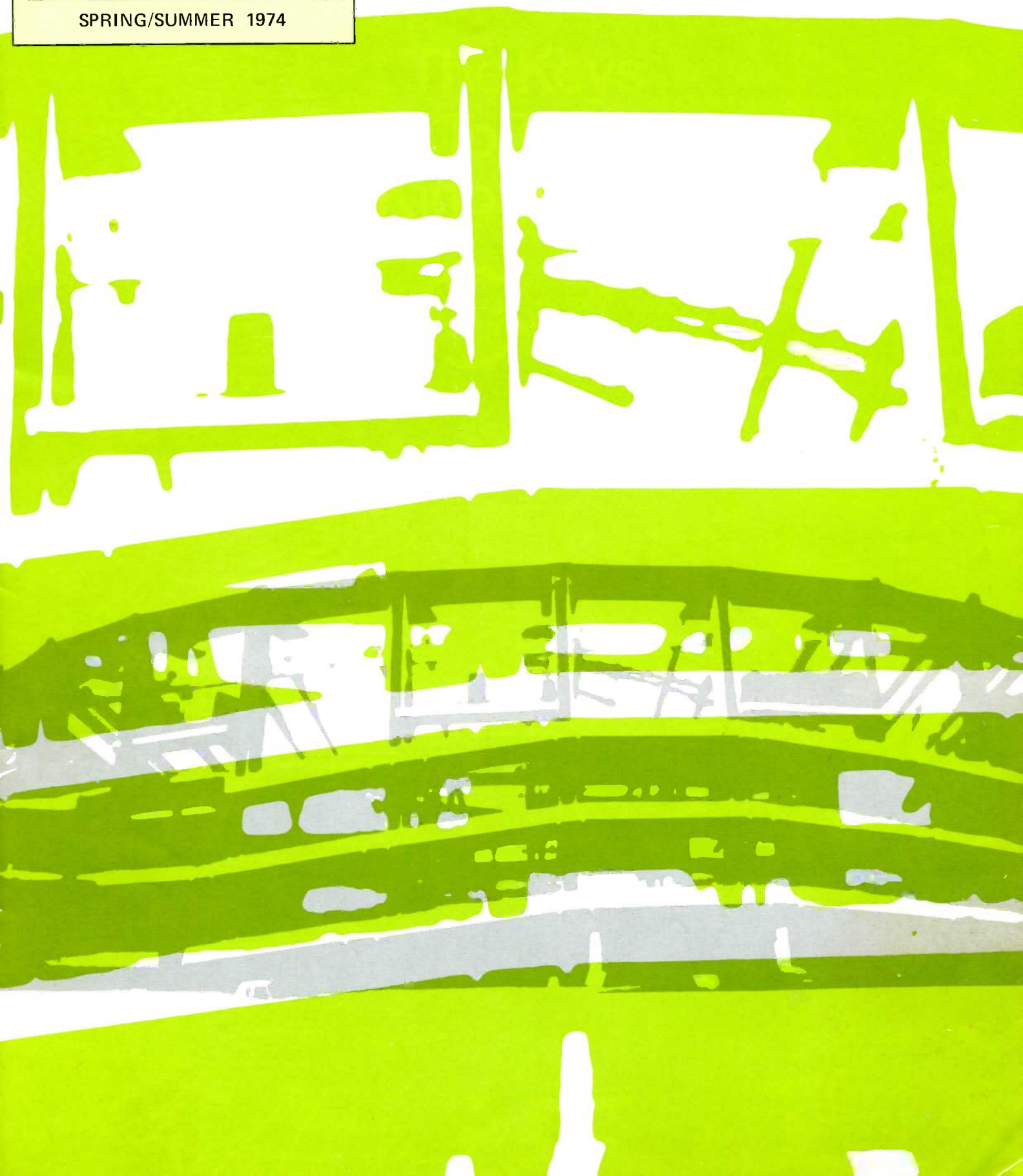
MUELLER Record

SPRING/SUMMER 1974



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Serving the water and gas industries since 1857

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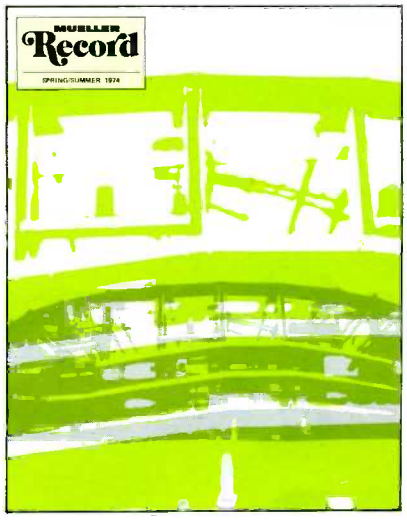
Editorial Consultant



About the Cover:

A stylized montage of actual construction scenes of the King County Stadium in Seattle, Washington, which is featured in the story starting on the following page.

The Keys To The King Dome

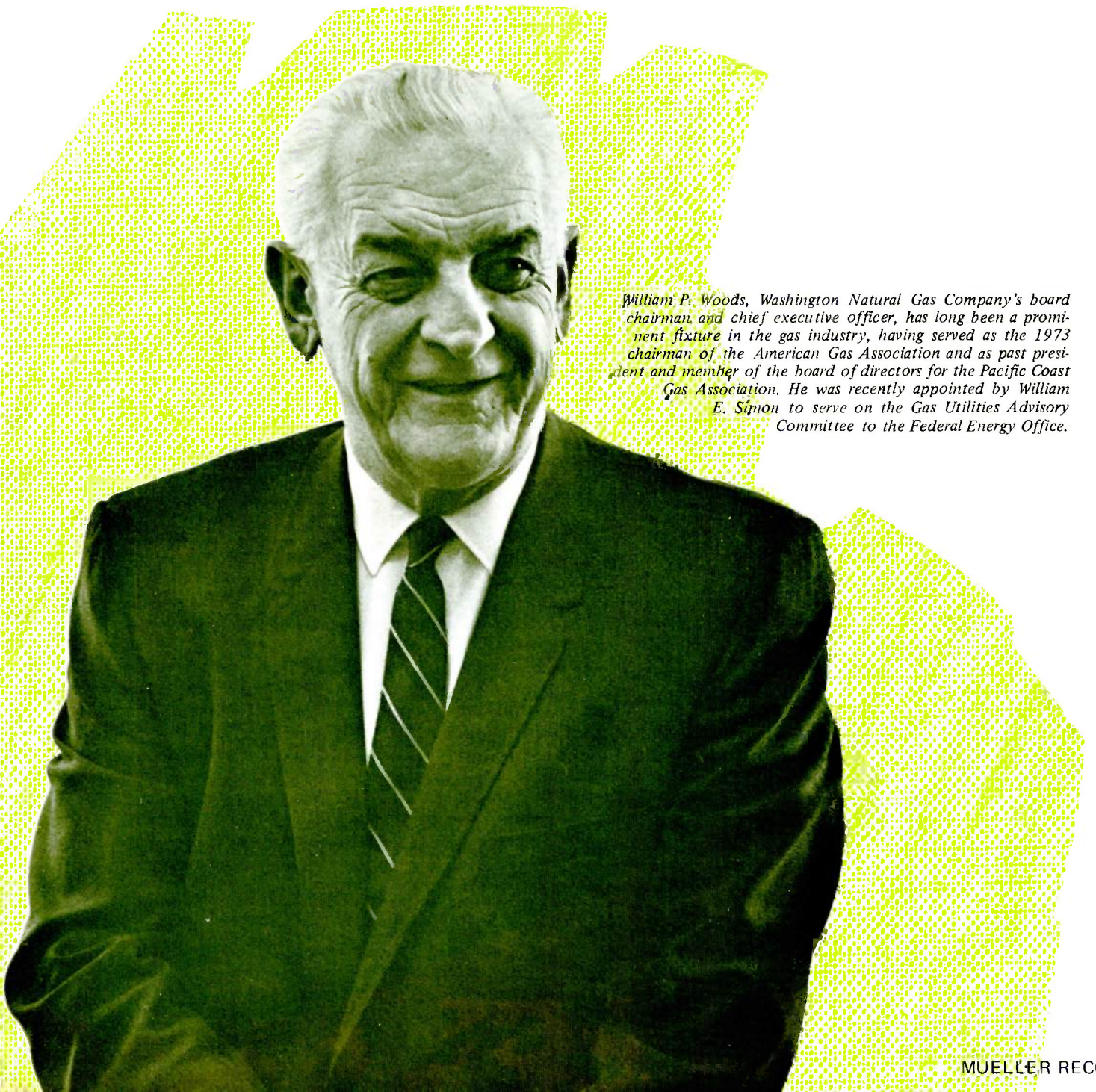
This scale model view of the King County Multipurpose Stadium shows the configuration of the 660-foot diameter dome, rising 250 feet above the ground level.

