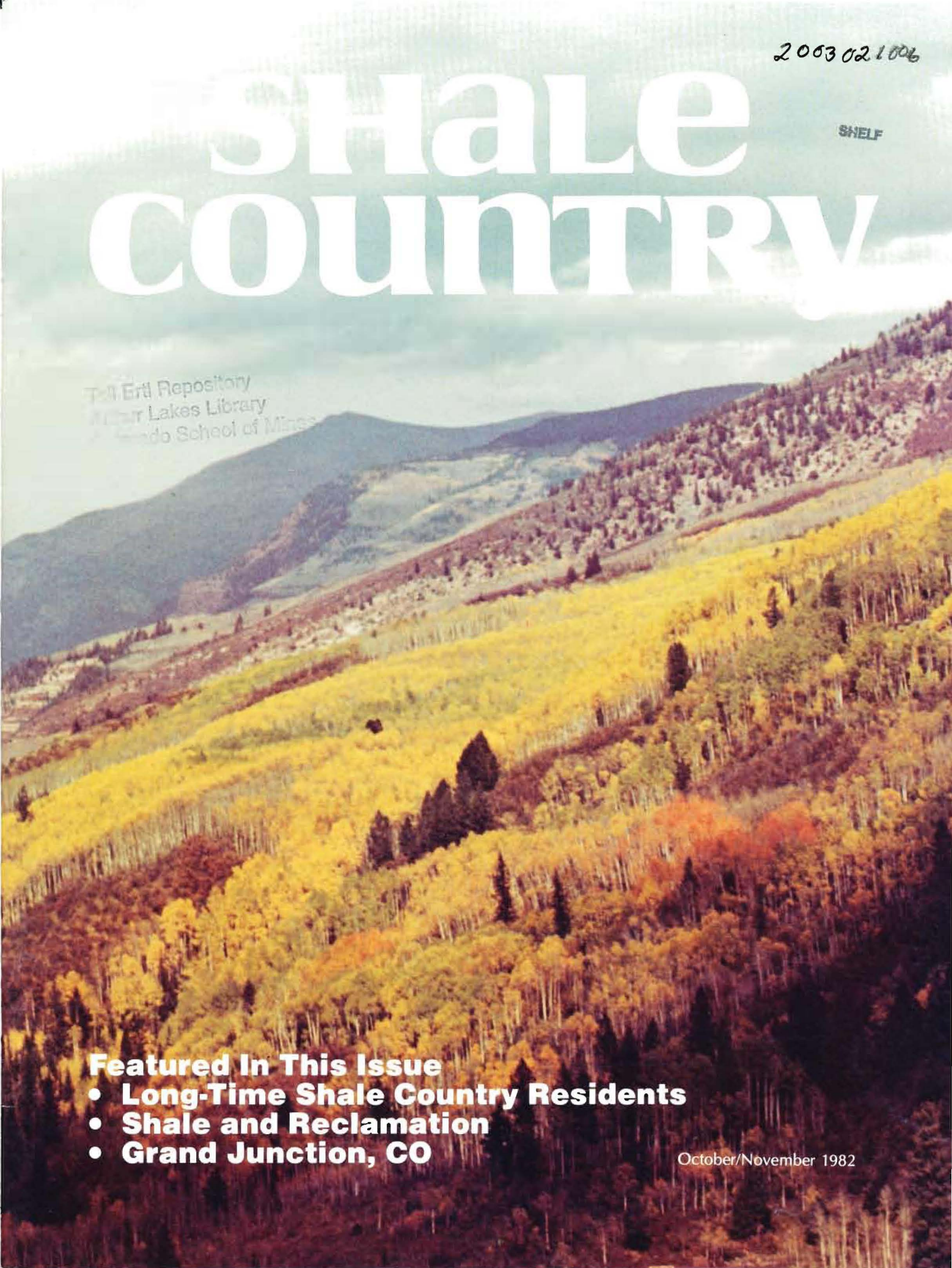
SHALE COUNTRY

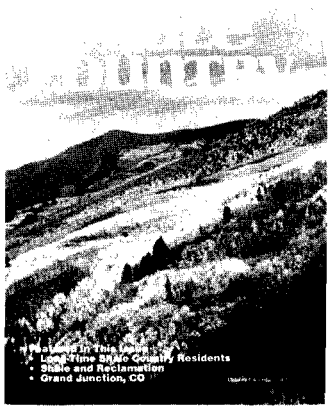


Featured In This Issue

- **Long-Time Shale Country Residents**
- **Shale and Reclamation**
- **Grand Junction, CO**

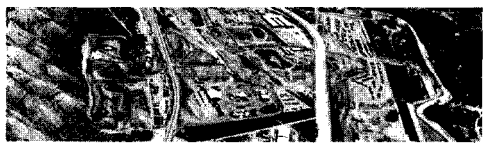
October/November 1982

THIS ISSUE



On the cover: The slopes show off their fall colors below McClure Pass.

SHALE COUNTRY stops by Grand Junction (p. 4-7), looks at Los Alamos' shale research (p. 8), finds out about shale reclamation (p. 10-13), and listens to what long-time shale residents have to say (p. 14-16).



SHALE COUNTRY

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Looking Ahead

Utah Envisions Human Services for the Future

Energy development can mean more jobs, but it also can mean changes in the communities surrounding commercial energy ventures—social as well as physical. Just as a growing population needs more housing and schools, it also can increase the need for support from professional agencies offering such services as mental health care, financial help and child welfare.

More jobs—but not enough

In Utah's Uintah County where the White River Shale Project (federal tracts U-a/U-b) is located, human services are part of a statewide system. McCord Marshall, director of District 6, which includes two other counties besides Uintah, notes that although the area is in beginning phases of energy development, it is being affected by social impacts.

"People are coming into the area because they've heard through the media that this is where the jobs are," says Marshall. "They expect to find work and then they find that it's not here, not yet. Our latest unemployment statistics are close to the state level—about 8 to 9 percent.

"One of the areas in social services to feel this has been financial-assistance referrals. A year ago we had 450 cases, today we have 600—that's almost a 50-percent increase. We are seeing an increase in child abuse and neglect referrals and mental health and family violence. We also recently started a detoxification program for public intoxicants, and that program already has people in it," says Marshall.

