALLOCATION OF SOUTHWEST'S PROPOSED MARGIN TO CUSTOMER CLASSES

Q. 19 Please describe how you utilized Southwest's ECCOSS in allocating Southwest's proposed margin to customer classes.

A. 19 As in prior rate cases, Southwest has used the ECCOSS as a guide in apportioning its requested increase in margin revenue among customer classes.

Schedule H-6, Sheets 1 and 2 reflect the development of Southwest's proposed allocation of margin to customer classes. The proposed approach results in

narrowing the gap between the system average return and that of the various classes of customers in order to establish margin revenue requirements by class that are more reflective of the cost of providing service.

Southwest proposes to apportion the proposed margin deficiency of $70,809,128 to customer classes using the same methodology adopted by the Commission in Southwest's last Arizona general rate case Docket No. G-01551A-00-0309. Southwest's proposal allocates the margin deficiency based on the system overall percentage margin increase and the relationship for each class of margin at present rates to the margin required for each class to earn the proposed system rate of return. However, no class return at proposed rates should be less than one-half of the proposed system rate of return.

Southwest's proposed allocation of margin consists of the following steps:

(1) For each customer class (excluding negotiated classes), determine the ratio of margin required to earn the proposed system rate of return to margin at present rates;

(2) Multiply the system average percentage increase in margin by the ratio determined in step (1) to develop an adjusted percentage margin increase for each class. The adjusted percentage increases were capped at twice the system average percent increase in margin to more evenly distribute the increase in

margin among customer classes and, because the Natural Gas Engine market is very responsive to price, the percentage was established so there was no overall change in margin for that class;

(3) Ensure the class rate of return is at least one-half of the proposed system rate of return. This requirement was waived for one customer class in order to avoid an unacceptably large percentage increase in margin; and

(4) Allocate any resulting over- or under-collection in margin back to all classes as a percent of margin resulting from step (2).

Q. 20 Why is it important for Southwest to align its rates more closely with the actual cost to provide service?

A. 20 To the extent rates for a class (or classes) of customers do not fully recover Southwest's cost of providing service, growth in those markets results in revenue deficiency. This phenomenon has been particularly noticeable in the residential customer class, which has experienced considerable growth over an extended period of time.

Additionally, competition in Arizona's energy marketplace requires Southwest to eliminate the historical subsidies provided to core customers by customers who have competitive alternatives to natural gas.

As competition increases and energy customers become more sophisticated, aligning rates more closely

with the actual costs of serving each customer class is necessary to ensure customers make economic energy choices.

Q. 21 What are the advantages of Southwest's proposed method of apportioning the proposed increase in margin among customer classes?

A. 21 The proposed allocation methodology apportions the cost of providing service to the different customer classes in a uniform, non-discriminatory manner while continuing the gradual movement of customer class margin responsibility towards fully-allocated cost of service.

Q. 22 Does Southwest recommend that the Commission use this method regardless of the level of margin increase that is ultimately approved?

A. 22 Yes. Depending on the level of margin ultimately authorized by the Commission, Southwest's proposed allocation of margin among customer classes can still be utilized by adjusting customer class margins at the authorized rate of return as discussed in step number (1) above and through following steps (2) through (4).

PROPOSED RATES AND TARIFF CHANGES

Q. 23 What is the objective of Southwest's proposed changes to its rate design in this case?

A. 23 As stated by Southwest witness Edward B. Gieseking, the objective of Southwest's rate design proposal is to maximize, to the extent possible given other rate design considerations, the movement toward cost-based pricing

for its gas distribution services.

Q. 24 Please summarize the rate design and tariff changes that Southwest is proposing in this proceeding.

A. 24 Southwest's proposed rate design and tariff changes are summarized below:

- Establish a new rate schedule for multi-family residential customers to reflect differences in the cost of providing service to multi-family customers and in multi-family customers' annual use of natural gas vis-à-vis single-family residential customers.
- Adjust the seasonally differentiated declining block rate designs for residential rate schedules by reducing the first block volumes, increasing the block rate differentials and extending the length of the summer season.
- Incorporate the low-income residential discount under Southwest's proposed single- and multi-family rate schedules and cancel Rate Schedule No. G-10, Low-Income Residential Gas Service.
- Cancel Southwest's Rate Schedule Nos. G-15 and G-16 Special Residential Gas Service.
- Add an additional general service rate schedule. Current Small General Service customers whose consumption is less than or equal to 7,200 therms annually, have been divided into the new Small (up to 600 therms per year) and Medium General Service customers (601 to 7,200 therms per year).