On opening day 1975 Seattle football fans will watch the game in a gas heated stadium under the biggest roof of its kind ever constructed.

When the city fathers built the first illuminating gas plant in Puget Sound on Seattle's tide flats, they didn't know that in a hundred years the site would house a $32 million multi-purpose stadium with the largest self-supporting concrete dome ever built. Nor could they have dreamed that the structure would be served with natural gas by a direct descendent of the Seattle Gas Light Company.

King County stadium has become a phenomenon in its own right, having survived two failures at the polls, three legal attacks and a site referendum before the first piling was driven into the ground four years after the project was approved by 62% of the voters in February, 1968. Today, a year away from completion, its awesome configuration dominates a 35.9 acre tract bounded by the Burlington Northern mainline railroad tracks, the recently renovated Pioneer Square district of Old Seattle and the town's historic waterfront.

The structure was designed in a record six month period by collaborating architects and engineers from the design team of Naramore-Skilling-Praeger, who in the face of crippling delays ran a winning race with escalating



William P. Woods, Washington Natural Gas Company's board chairman and chief executive officer, has long been a prominent fixture in the gas industry, having served as the 1973 chairman of the American Gas Association and as past president and member of the board of directors for the Pacific Coast Gas Association. He was recently appointed by William E. Simon to serve on the Gas Utilities Advisory Committee to the Federal Energy Office.

costs to come up with drawings and specifications that fell within the ceiling approved by the 1968 voters.

Incredibly, the contract was bid by The Donald M. Drake Company of Portland, Oregon at two tenths of one percent from the cost estimate, enabling the structure to be proclaimed the least expensive domed air-conditioned stadium of its size built anywhere in the world in this decade.

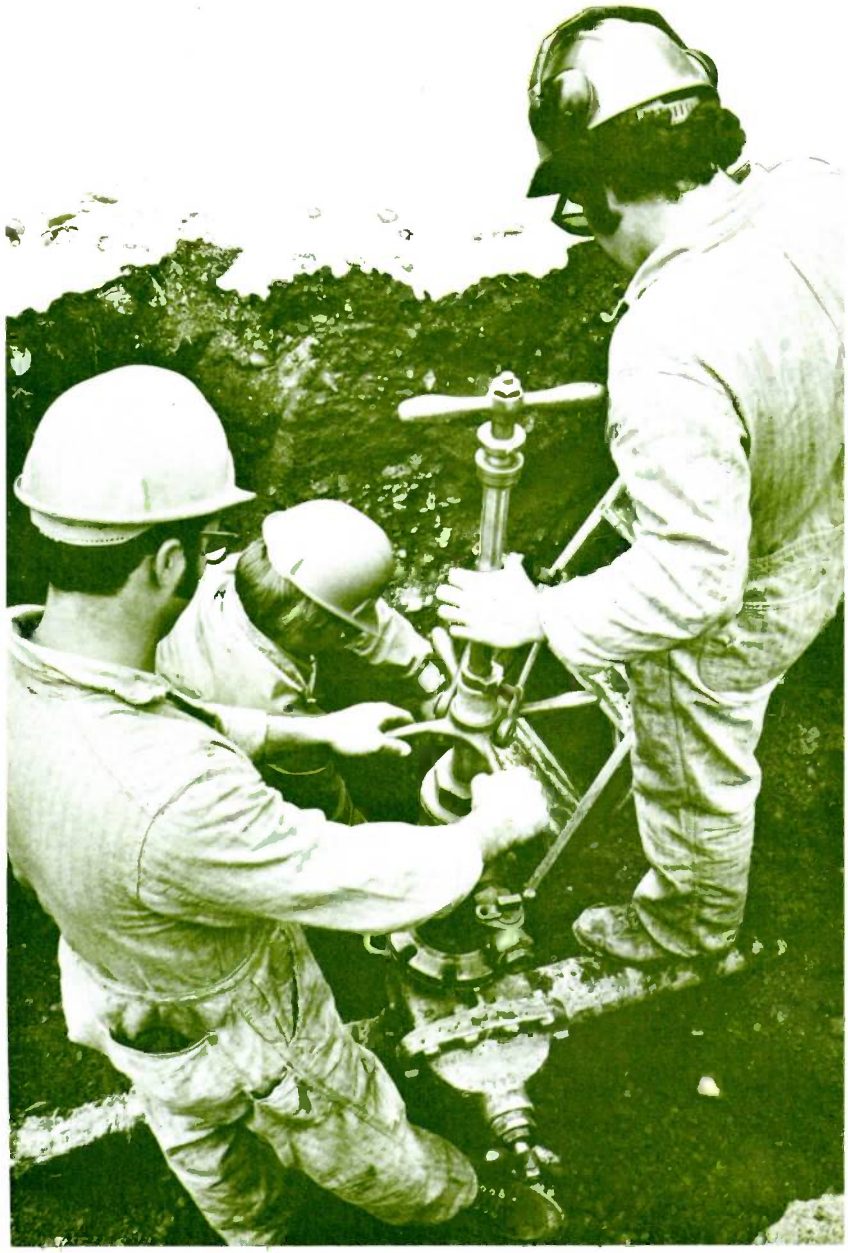
Finally in November, 1972, after a gold plated home plate commemorated the ground breaking, the controversial structure began its history-making ascent 250 feet into the air.

First came the erection of a 250 foot work tower in the center of the stadium floor. Containing 1140 tons of structural steel, the tower supports the roof forms now being used to construct the 660 foot diameter hyperbolic paraboloid cover.

To minimize construction costs each part of the structure will serve in as many ways as possible. Roof columns will perform five other functions besides the primary one of supporting exitways and grandstand ramps. And the ramps, which in turn thread in and out of the stadium, will not only provide simple, quick and inexpensive access for 65,000 people -- but as structural beams for lateral earthquake stability as well.

Instead of one huge mechanical room with miles of expensive ducting, the system will rely upon 34 mechanical rooms, all of which are being built and tested before being hoisted into place. This will also enable portions of the system to be turned on when only part of the stadium is being used.

Although the stadium will be an eighth of a mile in diameter and will cover nine acres, each of the 65,000 undercover seats will have an unobstructed view. The football configuration with artificial turf on the playing surface will provide seating for 65,000 fans. Around 5,000 seats will be removed to make a major league sized outfield for baseball games. And on a 12 hour turnover basis, the arena can be converted to handle trade shows, exhibitions, pageants and the like.



Mueller equipment is very much in evidence at the site of Seattle's King County domed stadium as Washington Natural Gas Company personnel prepare to extend 330 feet of 4-inch service to the facility's energy center using a Mueller line stopper fitting and the H-17235 stopping machine.