Deciding costs

In Uintah County, the statewide social service program coordinates services among agencies and provides a certain amount of funding each year. "Essentially, our budget—and as a result the programs and how many staff we have—is decided by the state legislature," says Marshall. "Each year the state Dept. of Social Services develops a budget that is reviewed by the governor and his staff. The legislature authorizes the budget and federal money is matched, and then the allocations are given to each district. (Utah has 14 districts.)

"The process of determining allocations is based on the programs we have in each district. Our budget (at district level) is based on existing staff and programs."

Marshall notes this has given the district about $1.5 million this year. Out of that money comes the salaries of 53 staff and services in four areas: mental health, alcohol and drugs, financial assistance and family, youth and children's programs.

Marshall adds, however, that districts are encouraged to and do seek other funding avenues. The mineral lease monies from the federal lease lands in Utah have made about $15 million specifically available to meet human service needs that result from energy impacts. Another source is special funding from the legislature for individual projects.

"Our two state legislators were instrumental in getting funding for a detention facility that cost around $350,000," comments Marshall. "It's being built in Vernal and will have live-in 'parents' and four bedrooms for hard-to-place kids until a home can be found for them, and four secure rooms for short-term detention."

A third potential source for funding is private industry and Marshall says initial talks with White River are encouraging. "We anticipate the real impacts will come by the early 1990s when the company has a work force of about 5,000. With families, that means about 12,000 to 13,000 additional people in the area. We hope to work out strategies that include help from White River to deal with the increase."