- Revise the billing determinant calculation for Southwest's general service schedule applicable to customers whose annual use exceeds 180,000 therms.
- Calculate general service rates to minimize differences in monthly bills to customers at the cross-over volumes between general service rate schedules.
- Close the Small Essential Agricultural rate schedule to new customers.
- Cancel Schedule No. G-35, the Armed Forces Gas Service.
- Revise the monthly basic service charge provision applicable to Southwest's Air-Conditioning Gas Service rate schedule.
- Expand the applicability of the current Cogeneration Gas Service rate schedule to provide service to other small electric generation customers (and renaming the schedule to Electric Generation Service). Limit Southwest's obligation to provide sales service to larger electric generation customers and include the Electric Generation rate schedule in Southwest's Special Supplementary Tariff Purchased Gas Cost Adjustment Provision.
- Implement tariff language necessary for Southwest's proposed Conservation Margin Tracker (CMT).
- Cancel Sheet No. 14, Statement of Rates Effective Transportation Rates Applicable To Arizona Schedules, and incorporate language on Sheet No. 13 describing

Southwest's pricing for transportation service.

- Adjust Southwest's Service Establishment and Returned Item charges to reflect current costs. Additional revenue derived from these changes is reflected in Southwest's other operating revenues at proposed rates.
- Make minor changes to Southwest's Rules to reflect proposed changes in rate schedules and better conform Southwest's Arizona Gas Tariff language to current business practice.

RATE DESIGN FOR SINGLE- AND MULTI-FAMILY RESIDENTIAL

Q. 25 Mr. Gieseking, in his prepared direct testimony, states that Southwest's residential rate design proposal is conditioned upon whether the Commission authorizes the CMT. If the Commission does not approve the implementation of the CMT, Southwest proposes that more of Southwest's costs of service be recovered in the basic service charge and the first block commodity rate. Please explain the development of Southwest's residential rate proposals.

A. 25 In both proposals, Southwest utilized bill frequency analyses for single- and multi-family customers to set the proposed summer and winter season blocks to capture approximately 50 percent of total seasonal volume in the first block of the rate structures. Setting the monthly blocks in this fashion results in lower monthly block volumes as illustrated below.

Description	First Block Volume Summer	Winter
Single-Family		
Proposed Block	8	30
Average Use	16	56
Multi-Family Apartment		
Proposed Block	7	18
Average Use	12	30

Southwest then set the price for the second block of the proposed rate structures to recover 100 percent of the demand- and commodity-related costs, plus a significant portion of the customer-related costs. A greater amount of customer-related cost is assigned to the second block rate in Southwest's primary rate proposal. The ECCOSS amounts utilized in these calculations are reflected in Schedule H-6, Sheets 6 and 7.

If the CMT is approved, Southwest proposes that pricing for the second block of the residential rate schedules be set at $.25000 per therm. If the CMT is not approved, the second block price should be $.15000 per therm to more accurately reflect Southwest's marginal cost of providing service.

Next, Southwest looked at the customer-related costs calculated in the ECCOSS. These customer-related costs are approximately $26 per month for single-family and $21 per month for multi-family residential customers (see Schedule H-6, Sheet 6).

In continuation of the effort to stabilize the

recovery of authorized margin, Southwest proposes an increase to the current residential basic service charges. If the Commission approves the CMT, Southwest proposes to establish the basic service charge for single-family customers at $12 per month and the multi-family basic service charge at $11 per month. This would increase the basic service charges by approximately 22 percent of the difference between the currently effective rate and the customer-related cost calculated in the ECCOSS.

If the Commission does not approve the CMT, Southwest proposes additional margin stabilization through basic service charges of $16 and $14 per month for single- and multi-family customers, respectively. This would increase the basic service charges by approximately 44 percent of the difference between the currently effective rate and the customer-related cost calculated in the ECCOSS.

After setting the second block and basic service charge rates, the first block rate is calculated to recover the remaining residential margin requirement.