If statistics are your bag, try these on for size. The total site coverage of the building is 415,000 square feet. The arena field will measure 150,000 square feet.

The dome will contain about 17,000 cubic yards of concrete and each of the 330 foot long ribs, one half of the span, will be poured in a continuous operation.

There will be 34 air handling units, each the size of a railway box car, to provide air-conditioning and heating inside the stadium.

The building will contain 32 public rest rooms, 87 water fountains, 46 concession areas, 18 entrances and exits, 12 ramps and two elevators for lifting the physically handicapped.

Some time this year, Washington Natural Gas Company will extend services that will provide a connected load of 39 million BTU's per hour for the generation of heat and hot water and whatever other uses materialize for the facility.

This aerial view of the new King County Stadium now under construction shows location within an area bounded by the Burlington Northern mainline railroad tracks, the recently renovated Pioneer Square district of Old Seattle and the city's historic waterfront.

In a city that ranks third in median family income and 17th in metropolitan designation the impact of a multi-purpose stadium is bound to be sizeable. During construction the project is creating 1,400 job years. When completed, 350 direct and indirect jobs are expected to result from the operation of the facility, with an estimated $3.5 million generated annually in direct spending.

At least 18 times a year, and usually on week ends, the area will become the center of gravitation for around 60,000 people. To accommodate the 60% expected to arrive by car, there is projected parking space for 14,030—2,600 on-site spaces, 3,500 in off-street spaces south of the building and another 7,930 spaces to the north.

Tourism, the industry that now ranks second only to aerospace in Puget Sound country, is bound to flourish, and Seattle's newest enterprise, the prime tourist area embraced by Pioneer Square, will enjoy an unprecedented renaissance.

And last, but not the least important, Seattle's weather-sensitive sports fans will never again have to see a game called off because of rain -- or even the impending threat of rain. "There is a time" says the slogan on stadium booster buttons. Amen, echo the citizens of Seattle.

For the city that rebuilt itself after the fire of 1889, that hosted both the Alaska-Yukon-Pacific Exposition of 1909 and the World's Fair of 1962. . .there will always be a time.

Ground level view showing the flowing lines of the spectator ramps at the King County Stadium.

John W. Partridge, Chairman of the Board, Columbia Gas System.

A Brief Description of the Columbia Gas System

Columbia is one of the largest natural gas systems in the United States and is composed of a parent holding company, a service company and 18 operating subsidiaries. The subsidiary companies are engaged primarily in the production, purchase, transmission, storage and distribution of natural gas at retail and wholesale.

Columbia supplies through affiliated and non-affiliated retail companies the gas requirements of over 4,000,000 customers, roughly 10 percent of the gas customers in the United States. Its service area includes large parts of Ohio, Pennsylvania, West Virginia, Maryland, Virginia, Kentucky and New York and the District of Columbia.

The Columbia Gas System, Inc. was incorporated under the laws of Delaware on September 30, 1926, and was a result of the consolidation of two utility systems, one of which dated back to 1906.

Action Program to Relieve Gas Shortage as proposed by Columbia Gas System

The Current Situation

Since 1971, there has been practically no increase in the volume of natural gas available to the interstate pipelines from gas producers. Thus, in the face of a strong demand for increased supplies of natural gas for residential, commercial and industrial uses (natural gas use doubled between 1958 and 1972), the pipelines have not been able in recent years to increase their deliveries, and in fact many have curtailed their deliveries. This was the reason why Columbia was forced in early 1972 to institute a complete freeze on all new demands.

A Federal Power Commission staff report indicates that for the 12 months ended August 1974, curtailments of firm requirements by interstate pipelines will amount to an estimated 1.579 trillion cubic feet of natural gas, the equivalent of about 10 percent of such firm requirements.

Columbia's current estimate is that for the twelve months ended October 31, 1974 deliveries by non-affiliated pipeline suppliers will be curtailed by about 54 billion cubic feet and deliveries from other historic sources will decline approximately 30 billion cubic feet. This total deficiency of 84 billion cubic feet will be offset somewhat by the production of synthetic gas from the new Green Springs reforming plant.

While annual volumes available from historic sources have and will decline in the years immediately ahead, the large volumes of gas available in the winter season from Columbia's large underground facilities will insure reliability of service to its residential and commercial customers. To maintain storage schedules, curtailment of gas sales to industry in the summer months will probably be necessary. Thus, continuation and improvement of the good voluntary conservation efforts of residential and commercial customers is essential to minimize loss of jobs.

Problems and Solutions

The problems which have caused the increasing shortages of natural gas and the solutions for these problems have been apparent for a long time. Unfortunately, our governmental leaders were not convinced of what they were being told by the energy industries and so far have failed to adopt the necessary solutions to correct the developing problems.

1. Problem—Unrealistic Federal Regulation of Natural Gas Field Prices

Since 1954 when the Supreme Court ordered the Federal Power Commission to fix the price of

natural gas at the wellhead, Columbia has warned that such price control efforts would result in a decline in supply. This has proven true. Such regulation resulted in prices not only greatly below true market value but even below the actual costs of exploring and developing new gas supplies. These unrealistically low prices overstimulated demand for natural gas and discouraged producers from risking their capital to seek new gas reserves. Thus, in the years 1968-72 inclusive, more gas was consumed than was found in the lower 48 states (106 versus 58.5 trillion cubic feet).

Solution: Prompt enactment by Congress of amendments to the Natural Gas Act providing for the orderly deregulation of wellhead prices. Subject to some modifications, the concepts of the Administration's proposals before Congress (S. 2048 and H.R. 7507) will provide for such orderly deregulation. In the long run, natural gas must sell at a price comparable to other convenient fuels such as oil. This will stimulate badly needed exploratory and development efforts and the cost impact on consumers will be gradual. Eventually, consumers will pay a proper and fair price rather than receive the unwarranted bargains they have had for many years.

2. Problem—Inadequate Availability of Federal Leases

Until recently, the federal lease sale schedule has been inadequate and therefore has reduced the opportunity to explore for new reserves. In addition, environmental groups have delayed sales. For example, there is strong opposition by them to exploration of the outer continental shelf off the Atlantic Coast, which offers great potential.

Solution: The current efforts to expand federal leasing must be accelerated and should include such new promising areas as offshore the Atlantic Coast from North Carolina to Maine and onshore and offshore Alaska. With proper safeguards, which will be utilized, exploration of such areas can be done with minimal, if any, adverse effects on the environment.

3. Problem—Inadequate Energy Research

Compounding the energy shortage is the past and present failure to formulate a comprehensive and aggressive federal energy research and development strategy designed to make available to American consumers large domestic energy reserves including fossil fuels, nuclear fuels, geothermal resources, solar energy, and other unconventional forms of energy.

Solution: The urgency of the nation's critical energy shortages will require a massive federal research, development and demonstration program similar to those undertaken in the Manhattan and NASA projects. Columbia supports legislation for such a program that would:

A. be conducted by a fresh, new organization, independent of existing entities, priorities and procedures, one which pulls together the present fragmented federal civilian energy research efforts and is charged with overall and specific accountability for meaningful results. It is essential that this program be subject to the least restraints possible, including those partisan and political. It must involve an independent effort by our best talent to do the job that must be done.

B. be funded on a sustained basis—a trust fund which would provide a minimum of $2 billion per year for at least ten years. This is essential so that needed funds can be utilized without any time lag and that long-range commitments can be readily made. The usual year-to-year Congressional authorization and appropriation procedure could severely retard proper progress of the program.