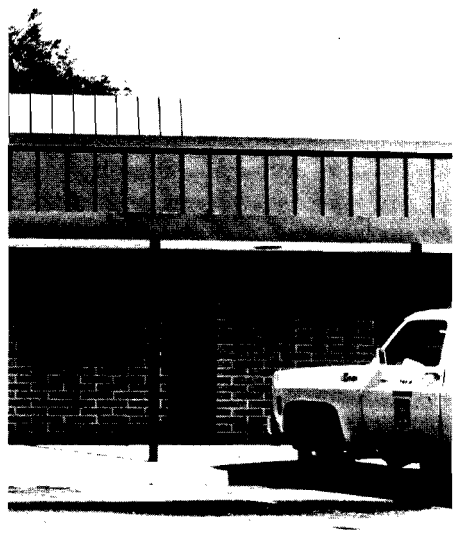
Framework for the future

The focus in Uintah County seems at this point to be to deal with the initial impacts and look ahead to what can be done about the future. "It appears the oil shale industry has stabilized and it will be 2 to 3 years before we see any significant population change due to operations at White River," comments Marshall. "I'd like to use that time to put in place strategies that will give us the programs and staff we will need—so we're not playing catch-up.

"We are looking at information that would suggest if you have 5,000 workers at White River and they generate a total population increase of 13,000 with families, then it would indicate how many mental health specialists you need to service that increase. We are also looking at what kinds of additional services are needed—alcohol and drug, detox, child welfare. With this information I can say to White River, if you're going to have 5,000 employees by the early 1990s, then we are going to need X number of staff and X programs to deal with those people.

"It takes time to set up programs. Our detoxification program is a good example. We had to contact hospitals and the police to get their support and cooperation, find an appropriate place, find funds—it didn't happen overnight." *N.L.S.* □

(**Editor's note:** As we went to press, the preliminary September unemployment rate for Uintah County was 10.4 percent.)



Energy-impacted areas such as Uintah County receive aid for human service programs from state-supported district offices.

Perspective

The Div. of Commerce and Development—Getting Down to Business

"We're happy with the way local governments are coming out of the energy slowdown financially..." says Steve Schmitz, division director.

From tourism to training to movies to television, the Div. of Commerce and Development, part of the Colorado Dept. of Local Affairs in Denver, is a multi-faceted organization. Composed of a variety of offices, commissions and programs, it uses a number of means—both traditional and non-traditional—to promote economic growth throughout the state.

Along the more traditional lines, "We have an industrial recruitment program," explains Steve Schmitz, division director, "that tries to interest outside companies in Colorado. We actually take company representatives around the state and show them the characteristics of the different areas. In fact, we were somewhat responsible for Anheuser-Busch deciding to locate its new plant in Colorado.

"Then, too, the tourism office promotes Colorado heavily," he continues, "particularly in states within a 1,000-mile radius, where Colorado is a big drawing card. With our international trade program we try to help Colorado businesses become more familiar with exporting, and we send people to international trade shows to promote Colorado products. We also promote the state to the motion picture and television industries. Last year this source provided $8 million worth of revenue in the state."

In addition, Commerce and Development has several programs that provide communities with technical assistance in such areas as planning and economics. One example is the division's Main Street program, administered by the Office of Rural Development, which helps small communities revitalize and preserve their downtowns. Main Street is a spinoff of a federal demonstration program that included Grand Junction, Delta, Durango, Manitou Springs and Sterling. Now several other communities are participating in the program, which assists with such things as conducting economic analyses, setting up improvement districts to raise money and forming downtown business associations.

Another example of the division's community involvement is its Office of Industrial Training. If a corporation wants to move into an area but needs skilled employees, this office works with the company and local vocational schools to set up the required training programs. A case in point would be the machine-operator training program developed for the Neoplan Bus Manufacturer in Lamar.