GENERAL GAS SERVICE RATE SCHEDULES

Q. 26 Please describe the changes Southwest is proposing to the General Gas Service rate schedules.

A. 26 Southwest's currently effective Arizona General Gas Service rate schedules include discrete prices for Small (annual usage 0 - 7,200 therms), Medium (annual usage

7,201 - 180,000 therms) and Large (annual usage greater than 180,000 therms) General Gas Service customers. As described by Mr. Gieseking, Southwest is proposing to create an additional schedule to separate the current Small General Gas Service customers into separate rate schedules for customers using up to 600 therms per year and customers using between 601 and 7,200 therms annually. This will allow pricing that more closely matches Southwest's cost of service while, at the same time, minimizing the impact on Southwest's smallest General Gas Service customers. Implementation of four, rather than three, General Gas Service rate schedules also allows Southwest to minimize differences in customer bills at the "cross-over" volumes between the proposed General Gas Service rate schedules.

In establishing rates for the proposed General Gas Service rate schedules, Southwest attempted to minimize differences in monthly bills for service at the cross-over volumes between general service rate schedules. The importance of accomplishing this is illustrated by the following example. Given Southwest's presently effective Medium and Large General Gas Service margin rates, a customer's Medium General Gas Service monthly bill at 15,000 therms would be $4,171.65. The same customer's Large General Gas Service monthly bill with the demand charge based on the large general service class load factor would only be $2,702.66.

Differences in monthly bills between proposed general service rate schedules should be minimized to avoid rate shock to customers who increase or decrease their use of natural gas and see a disproportionate change in their monthly bill if they are reclassified to another general service rate schedule. Similarly, Southwest should neither benefit nor be harmed if customers are reclassified to another general service rate schedule. Southwest's proposed adjustments to the basic service charges for all general service rate schedules were made to minimize differences in monthly bills at the cross-over volumes between general service rate schedules.

REVISIONS TO SOUTHWEST'S COGENERATION GAS SERVICE RATE SCHEDULE

Southwest's presently effective Rate Schedule No. G-60 is available only to customers that meet the efficiency standards outlined in Title 18, Code of Federal Regulation, Part 292, Subparts A and B. Southwest proposes to make the schedule available to all electric generation customers and change the title of Schedule No. G-60 to Electric Generation Gas Service.

Southwest, with expected changes on the El Paso Natural Gas pipeline system, is concerned with regard to the impact of providing sales service to future electric generation customers. To address this issue, Southwest proposes to include language in Schedule No. G-60 requiring new electric generation customers whose

facilities exceed 5 megawatts in nameplate capacity to take transportation service or, if qualified, enter into a Special Gas Procurement Agreement under Schedule No. G-30, and to more equitable recover the cost of upstream pipeline capacity Southwest proposes to remove Schedule No. G-60 from the current G-60/G-80 seasonal gas purchase portfolio and include Schedule No. G-60 in Southwest's Special Supplementary Tariff Purchased Gas Adjustment Provision.

GAS COST ADJUSTMENT

Q. 27 Please describe Southwest's annualization of gas costs for ratemaking purposes.

A. 27 As detailed in Schedule C-2, Adjustment No. 2, gas costs have been annualized by applying the average cost of gas in sales rates effective August 31, 2004, to Southwest's adjusted test year sales volumes.

Q. 28 Please explain the gas cost adjustment reflected in Schedule C-2, Sheets 1 and 2.

A. 28 Schedule C-2, Sheet 1 summarizes the components of gas cost, which have been removed from Southwest's cost of service for ratemaking purposes.

The volume adjustment reflects the differences between recorded sales and adjusted test year sales. Column (k) reflects the total ratemaking adjustment given the August 31, 2004 cost of gas, included in sales rates and adjusted test year sales. Schedule C-2, Sheet 2 reflects volume adjustments in columns (c) through (f)

and rate adjustments in columns (g) through (j) using the present gas cost accounting methodology. The rate adjustment reflects the difference between the cost of purchased gas recorded in Account No. 803 and the cost of gas effective August 31, 2004. Southwest's gas cost adjustments do not impact its rate case margin(s).