4. Problem—A Highly Inefficient and Fragmented Governmental Structure with Respect to Federal Energy Policies

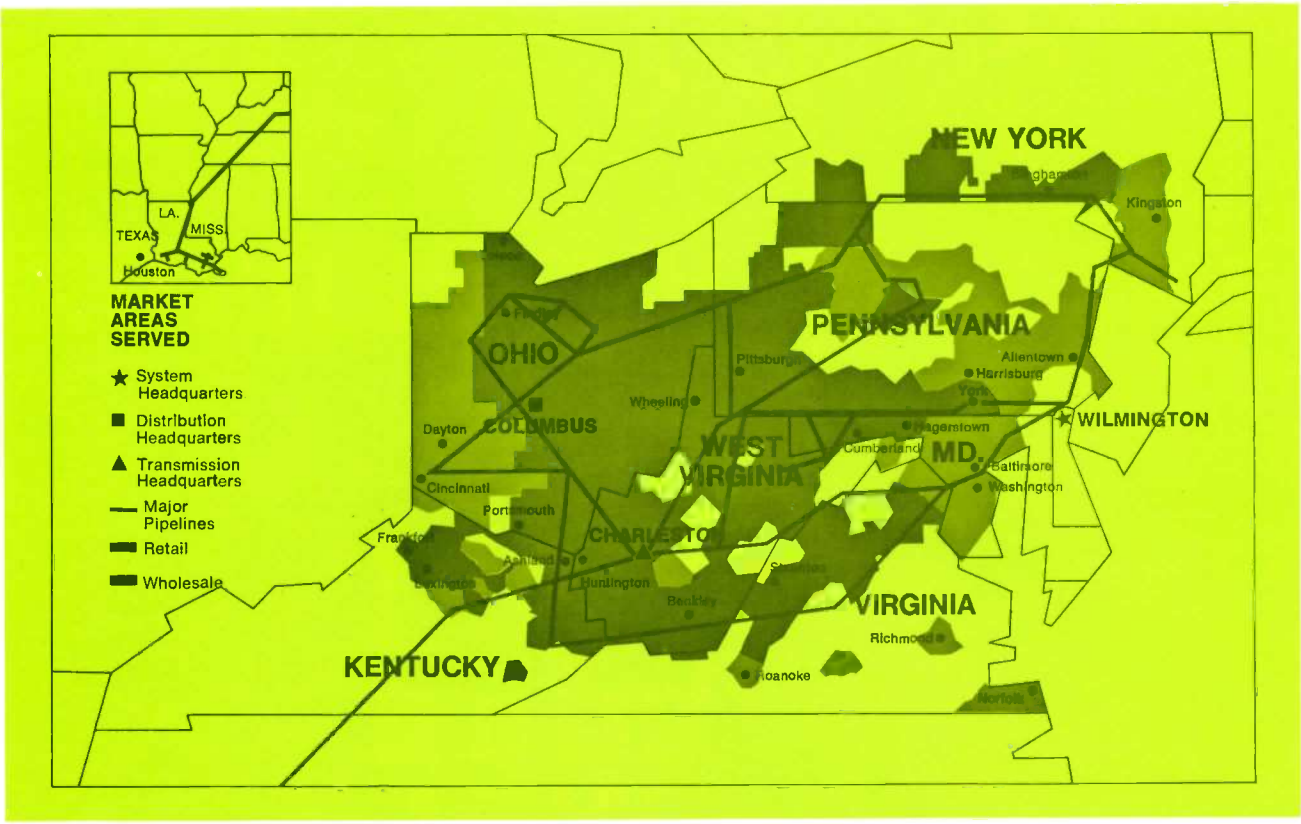
Historically the federal governmental structure dealing with energy policies has been badly fragmented—well over sixty separate federal departments and agencies have some control or responsibility for energy policies and execution. The division of authority and the lack of accountability greatly hamper solution of America's energy problems.

Solution: Congress should promptly enact legislation creating a Department of Energy within the Executive Branch. The Department should have sole responsibility and authority for formulating national energy policies and priorities and for directing the execution thereof.

5. Problem—A Highly Unbalanced Approach for Improving the Quality of the Environment

As a nation, it was realized that important steps had to be taken to halt the progressive deterioration in many aspects of the nation's environment and to establish the mechanism for having such environmental concerns considered along with other national goals and objectives when taking federal action.

However, in the four years since the National Environmental Policy Act of 1969 (NEPA) has been implemented, the untoward delays, and in



MAP OF COLUMBIA GAS SYSTEM

many cases a complete lack of balance between environmental concerns and national energy needs, have resulted in frustrating the efforts of the energy industries to provide additional supplies.

Solution: Congress must promptly review and amend NEPA with particular emphasis on procedural requirements so as to establish the needed balance between the nation's environmental and other essential goals, such as an adequate supply of acceptable energy. This can be done while still maintaining NEPA's basic objectives.

6. Problem—Costly, Inefficient and in Many Cases Counter-Productive Regulatory Procedures for Natural Gas

Unreasonable delays by the Federal Power Commission in processing urgent matters and the current overemphasis on preparation of environmental impact statements are only illustrations of an overall regulatory process that has hindered the gas industry in meeting its responsibilities. This has added incalculable costs to the consumer because of the dollar effect of proceedings and delay upon companies subject to FPC jurisdiction.

Solution: There must be an intensive effort made to streamline and expedite the administrative process. An Executive Task Force is examining the broad problem of regulatory delay. It is important that both the Administration and Congress give this Task Force support and encouragement. As it relates to the gas industry, the nation can no longer afford the delays and cost of current regulatory procedures and practices.

7. Problem—Financing A Vastly Expanded Gas Procurement Program

In developing the needed new sources of gas, both from historic and non-historic sources, the gas industry is confronted with financing that is double or triple past requirements.

Solution: Federal and state regulatory agencies must adopt policies and procedures that will assure significantly higher earnings and cash flow. Only then can the natural gas industry obtain the tremendous sums it requires.

***

It is emphasized that even providing the above solutions promptly will not immediately produce significant increases in supply: a minimum of 3 to 5 years is needed for any appreciable relief; 5 to 10 years for significant improvements.

Columbia has outlined above an Action Program. It is much the same program announced in April 1972. The passage of time has only made its implementation more urgent. Columbia plans to keep its stockholders, employees and customers advised about specific legislation needed to effect the above solutions, in the hope that they will convey their views to their legislators, which is all important.

55 reasons why MUELLER® means more

Your Mueller Representative is at your service. But not on your payroll. That's part of the value you get when you specify Mueller.

Mueller Sales Representatives are factory trained and field experienced to provide you with extra "know-how" for every job. They're available regularly and quickly when you need them. And they're backed by a large staff of engineering and sales-service personnel, five plants strategically located throughout the nation to serve the gas industry.

It's the fullest sales and service coverage in the industry. Combine this with the most complete product line available, unmatched research and development, and over a century of highest quality in engineering and manufacturing and you know why Mueller gives you more value in the best package you can buy.

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serving the water and gas industries since 1857

GC-453

NO-BLO®

for your money

Editor's Note: How better could we show you the unusually broad sales coverage than to give you a sneak preview of this ad which will soon be appearing in various trade publications? We know that most of you will recognize the representative and/or district manager in your area. But there's another side to the sales coin—Mueller's fine inside force which is described on the following two pages.

How often do you try to put a face on someone with whom your only communication is via the telephone? Often, we're sure.

On the previous two pages we have shown you Mueller's "outside" sales force with whom all of our customers are acquainted personally.

But, these outside sales representatives are backed up by an equally competent "inside" sales staff. . .whose only "faces" are a phone voice to the hundreds of people who call in to our Decatur or Brea, California offices for sales servicing every month.

The Gas Department of the Decatur sales office receives and processes all orders for gas products from all of the nation except the Western District (comprised of Alaska, Arizona, California, Hawaii, Idaho, Nevada, Oregon, Utah, Washington and part of Montana) which is serviced by Brea.