A shift in direction

For the past several years, rather than promoting economic development on the Western Slope, the division has had to concentrate on programs aimed at coping with rapid growth. But now that energy activities have taken a downturn, the division is shifting its emphasis to meet the area's changed needs.

Schmitz points out that Commerce and Development has many programs already in-place that could be used by areas no longer facing a boom. An example is the 1-day community workshop that the division can hold for town officials upon request. The workshops are basically an overview of and orientation to various economic opportunities—the motion picture and tourism industries, for instance—and include discussions of such things as financial assistance, promotional activities and worker training. When the community decides what area it wants to pursue, a follow-up team of technical experts is sent in to help improve its competitiveness in that market.

Along straight financial lines, Schmitz notes, "Our division gives out funds through federal and state grant impact programs, which have been applied to projects for communities and local governments faced with rapid growth. These funds, though, can also apply to impacts from declining growth. And," he adds, "there are ways in which the division can help the private sector, too, although these are somewhat limited. For instance, after the Colony announcement, we worked with State Treasurer Roy Romer to put state money into Western Slope banks to help keep them going. And we can also help some with small business loans.

"The governor has put together a task force—primarily composed of bankers and chamber of commerce people—to study the situation on the Western Slope. Mortgage foreclosures and office vacancies are up, but so far no one's come up with any remedies. Once Colorado Housing Finance

Authority (CHFA) money becomes available, that should help."

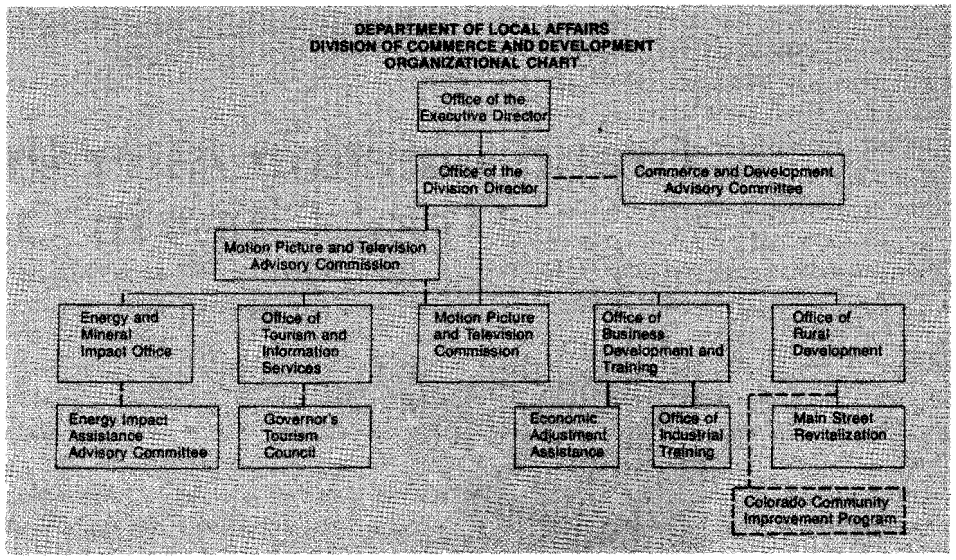
Using whatever works

CHFA, while not actually part of Commerce and Development, is one example of how the division uses non-traditional ways to help the state's economy—cooperation with other organizations that have the same goal. Evan Metcalf is the division's representative on the Colorado Small Business Council, which is how he became involved with CHFA. Metcalf explains that the financing authority was created by the legislature in 1973 to raise money for low-to-moderate-income housing by selling bonds outside the state and bringing the capital back to Colorado. This year the legislature passed a bill broadening CHFA's powers, so it can now raise money for loans for small businesses.

According to Metcalf, the legislature chose this mechanism to help small business because CHFA has a good track record on the national financial scene. "It's a brand new program," he says, "and the division is in the process of helping define the regulations. But basically, by the beginning of the year, the authority will be raising money by selling bonds, then channeling the money through banks and S&Ls, which will loan it out to businesses.