SUMMARY

Q. 29 Has Southwest quantified the impact of its proposed changes in rates?

A. 29 Yes. The overall impact of the proposed changes to margin developed in Schedule H-6 is summarized in Schedule H-1, Sheets 1 and 2 and Schedule H-2, Sheets 9-11. Schedule H-1, Sheet 1 summarizes the change in revenue, including gas cost, for each rate class that results from Southwest's proposed changes to margin. The impact by class of Southwest's proposed changes to margin is reflected on Schedule H-1, Sheet 2. Changes in revenue by rate component are reflected in Schedule H-2, Sheets 9-11.

Q. 30 Has Southwest prepared schedules summarizing the impact of its proposed rates by rate component and the impact on customer bills?

A. 30 Yes. Schedule H-3, Sheets 1-3 compare the currently effective and proposed rate components for each rate schedule. Schedule H-4, Sheets 1-10 present typical monthly bill comparisons for major rate schedules showing the impact, including all surcharges, of Southwest's proposed changes in rates. Schedule H-7, Sheets 1-3

reflect Southwest's proposed low-income residential customer benefit and the resulting affect on low-income customer bills. Schedule H-8, Sheets 1-8 reflect the calculation of proposed rates without the CMT and the impact of those rates on affected rate schedules.

Q. 31 Does this conclude your prepared direct testimony?

A. 31 Yes, it does.

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Scott

Southwest Gas Corporation
Docket No. G-01551A-04-__

BEFORE THE ARIZONA CORPORATION COMMISSION

Prepared Direct Testimony
of
VIVIAN E. SCOTT

I. **INTRODUCTION**

Q. 1 Please state your name and business address.

A. 1 My name is Vivian E. Scott. My business address is 5241 Spring Mountain Road, Las Vegas, Nevada 89150-0002.

Q. 2 What is your position and what are your responsibilities at Southwest Gas Corporation (Southwest)?

A. 2 I am the Manager of Research/Conservation and Demand Side Management (DSM) at Southwest. In that capacity, I am responsible for conducting Southwest's current DSM programs. This function involves such activities as program implementation, monitoring, and reporting. I am also involved in the development of new conservation and energy efficiency programs, which includes program research, analysis, and evaluation. My statement of qualifications is attached to this testimony as Appendix A.

Q. 3 Please summarize the purpose of your prepared direct testimony.

A. 3 The purpose of my prepared direct testimony is to explain Southwest's current DSM programs and to provide an overview of new conservation and energy efficiency

programs that Southwest is proposing. I will also discuss the proposed cost recovery mechanism and approval process for the programs.

II. SOUTHWEST'S CURRENT DSM PROGRAMS

Q. 4 Is Southwest currently conducting any DSM programs?

A. 4 Yes. Southwest currently conducts two DSM programs: 1) the Low-Income Energy Conservation (LIEC) program; and 2) the Energy Advantage Plus (EAP) program.

Q. 5 Please describe the LIEC program.

A. 5 The LIEC program offers weatherization measures to Southwest's low-income customers. The purpose of the program is to increase energy efficiency and reduce customer energy bills through the installation of energy efficiency measures and consumer education.

Customers qualify for the LIEC program if they have a household income of up to 125 percent of the poverty guidelines established by the Federal Office of Management and Budget. Those customers who are handicapped or elderly (age 60 and over) are eligible, if they have an income of up to 150 percent of the federal poverty level. In addition to individual home weatherization, the program also provides special funding for large, multi-family housing projects.

The LIEC program is currently conducted by Southwest in conjunction with the Arizona Department of Commerce Energy Office, community action agencies, and other Arizona utilities. During the 2003-2004 program

year, a total of 257 low-income households and two special projects (multi-family housing) were served.

Q. 6 Is Southwest planning to continue the LIEC program?

A. 6 Yes. Southwest believes the LIEC is very beneficial to low-income customers and would like to continue offering the program. Southwest is proposing an annual funding level of $500,000 (an increase from the current $350,000) for the LIEC program.

Q. 7 Why is Southwest suggesting an increased funding level for the LIEC program?

A. 7 Southwest is suggesting an increased funding level in order to offer the LIEC program to additional eligible customers. Also, Southwest is proposing that a bill discount be provided to low-income customers through the LIEC program.

Q. 8 How much of the LIEC program funding would be allocated to bill discounts?

A. 8 Southwest suggests that up to $50,000 of the LIEC program funds be allocated to the bill discount portion of the program.