We thought it would be of interest to all who may call in to put faces with the voices of these sales people and also to know a little more about each one. So here are the members of Mueller Company's "inside" sales force:

C. O. BAFFORD - Decatur Sales Office Manager
Charlie, a native of Blue Mound, Illinois, joined MUELLER CO. in 1950 and worked for a brief period in the factory. He was then transferred to the Decatur Sales Office and, since that time, has advanced through various positions to his present position as Decatur Sales Office Manager. Charlie supervises sales activities and the duties of all members of both the Gas and Water Departments in the Decatur Sales Office. He is a likable and talented person and has a wealth of experience and wide acquaintance with our customers in the gas industry. Charlie is married and has three children. His outside interests are many and varied. He is very active in fraternal organizations and enjoys watching high school, college or professional football.

W. C. ROHMAN - Decatur Sales Service Manager
Bill, a native of Decatur, Illinois, joined MUELLER CO. in 1936 and is now in charge of the Gas Department in the Decatur Sales Office. His primary responsibility is to assist the Decatur Sales Office Manager in providing services incidental to the sales activity of the Gas Department. This includes answering inquiries by mail, phone or personal contact regarding products, prices, deliveries and complaints as well as the uses of products. Bill also prepares both formal and informal quotations and assists in the training of new employees in the Decatur Sales Office. Everyone seems to know Bill, and it's most unusual to find one of our gas customers who is not acquainted with Bill Rohman. Bill is married and has one child. His outside activities include woodworking and fishing. To date, he has built four houses and a cabin cruiser.

J. W. JONES - Decatur Sales Service Correspondent
Jim too is a native of Decatur and has been with MUELLER CO. since 1955. Jim's primary responsibility is to provide services incidental to all sales activities of the Decatur Sales Office Gas Department. His duties are the same as Bill Rohman, and he acts as backup man when Bill is absent. Jim is married and has two children. His outside activities include remodeling houses as well as watching football and basketball.

R. D. MC INTYRE - Decatur Sales Department Assistant
Bob, another native of Decatur, Illinois, joined MUELLER CO. in 1964. His primary responsiblity is to assist the Decatur Sales Service Manager and Sales Service Correspondent in the performance of their duties and assume their work or duties if they are absent. In addition, he helps expedite the flow of work through the Gas Department. Bob is married and has one daughter. His outside activities include the collecting of stamps and coins.

R. J. STARK - Decatur Customer Service Correspondent
Bob, a native of Metropolis, Illinois, joined MUELLER CO. in 1969. His primary responsibility is to answer customer inquiries on delivery of orders. He determines delivery dates on items from stock, obtains information from the various production centers as to delivery dates and, in turn, advises customers. He also checks unshipped orders, determines the reason for delay and establishes revised shipping dates. Bob is married and has two children. His main outside interests are baseball and tennis.

J. R. WOOD - Decatur Order Department Supervisor
Dick is a native of Kokomo, Indiana. He joined MUELLER CO. in 1953. Dick's primary responsibility is to assist the Decatur Sales Office Manager and Sales Service Manager in providing services to expedite sales activities in the Decatur Sales Office. He interprets all sales orders and is responsible for their being correct. He ascertains the exact interpretation for each line item on each order received. At times, this necessitates consultation with various departments at MUELLER CO. to obtain information to interpret a customer's requirements properly. Dick is married and has one daughter. His outside interests include sports of all kinds.

R. L. GRANT - Decatur Assistant Order Interpreter
Ron is a native of Stonington, Illinois and now lives in Taylorville, Illinois. Since joining MUELLER CO. in 1968, Ron has been Dick Wood's assistant. Ron's primary responsiblity is to assist the Decatur Order Department Supervisor in all his functions and take over his duties in his absence. Ron is married, and his outside interests include boating, golfing and tennis.

J. R. WOLF - Brea Sales Office Manager
Jim is a native of Fullerton, California. He started in the Brea Sales Office in 1953 and has advanced through various positions to his present position as Brea Sales Office Manager. Jim's work consists of supervising the sales activities and duties of all members of both the Gas and Water Departments in the Brea Sales Office. Jim is well known to members of the gas industry in the Western District. He is married, has one child, and his outside interests are centered around golf.

R. L. HOOD - Brea Sales Service Supervisor
Ron joined MUELLER CO. in 1968 and now lives in Brea. His primary responsibility is to assist the Brea Sales Office Manager in providing services incidental to the sales activity of the Gas Department. This includes answering inquiries by mail, phone or personal contact regarding products, prices, deliveries and complaints as well as the uses of products. Ron also prepares both formal and informal quotations and assists in the training of new employees in the Brea Sales Office. Like Jim, he is well known to the members of the gas industry in the Western Sales District. Ron is married and has two children. His outside interests are also centered around golf.

J. D'ANGELO - Brea Sales Service Correspondent
John also joined MUELLER CO. in 1968 and now lives in Brea. John's primary responsibility is to provide services incidental to all sales activities of the Brea Sales Office Gas Department. His duties are the same as Ron Hood, and he acts as Ron's backup man when he is absent. John is married and has one child. Like Jim and Ron, his outside interests are centered around golf.

S. POLSTON - Brea Order Analyst
Sandra or "Sandy" joined MUELLER CO. in 1967. Sandy lives in Fullerton, California. Sandy's primary responsibility is to assist the Brea Sales Office Manager and Sales Service Manager in providing services to expedite sales activities in the Brea Office. Her work consists of interpreting all sales orders, and she is responsible for their being correct. She ascertains the exact interpretation for each line item on each order received. At times, this necessitates consultation with various departments at MUELLER CO. to obtain information to interpret a customer's requirements properly. Sandy is married, and her outside interests include boating and water skiing.

R. M. BASILE - Brea Order Analyst
Bob joined MUELLER CO. in 1972 and now lives in Anaheim, California. Bob's primary responsibility is to assist Sandy Polston in all her functions and to take over her duties in her absence. Bob is married and has two children. His outside interests include golf and deep sea fishing.

Engineering Report On The Mueller Gas-Phuse® Safety Device

Dennis W. Humes, MUELLER Co. Project Engineer and author of the report on the MUELLER GAS-PHUSE Safety Device.

Gas utility companies continually strive to improve or maintain an already remarkable safety record in the distribution of natural gas. Consistent with this is the protection of the natural gas service line connecting the main and the home regulator. Most instances of leakage between the main and the house are the result of someone disturbing the pipe with digging operations, resulting in either a rupture at the point of digging or pulling out a connection some distance from the hole. Digging operations are prevalent during any new construction, relocation of old water or electrical services, an energetic homeowner planting a tree, or any one of a number of occasions when opening a hole is required. Many soft service line materials, such as copper or plastic, tend to look much like a large root when unearthed and can easily be cut with a shovel or axe by an unsuspecting worker.

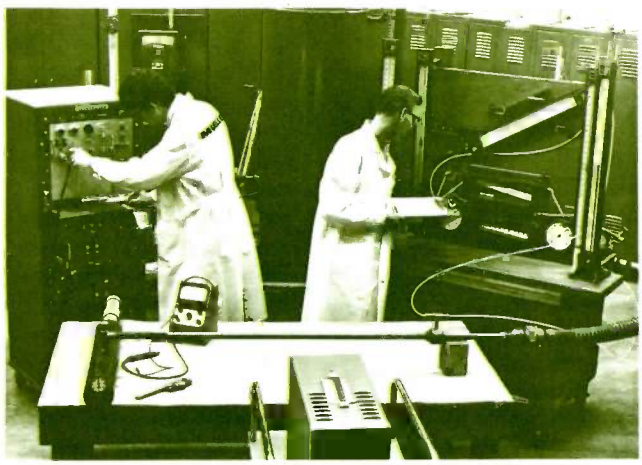
The MUELLER GAS-PHUSE Safety device will protect against the hazardous blowing of gas in these situations. This device is installed at the main where the service begins. It is designed to pass a normal flow of gas, but when this flow exceeds the predetermined level, it shuts off the supply of gas to the broken service line and keeps it shut off until repairs are made and the line is again sound and leak free. It can also be used to permit service line shut off at the main by action at the house when repairing or relocating services or changing meter valves.