Q. 9 Please describe the EAP program.

A. 9 The EAP program is a residential new construction program. The goal of the program is to upgrade the energy efficiency of new housing through improved thermal shell construction and the installation of high-efficiency mechanical equipment. Since the start of the EAP program in 1996, approximately 225 builders have participated,

with nearly 24,000 new and improved homes being constructed in the Tucson market. Annual funding for the EAP program is currently $900,000.

Q. 10 Is Southwest planning to continue the EAP program?

A. 10 Southwest is planning to continue a modified version of the EAP program. In the past, Southwest has spent a considerable portion of the EAP program funds on cooperative incentives for homebuilders. However, Southwest now believes that the market has been sufficiently transformed and that incentives are no longer necessary to ensure more energy-efficient construction. In addition, new building codes (the 2000 International Energy Conservation Code) have been adopted in Tucson. These new codes set stricter standards and are likely to further transform the new construction market. However, Southwest does see a need for assisting homebuilders with plan review and random inspections of their new homes. As such, Southwest is proposing a continuation of the EAP program under the name of the Energy Star® Home Certification program, with annual funding of $250,000.

III. SOUTHWEST'S PROPOSED NEW CONSERVATION AND ENERGY EFFICIENCY PROGRAMS

Q. 11 Is Southwest proposing new conservation and energy efficiency programs?

A. 11 Yes. Southwest is proposing seven new programs and the associated funding, contingent upon Arizona Corporation

Commission (Commission) approval.

Q. 12 Why do you characterize Southwest's new proposals as "conservation and energy efficiency programs" instead of as "DSM programs"?

A. 12 The current LIEC and EAP programs have been characterized as DSM programs since their inception, and Southwest is concerned there may be some confusion if the historical characterization were to be dropped abruptly at this time. However, Southwest views both the existing programs and the proposed new programs as falling more appropriately under a common umbrella embracing the goals of conservation and energy efficiency. The DSM nomenclature is being maintained for the time being for the existing programs; however, Southwest views all of the programs (i.e., existing and proposed) to be in harmony with the goals of conservation and energy efficiency and, accordingly, when referred to in the aggregate, Southwest characterizes the programs as "conservation and energy efficiency programs."

Q. 13 Why is Southwest proposing an expansion of its conservation and energy efficiency programs?

A. 13 Southwest believes it is in the best interests of its customers, the State of Arizona, and the overall resource mix to expand Southwest's programs. An increased number of programs would enable Southwest to serve all customer segments, including residential, commercial, and industrial customers. Currently, Southwest's conservation

and energy efficiency programs serve only residential customers.

The expanded set of programs that Southwest is proposing would also provide programs for customers throughout Arizona. Although Southwest's LIEC program is offered on a statewide basis, the current EAP program is only available to Tucson customers. With more programs available, a greater number of customers would have the opportunity to lower both their energy usage and their utility bills.

Further, an increased conservation and energy efficiency portfolio will be advantageous to the overall resource mix by reducing the demand for natural gas and electricity, lowering natural gas and electrical peak demand, improving air quality, and conserving water.

Q. 14 In the Application in this proceeding, Southwest focuses on the continuing decline in average residential customer usage and the resulting adverse impacts on earnings. If the proposed new conservation and energy efficiency programs are approved by the Commission and they turn out to be successful, is it not true that the threat to Southwest's earnings would be exacerbated?

A. 14 Yes, and in large measure that is why Southwest is urging the Commission to approve its proposed Conservation Margin Tracker (CMT) to ensure, among other things, that Southwest will not be penalized by aggressively promoting the success of the programs.

Q. 15 What new programs is Southwest proposing for residential customers?

A. 15 Southwest is proposing three new conservation and energy efficiency programs for residential customers: 1) Multi-Family New Construction; 2) Residential Energy Conservation; and 3) Energy Star® Appliances.

Q. 16 Please explain the Multi-Family New Construction program.

A. 16 The Multi-Family New Construction program is designed for renters and condominium owners—two groups that are often under-served by existing programs, but which represent a significant potential for energy savings. Due to their generally lower economic status, renters are likely to have an even greater need for cost savings on their utility bills than single-family homeowners. Similarly, many condominium owners are often first-time homebuyers who cannot afford a single-family home. These customers have a need for lower utility bills and will likely benefit from a new construction program designed for multi-family housing. In order to serve the two groups, the program will focus on the designers and developers of multi-family new construction in Maricopa and Pima Counties. The program will also seek opportunities to partner with low-income housing agencies.

The purpose of the program is to provide energy-efficient housing in the multi-family sector. The program will require building standards that exceed existing building codes, similar to Southwest's EAP

program and the Energy Star® program sponsored by the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Energy (DOE). Both the building envelope and the appliances will be upgraded. Financial incentives will be offered to builders to mitigate first-cost concerns and encourage participation. The program will also include an educational component to increase the awareness of energy efficiency among consumers, builders, and designers.

Southwest is proposing an annual funding level of $1,200,000 for the Multi-Family New Construction program.

Q. 17 Please explain the Residential Energy Conservation program.

A. 17 The Residential Energy Conservation program will offer education, instruction, and incentives to do-it-yourself homeowners who wish to install energy-saving measures in their homes. The program targets all residential customers who weatherize or improve the energy efficiency of their homes themselves.

The purpose of the program is to increase energy efficiency and reduce customer energy bills. Southwest will partner with local home improvement stores to conduct in-store training seminars on basic weatherization techniques, such as installing insulation, weatherstripping, and caulking. Southwest will also work with the stores to make educational materials available to customers. Further, the program will offer rebates to

customers who purchase selected energy efficiency products and/or materials in the stores. Through such activities, the program is expected to increase consumer awareness about energy efficiency and save energy in Arizona homes.

Southwest is proposing an annual funding level of $200,000 for the Residential Energy Conservation program.

Q. 18 Please explain the Energy Star® Appliances program.

A. 18 The Energy Star® Appliances program is aimed at consumers who purchase either new or replacement equipment at retail stores. Various types of high-efficiency natural gas appliances and equipment are available for purchase at the retail level, including furnaces, water heaters, ranges, dishwashers, washing machines, and programmable thermostats. The goal of the program is to encourage consumers to purchase more efficient appliances and equipment for their homes.

The program promotes Energy Star® appliances certified by the EPA and the DOE. The program will feature partnerships between Southwest, appliance manufacturers, and retailers. It will focus on building consumer awareness by providing educational materials at the point of purchase and on increasing the availability of high-efficiency equipment in the stores. The program will also include retailer training. In addition, incentives will be offered to consumers for the purchase of selected high-efficiency appliances.

Southwest is proposing an annual funding level of $800,000 for the Energy Star® Appliances program.

Q. 19 What is the proposed annual funding level for all of the residential conservation and energy efficiency programs?

A. 19 The proposed funding level for all of the residential programs, both existing and new, is $2.95 million per year.

Q. 20 What new programs is Southwest proposing for commercial and industrial customers?

A. 20 Southwest is proposing four new conservation and energy efficiency programs for commercial and industrial customers: 1) Food Service Equipment; 2) Efficient Commercial Building Design; 3) Technology Information Center; and 4) Distributed Generation.

Q. 21 Please explain the Food Service Equipment program.

A. 21 The purpose of the Food Service Equipment program is to increase the utilization of high-efficiency cooking equipment in restaurants and commercial food service facilities throughout Arizona. The program is designed to educate food service managers about high-efficiency equipment and to influence their purchasing decisions. In addition to providing informational material and technical guides, Southwest will utilize its existing Food Service Center in Tempe as a training facility to demonstrate the latest, most efficient equipment available in the market.

The program will include rebates for

high-efficiency natural gas applications. Examples of eligible equipment include hot water booster heaters for dishwashers, new generations of commercial gas cooking appliances, energy-efficient warewashing equipment, and high-efficiency hot water heaters.

In addition, the program will feature free, low-flow, dish rinse wands that save water and energy, while also reducing the need for sewage treatment. Each rinse nozzle saves up to 100,000 gallons of water per year. To put that number in perspective, assume that 10,000 Arizona restaurants install one rinse wand each. The resulting water savings could be as much as one billion gallons of water per year. The nozzles also provide environmental benefits by significantly reducing the emission of chemical-based sanitizers into the wastewater. This part of the program will feature a partnership between the Food Service Center and Arizona water agencies.

Southwest is proposing an annual funding level of $500,000 for the Food Service Equipment program.