The MUELLER GAS-PHUSE Safety device is a simple, three-piece assembly consisting of a body, ball and magnet. The magnet holds the ball suspended in the flowing gas stream as it passes through the body. When the velocity of the flowing gas exceeds a preselected level, the resulting fluid drag on the ball overcomes the magnetic force and moves the ball from the magnet to a seat in the outlet of the body, effectively stopping flow. In the case of a gas service line, a rupture occurring any place between the GAS-PHUSE Safety device (usually located at the service take off) and the home regulator would cause the flow to increase and activate the device to the shut-off position. The device will remain in the shut-off position until the damage is repaired and the line again safe and capable of allowing pressure to be equalized across the ball, i.e. service line pressure equal to the main pressure.

Originally developed by the late Mr. Daniel L. Jerman, the concept was later acquired and further developed by MUELLER CO. to the point where we felt confident of its performance in gas distribution systems. We had to imagine and simulate as many different installation and service situations as possible to evaluate its performance and answer the same questions for ourselves as would be asked by gas engineers when it is offered for public use. A brief review of some of our test work is given in the following.

FLOW TESTING

In the initial stages, many test models were flow tested. These models had variations in body dimensions, ball diameters and magnet strengths, and the accumulated data serves as the basis for charts and equations that allow us to mathematically predict and explain the functions of the device and determine the effects of manufacturing tolerances on performance. This proves very valuable when it is necessary to select or design a device for a special installation. It was shown that the flow capacity increases with pressure, so it provides for future demand expansions which are usually accompanied by a pressure increase. It also became apparent that, should something happen to the magnet, the device would shut off flow. Thus, its very design makes it "fail-safe" which is consistent with its intended use.



Project Engineer and Lab Technician conduct a flow test to determine performance characteristics of a GAS-PHUSE Safety Device.

TIME

The element of the device that would be affected is the magnet. Careful study of available books and literature, along with close contact with a magnet producing company, determined that the properties of a permanent magnet are virtually unaffected by time. Only outside physical influences as shown below, could effect a change, and these are greatly diminished by the ball acting as a keeper across the poles of the magnet and thus forming a closed loop. The stability of a permanent magnet is demonstrated by the fact that the Earth has retained its magnetic properties on a relatively even basis for a very long time. Our work in this area since 1950 has done nothing to upset this conclusion.

HEAT

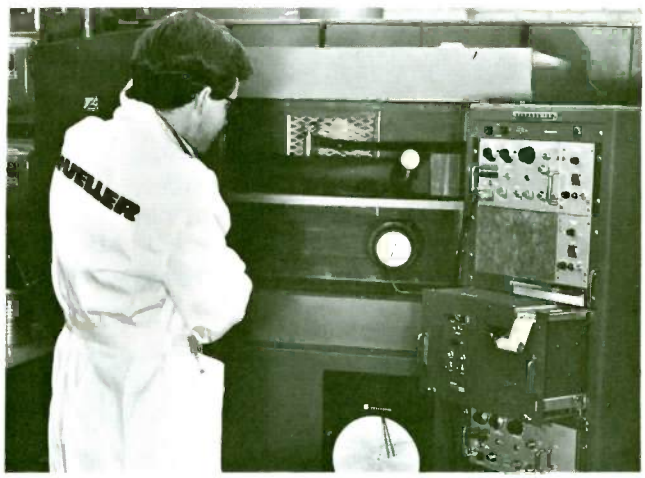
GAS-PHUSE Safety devices are equipped with Alnico II magnets. These are quite resistant to demagnetization effects of heat. An Alnico II magnet loses only 10% of its magnetization at 500°F and it takes a temperature all the way up to 1500°F to become completely demagnetized. For practical consideration, welding heat is the only heat source even liable to produce an appreciable heat effect on GAS-PHUSE Safety devices. Laboratory and field work by Mueller Co. indicate electric-arc welding can be done in the immediate area of the GAS-PHUSE Safety devices with no harmful effects, and gas welding can be performed to within about 3" of the GAS-PHUSE Safety devices, even without wet-rag cooling, etc.

LINE DUST AND CHIPS

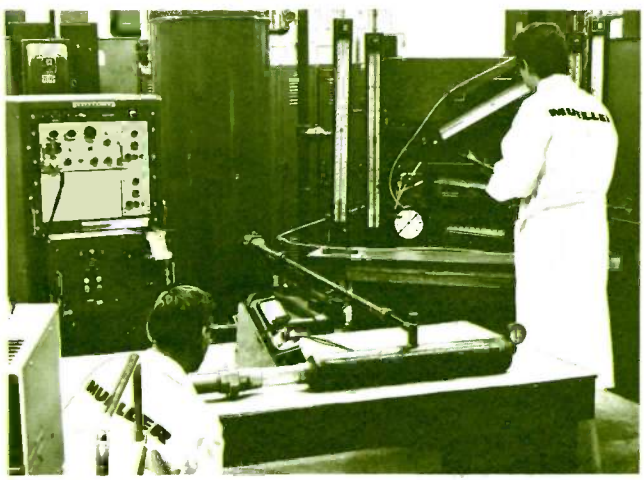
Probably the most important aspect of GAS-PHUSE Safety devices effectiveness lies in the part ferritic line dust and chips will play with relation to the magnet and ultimate GAS-PHUSE Safety device performance. Normally, the magnet and ball constitute a closed magnetic circuit. This condition leaves only a small percentage of the available holding power of the magnet free to collect foreign particles. However, it has been MUELLER CO.'s experience that normal flows are adequate to perform a self-cleaning operation. Dust and iron filings (intentionally placed on magnet under static condition) were used to test and evaluate any effect on closure flows. Conditions such as this were adequately compensated for in establishing the GAS-PHUSE Safety device selection material. Larger drilling chips, due to packing density, effect much less magnetic loss, although larger chips could interfere with reseating of the ball.

Because of the undesirable effects of drilling chips, it is recommended that drilling be performed without lubrication and that steps be taken to blow the tee before GAS-PHUSE Safety device installation whenever possible. A 2.5 psig pressure has been shown to be adequate for eliminating chips with blowdown of very short duration. It is believed that this blowdown is generally desirable even in present installations without GAS-PHUSE Safety devices.

(continued on next page)



Testing to determine the effects of elevated temperature on flow performance.



Flow testing of a simulated installation to determine the effects of line debris on flow performance.

SURGES

Most surges will be effectively damped by service line pack, and resistance and operation of the service regulator and meter. Mueller experimentation has been able to show that normal surges of flow greater than design demand will not cause premature actuation of GAS-PHUSE Safety devices. Surges will usually be quite small and will not trigger the safety mechanism.

STRAY A-C OR D-C CURRENTS

It is believed that stray currents normally would not be of sufficient magnitude to induce harmful demagnetizing influence on GAS-PHUSE Safety device magnets.

Further, the configuration of the magnet with relation to the tee or the main does not lend itself to an effective means of inducing a magnetic field in the magnet, even if currents were strong, chiefly because of the closed circuit condition where the ball is normally seated between magnet poles. Finally, the magnet material in question is among that group having the strongest resistance to demagnetization from any source.

FREEZING

Gas flow through a confined area in a gas line can experience stoppage from freezing or hydrate buildup under certain conditions. A properly installed GAS-PHUSE Safety device will not experience these problems because, unlike a service regulator which exposes the dew point of a flowing gas stream to atmospheric temperature drops and thermodynamic changes, it is located underground and does not cause an appreciable orifice effect.

Testing to determine the effects of low temperature on flow performance.

The Mueller GAS-PHUSE Safety device is different than any other offered on the market today. It has been available for many years in a wide variety of products and is backed by the extensive test and development work outlined previously. There are other products available today for the same intended purpose. The "free-ball" design must be installed with its flow centerline quite close to level but the properties of the magnet in the Mueller design allow it to be installed at any angle around the pipe and provide complete protection (when the flow centerline is below 20° below horizontal, the manual back pressure resetting method must be used) while also providing more accurate flow control. The magnet holds the ball centered in the gas stream until closure flow is reached, then it snaps into the seat in contrast to the vibration and seeking pulsations of the spring and plunger variety. The device is essentially self-cleaning as compared to others whose flow passages are shrouded by a fine screen. Considering performance, reliability and ease of installation, we feel that our device is superior to others offered to accomplish the same purpose.

Recently, an effort has been made to make the GAS-PHUSE Safety device more widely usable and easier to determine the proper size device for a given installation. The selection method used in the past was based on selecting a device that was compatible with the flow demand of the home being served. This can vary widely between services, even those all in the same area which is demonstrated by comparing your gas utility bill with your neighbors. Using known gas flow equations, we determined the flow capacity of common service lines at various pressures and coupled this with the performance characteristics of the GAS-PHUSE Safety device. The new selection guide matches the size of device to the capacity of the service piping, eliminating the need to know the normal flow expected in the pipe.

The device will automatically reset itself after the service line has been repaired by allowing the leakage between the ball and seat to fill the line and increase its pressure to equal that of the main. The factors to consider in this procedure are the length of time required, not knowing when the line is repressurized, and the fact that the leakage rate can be offset by a small leak in the downstream service line. For those who desire a quick, sure method of resetting, we suggest that they introduce a positive back pressure from the meter stop end of the service with a cylinder of pressurized gas. It is felt that this method saves time and effort in the long run, and we make special equipment to simplify this procedure.

Mueller Co. acquired full rights to the GAS-PHUSE Safety device in 1962 and has since sold many for installation around the country. We have reports of cases where the device has performed in a field situation, and these are believed to be backed by many more similar instances which were not reported as a customer rarely reports a product that performs as expected. To insure proper performance, each and every GAS-PHUSE Safety device is factory flow tested to check the closure flow and leakage rate. The work invested in development and experience gained through contact with gas utility companies has resulted in fortifying our confidence that this is a worthwhile and necessary product which we are glad to be able to provide to the gas industry. It is the kind of product we are proud to offer.

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SGA PRESIDENT HAS GOOD NEWS AND BAD

Jackson C. Hinds, president of the Southern Gas Association, delivered an address to the SGA convention, entitled "What Everyone Wants to Know About the Gas Business and Is Afraid Someone Might Attempt to Cover in a 30-Minute Speech."

He stated, "The gas business is not a dying industry. The good news is that we are going to be handling more gas - 27 trillion cubic feet - in 1990, than we handle today - 23 trillion a year. Even if residential and commercial requirements grow 100% from 1970 to 1990, only 50% of 1990's available gas supply will be needed.

"The bad news is that, if the present price structure is maintained, industrial and electric generating customers, who use 2/3 of the natural gas consumed in the U.S. today, will have to switch to much more expensive and less efficient fuels - oil, coal or nuclear.

"In 1970 the average price of gas at the wellhead was approximately 16¢ per million BTU's. Comparable prices were: coal - 25¢ per million BTU's and oil - 56¢ per million BTU's.

"Arabian oil is now being priced at about $11 per barrel. 'New' discoveries of domestic oil are being priced at approximately $10.50 per barrel, and 'old' oil production is being priced at about $5.25 per barrel. The comparable price for natural gas is approximately $1.50 per barrel.

"If we are to move toward domestic self-sufficiency, natural gas can make a great contribution, but this will happen only if the wellhead price is permitted to increase enough to provide the incentive for exploration."

AGA PROPOSES JOINT FPC REVIEW OF OFFSHORE LOUISIANA RESERVE DATA

To resolve any differences of reserve statistics indicated by a recent Federal Power Commission staff report, the American Gas Association proposes that AGA and the FPC Bureau of Natural Gas conduct, jointly, a thorough review of natural gas reserves in the offshore Louisiana areas.

The FPC study estimated 4,854 billion cubic feet of natural gas attributable to 31 offshore leases involved in the December 1970 wildcat lease sales, whereas AGA estimates for offshore Louisiana leases were 3,816 billion cubic feet.

George H. Lawrence, AGA Senior Vice President for Public Affairs, says, "Deviations in reserve estimates are to be expected because of professional judgements in calculating any reserves."

"CONSUMER EDUCATION" NEEDED

"Consumer Education" is the catchall phrase for the changes resulting from the energy crisis. "The energy crisis, particularly oil and gas, is a fact of life that marketers will have to live with forever," says William J. Gillian, vice chairman of the board of Ketchum, MacLeod and Grove. "Its effect on advertising will be profound. As new ways are developed to make better use of energy and to create new forms of energy, it will be advertising's job to sell those new products and techniques."

The large oil companies were the first to switch their advertising. They moved from a "buy gas" approach to conservation, stressing what their companies are doing to help solve the energy crisis.

POTENTIAL GAS RESERVES SEEN AS KEY TO U.S. SUPPLY NEEDS

The gas industry has enormous potential with tremendous untouched conventional domestic resources awaiting development under favorable economic conditions and advanced technology, according to AGA chairman Herbert D. Clay.

Clay told the AGA National Marketing Conference that "an estimated 1700 trillion cubic feet of natural gas in the United States will provide a long term supply for Americans. Total proven natural gas reserves in the contiguous United States at the end of 1972 were 235 trillion cubic feet. Our present reserves are estimated at 266 trillion cubic feet, and it is estimated that almost 800 trillion cubic feet remain to be discovered in the lower 48 states; at least 366 trillion cubic feet are yet to be found in Alaska; and about 300 trillion cubic feet lie trapped in tight geological formations in the Rocky Mountains."

"Taking all this into consideration," he said, "there is no justification for any pessimistic view that we are running out of gas. At the same time, however, let's not nonchalantly assume that long-term gas supplies will be forthcoming unless we make an all-out effort to transform potential into reality.

"Even though the prolific North Slope discovery was made in Alaska nearly five years ago (31.5 trillion proved and 366 trillion estimated), not one cubic foot of that gas supply has yet moved to the United States.

"AGA supports any project that will begin moving these vast supplies down from Alaska as soon as possible to meet today's serious energy problems. Alaska's gas is needed to meet our national environmental and economic goals as well as the health and comfort of the 160 million consumers served by the gas industry."

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SUPER SNIFFER

Over 2,500 miles of natural gas distribution mains get an annual leak detection inspection by workmen of Wisconsin Public Service Corporation. The inspection is done by a specialized vehicle called a flame ionization unit.

Sophisticated gas leak detecting equipment, mounted in an Econovan, takes samples of air through suction-cup-like arms extending from the front of the vehicle. The truck moves slowly along city streets drawing in air samples through a sampling boom. The samples are passed through sensitive electronic instruments which can detect minute quantities of natural gas in the atmosphere. The result is automatically recorded on a continuously moving chart. From this chart, company engineers can determine the condition of the underground mains.

The company's gas lines are checked annually as a precautionary measure. A detection unit can sample 10 to 15 miles of main per day.

GAS JET SET

Publication of the MUELLER RECORD is now being supervised by Jim Cussins, advertising and sales promotion manager, working with Robert Nichols & Associates, Decatur advertising agency.

Joseph C. Penne, editor of the Mueller Record during most of his 13 years with Mueller Company, resigned December 1 for other employment. Joe also supervised the firm's public relations program and put out the employee NEWSLETTER. A journalism graduate of the University of Iowa, Penne was formerly with the Decatur Herald & Review.