Q. 22 Please explain the Efficient Commercial Building Design program.

A. 22 The Efficient Commercial Building Design program targets architects, engineers, designers, trade allies, and builders of new commercial construction projects to improve the energy efficiency of commercial buildings. By targeting new construction, savings are obtained more

readily and more cost-effectively than through a retrofit program.

The purpose of this program is to reduce natural gas consumption and peak-day demand by encouraging commercial building owners to incorporate cost-effective, energy-saving measures in the design and construction of new buildings. Information and continuing education will be provided to the building and design community through educational materials and workshops. Information on energy-efficient equipment, manufacturers, and improved construction techniques and building materials will be included. The program will assist engineers and designers in identifying cost-effective construction and equipment choices that exceed building code requirements. The program will also provide financial incentives to builders to offset increased initial costs and encourage participation.

Southwest is proposing an annual funding level of $500,000 for the Efficient Commercial Building Design program.

Q. 23 Please explain the Technology Information Center program.

A. 23 The Technology Information Center program is designed to provide technical information to industrial and commercial customers to reduce energy usage, lower utility bills, answer questions about energy-efficient technologies, and increase awareness of environmental issues.

Various media formats will be utilized, including an Internet resource Web site, an "Ask an Expert" hotline, newsletters, and an electronic research library. Customer interest in various topics will be tracked for use in tailoring future programs to meet the needs of industrial/commercial customers.

Southwest is proposing an annual funding level of $35,000 for the Technology Information Center program.

Q. 24 Please explain the Distributed Generation program.

A. 24 The Distributed Generation program is intended for a variety of industrial customers, depending on the distributed generation application. Program participants could range from small to large industrial customers.

The program encourages projects that demonstrate either combined heat and power or peak-shaving concepts. Fuel cells and microturbines will be considered. An educational component is essential to the program to increase awareness and acceptance for the technology in the industrial community. Partnerships with municipalities and other funding sources will be encouraged. The program's advantages include higher efficiency, reduced emissions, cost savings, peak shaving, power reliability, and risk management.

Southwest is proposing an annual funding level of $400,000 for the Distributed Generation program.

Q. 25 What is the proposed funding level for the four new commercial and industrial programs?

A. 25 Southwest is proposing a total funding level of $1.435 million per year for the four new commercial and industrial programs.

Q. 26 What is the proposed funding level for all of the conservation and energy efficiency programs, both existing and proposed?

A. 26 The proposed funding level for all of the programs, both existing and proposed, is $4.385 million per year. A listing of the programs and the associated funding levels is provided in Appendix B.

IV. COST RECOVERY AND APPROVAL PROCESS

Q. 27 How does Southwest expect to recover the cost of the programs, if approved?

A. 27 Southwest is proposing that the current adjuster mechanism, which was approved by the Commission in Decision No. 60352, be utilized to provide cost recovery for the approved programs. The recovery mechanism has worked well to date, by facilitating the timely and ongoing recovery of program costs.

One difference, though, is that the current recovery mechanism recovers the cost of programs from residential customers only. Because the proposed programs are designed for all customer classes, Southwest expects that all customers would pay the surcharge in the future.

Q. 28 What is the current surcharge amount?

A. 28 The current surcharge amount paid by residential customers is $0.00486 per therm.

Q. 29 What is the projected future surcharge amount, if all of the proposed programs are approved?

A. 29 If all of the proposed programs are approved, the projected future surcharge would be approximately $0.00724, and would be paid by all customers.

Q. 30 How will Southwest obtain approval for the proposed programs?

A. 30 Southwest expects to obtain approval for the proposed programs through a two-part process. First, Southwest will request the Commission to approve the funding level presented in this Docket. If the requested funding level is approved, then Southwest will submit the proposed programs to the Commission Staff for pre-approval after this general rate case has concluded.

Q. 31 Will the cost-effectiveness of the programs be evaluated?

A. 31 Yes. Southwest expects to use the Societal Test to evaluate program cost-effectiveness. That particular test has been identified as the appropriate cost-effectiveness test in the draft DSM policy, which is being developed in the current Commission DSM workshop process.

Q. 32 Does Southwest agree with using the Societal Test?

A. 32 Yes. Southwest believes it is important to use the Societal Test because this test goes beyond the Total Resource Cost Test (the previously-used criterion test in Arizona) and incorporates the costs and benefits of emissions and water savings. Southwest believes that these factors are important to consider when determining

the total resource, economic, and societal value of conservation and energy efficiency programs.

Q. 33 Although Southwest is proposing a mechanism to recover the expenses associated with the conservation and energy efficiency programs, is it not true as discussed earlier in your testimony that, everything else remaining constant, Southwest would experience a revenue shortfall if the programs are successful?

A. 33 Yes. It is axiomatic that, if the programs result in decreased natural gas usage, a corresponding reduction in revenue from natural gas sales would be experienced.

Q. 34 Does Southwest have any proposal to address revenue shortfalls resulting from decreased natural gas usage?

A. 34 Yes. Southwest is proposing a decoupling mechanism referred to by Southwest as the CMT. It should be noted that the CMT not only addresses revenue shortfalls due to decreased natural gas usage but, as well, it protects Southwest's customers from revenue windfalls resulting from an increase in average residential natural gas consumption which could occur as a consequence of colder-than-normal weather. Southwest witness Edward B. Gieseking describes the CMT in detail in his prepared direct testimony.

Q. 35 Does Southwest have any concluding remarks about its proposals?

A. 35 Yes. Southwest believes that an expanded set of conservation and energy efficiency programs will benefit

both its customers and other Arizona energy consumers. Southwest has suggested expanding its currently successful residential programs to include other customer classes, including commercial and industrial customers. Southwest has also proposed offering more programs to existing residential customers. In addition, Southwest has presented programs that will reach many more customers throughout the State of Arizona. With increased program availability and customer outreach, Southwest can effect greater customer awareness and behavioral change. The result can only be beneficial for Arizona, in terms of saving energy resources, improving air quality, and conserving water.

Southwest also believes that the proposed programs can be implemented in a cost-effective manner. Southwest has suggested that funding be obtained through the continued use of the existing surcharge mechanism—a system that has worked well in the past for conservation and energy efficiency programs.

Q. 36 Does this conclude your prepared direct testimony?

A. 36 Yes, it does.

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APPENDIX A
STATEMENT OF QUALIFICATIONS
VIVIAN SCOTT

EDUCATION

UCLA – Los Angeles, California

1985	Ph.D. Marketing program – completed course requirements and qualifying exam

California State Polytechnic University - Pomona, California

1980	Master of Business Administration

Humboldt State University – Arcata, California

1972	B.A. Psychology

EXPERIENCE

Southwest Gas Corporation – Las Vegas, Nevada

2002-2004	Manager, Research/Conservation & DSM
1996-2002	Supervisor, Marketing Research
1993-1996	Administrator, Marketing/DSM
1989-1993	Specialist, Marketing/DSM

Develop, implement, promote, track, and report on demand side management programs in Arizona, Nevada, and California. Serve as a company witness in rate cases and regulatory matters. Coordinate with public utility commission staff, community-based organizations, contractors, and consultants. Conduct primary/secondary research projects and provide statistical/analytical support.

Millers Outpost – Ontario, California

1985-1989	Director, Marketing Research

Directed primary and secondary research projects for a 350-store clothing retailer throughout the Southwest. Provided input for strategic planning. Served as marketing consultant to other retail chains owned by parent corporation.

California State Polytechnic University – Pomona, California

1982-1985	Assistant Professor, Marketing
1980-1982	Lecturer, Management & Human Resources

Taught upper division courses in Marketing, Marketing Research, Business Computations, and Business Communications. Assisted in MBA program administration and student advising.

APPENDIX B
SOUTHWEST GAS CORPORATION

PROPOSED CONSERVATION AND ENERGY EFFICIENCY PROGRAMS INCLUDING CUSTOMER SECTOR AND FUNDING LEVEL

Customer Sector	Program	Funding
Residential	Low-Income Energy Conservation	$ 500,000
Residential	Energy Star Home Certification	250,000
Residential	Multi-Family New Construction	1,200,000
Residential	Residential Energy Conservation	200,000
Residential	Energy Star Appliances	800,000
Commercial/Industrial	Food Service Equipment	500,000
Commercial/Industrial	Efficient Commercial Building Design	500,000
Commercial/Industrial	Technology Information Center	35,000
Industrial	Distributed Generation	400,000
	Total	**$ 4,385,000**