Don Bathe, who has been in the Decatur Plant Engineering office for 10 years and with the company for 23 years, is now responsible for producing the employee NEWSLETTER and news releases. Don's new title is Supervisor of Property Records and Employee Newsletter Publication.

Hugh L. Baker has been promoted to the newly-created position of Product Development Manager. He was formerly Manager of Marketing Services with an extensive background in both products and marketing.

A native of Decatur, Illinois, Baker graduated from the University of Michigan in 1933 and began working at Mueller Co. in 1934 in the engineering department of the company's Columbian Iron Works divison in Chattanooga, Tennessee. A year later he entered the division's sales department, becoming sales manager in 1937.

In 1945 he was transferred to Decatur as assistant sales manager for the company. Baker has held a number of positions in the headquarters sales, as well as advertising and marketing.

William F. Gilbert, Jr. has been appointed Sales Representative for MUELLER CO. in the State of Mississippi. He succeeds the late John W. Kirk.

Bill joined MUELLER CO. in 1964. He worked in our Chattanooga plant until 1973 when he was selected as a Sales Trainee. Since that time, he has been in an intensive sales training program. This program, combined with Bill's previous experience, has given him a thorough knowledge of products for both the water and gas industries.

Bill is married and has one daughter. His headquarters will be in the Jackson area.

Anyone who has to travel as a part of his work realizes there is always a certain element of danger present. Mueller Co. has been extremely fortunate in that until recently we have had only one fatality among our field sales force.

It is with deep regret that we must announce the death of our Sales Representative in Mississippi, John W. Kirk. John was critically injured in an automobile accident on January 25, 1974. After 13 weeks in intensive care at the University Medical Center in Jackson, Mississippi, John passed away at 11:00 a.m. April 28.

A native of Blue Mound, Illinois, John had been with Mueller Co. for ten years. During that period of time, he had worked in the Decatur factory, Decatur Sales Office, Advertising and Sales Promotion Department and as a sales Representative in Mississippi since 1971.

John is survived by his wife, three daughters, his parents and a sister. The John W. Kirk Educational Fund has been established at the State Bank of Blue Mound in Blue Mound, Illinois to help finance his daughters' education.

A most popular man, John will be missed by all of us who knew him.

off the Record

An engineer is said to be a man who knows a great deal about very little and goes along knowing more and more about less and less until, finally, he knows practically everything about nothing.

A salesman, on the other hand, knows very little about everything and keeps on knowing less and less about more and more until he knows practically nothing about everything.

The purchasing agent starts out knowing practically everything about everything but ends up knowing nothing about anything - due to years of association with engineers and salesmen.

More than one pessimist got that way by financing an optimist.

Love of learning is seldom unrequited.

A college boy wrote his father, "I can't understand why you call yourself a kind parent when you haven't sent me a check in two months. What sort of kindness is that?" The father replied, "Son, that's unremitting kindness."

Signs of the times in this crazy mixed up world - Copyright is what takes away the right to copy.

You are doing your best only when you're trying to improve what you're doing.

It's too bad mankind isn't, freeways aren't and diehards don't.

A talk show host is the guy who gabs until he gives you a headache and then tries to sell you something for it.

A third grade homework assignment to write a "poem" produced the following laconic verse from a nine year old boy:

MY WISH

I wish that I could have a horse.
He would eat the grass, of course.
He'd keep it short and crop it low,
And then I wouldn't have to mow.

What happens when you don't pay your exorcist? You're repossessed.

Sign in cocktail bar: We install and service hangovers.

Weather forecasting has been speeded up, but it's still several hours behind arthritis.

An old Portugese monastery is perched high on a 300 foot cliff. To reach it, visitors are strapped into a big basket and pulled to the top with a ragged old rope.

Halfway up, a passenger nervously inquired, "How often do you change the rope?"

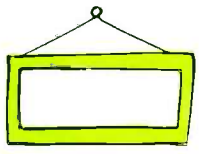
The monk in charge replied, "Whenever the old one breaks."

Door-to-door salesman to housewife: "You should have seen what I saw at your neighbor's! May I step in and tell you about it?"

When a certain Southern politician announced he was "a favorite son," one of his enemies roared, "That's the greatest unfinished sentence in the history of the Southland!"

Poetic Justice - Two high school students pooled their efforts on the sly to write a test. Their teacher made no effort to stop them until their papers were graded, showing a mark of 90. Then he explained to them that, since it required two of them to achieve the 90, he would split it and record a grade of 45 for each.

One reason it's hard to get men to go to church is that they don't care what other men are wearing.



No Smoking sign at a mind reader's convention.

Bigamy is having one spouse too many; monogamy is the same.

Born Loser—The Wall Street Journal reported this about a bank robbery in Southern California. The man pulled a gun which the teller noticed had water dripping from the barrel. He handed her a note which said: "Milk, Bread, Catsup, Laundry." She sounded the alarm and the man raced for his car only to discover it wouldn't start.

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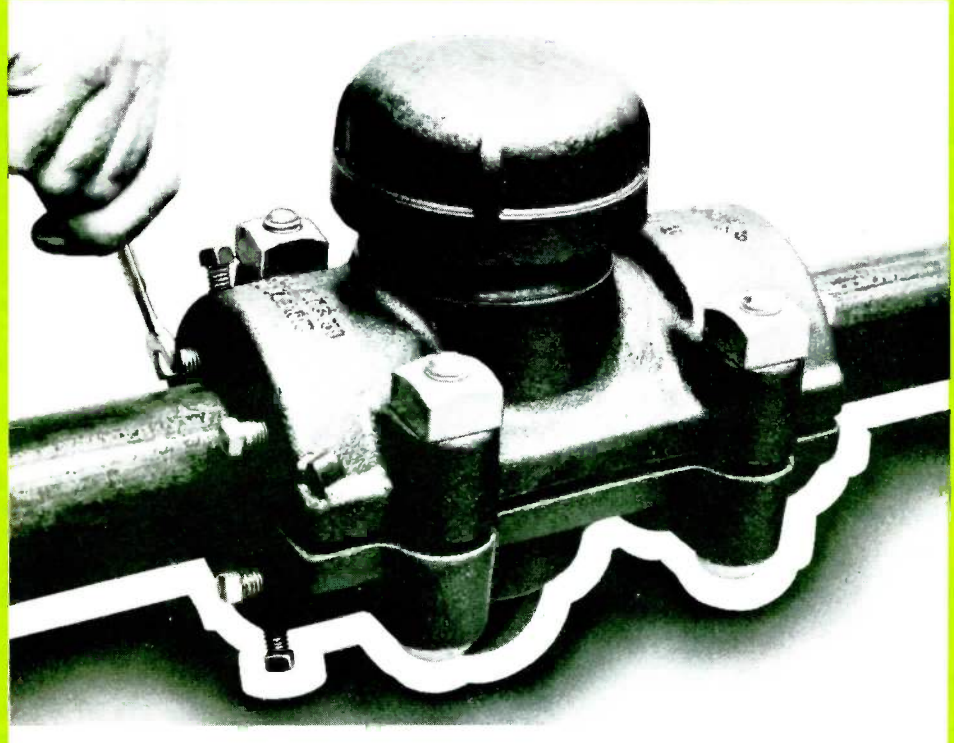

Isolate mains where needed for efficient cathodic protection— provide for future stop-offs at the same time!

The MUELLER® H-17166 Mechanical Joint Insulated Line Stopper Fitting provides a quick, easy way to isolate a section of main so it may be cathodically protected. Simply bolt the fitting on the main and *use your existing MUELLER Drilling Equipment to drill out the main* under pressure with no leakage and no gas flow interruption.

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