"Right now financing is only available for fixed assets—land and buildings—but we're hoping it will include working capital in the future. Currently we are working with lenders to design a program that will be attractive to them, and once that's done we'll help CHFA encourage small businesses to use it. It's a bit of a tightrope. We have to work with the businesses, which the program is designed to help, the lending institutions that have to make it work, and the people who are going to buy the bonds—we have to satisfy them, too.

"This legislation," he continues, "was not sparked by the shale slowdown, but the slowdown was a key factor in its passage. Originally the feeling was that the program was needed because small businesses were going to be left behind by growth—they didn't have enough money to compete with national companies and franchises. There was also the feeling that in the long-run there was a need for diversity, and that small business was the key to diversity. Now, of course, all those concerns have changed because of the slowdown, but the program has strong potential for helping improve this difficult financial situation. Although it's not going to be a panacea, it can help—the most important thing right now is to make it work."



Redistributing dollars

One section of Commerce and Development that has probably been most affected by the energy slowdown is the Office of Impact Assistance. Steve Colby, director, explains, "Impact assistance was originally part of the Office of Rural Development; then when the program became so large, we separated it out. With the energy slowdown the program is now focusing more directly on economic and community development."

Funding for the program, which this year amounted to $25 million, comes from the Colorado mineral-severance tax—the program receives 50 percent of these monies. The program also gets 15 percent of the mineral lease royalties the state receives from the federal government. Currently, 47 of the state's 63 counties have severance-taxable mineral production. Applications for grants go through the Office of Impact Assistance for review, a state agency as appropriate—the highway department in the case of roads, for example—then through the governor's advisory board.

"We're now seeing even more requests than before the slowdown, because of cutbacks in federal dollars," Colby notes. "Roughly 70 percent of the requests are coming from Northwestern Colorado, and 70 percent of the funding is going to that part of the state. People are just not sure that they don't have to develop additional capacity. They're talking in terms of improvements for sewer systems, for example, which will still be needed even if no new industry moves in. There is as yet no dramatic change in what people are doing; it's just that they're no longer sure of where the revenue will come from."

Still, Schmitz reports, "We're happy with the way local governments are coming out of the energy slowdown financially—they've been largely protected by planning and grants programs. The national economy only complicates the situation created by the slowdown. It helps that Union is going forward and I think it will continue to hold.

"Right now we're trying to help communities find ways to get through the recession and not depend *solely* on attracting new business. We're saying, 'Look, it's not realistic to wait for a small electronics firm to settle in your community during these times—we have to do something else as well. Maybe we need to get together and work with the banking community to try to stimulate programs at local sources, maybe we need to reexamine zoning....' We're trying to find alternative ways for these communities to help themselves." *K.C.* □

Community Profile

Grand Junction After the Boom: 'Two' Cities in One

By Carol Edmonds Sullivan

City road improvements are among many capital construction projects bolstering local economy.

Mayor Louis Brach is one of Grand Junction, CO's, long-time residents. He moved to the small town from Wyoming in 1928 at the age of 4. He worked in grocery stores, served in the U.S. Army and in 1951 opened his own grocery business, which he has run ever since.

When the uranium boom of the 1950s brought big spenders and big speculators, Brach got caught up in the excitement and agreed to deal. In return for groceries, developers promised him "part of the action." When uranium bottomed out, Brach lost several thousand dollars, as did many Grand Junction businessmen. "The uranium boom came and left," he says. "It left a lot of bad debts and a lot of bad feelings."

Today, says Brach, oil shale fortunes have flowed and now ebbed, and some Grand Junction businessmen have been hurt. But this time the slowdown hasn't cracked the city's economic foundations. "Some of us remember when there were some pretty slim pickings" in Grand Junction jobs before the energy boom, Brach notes. Until uranium, the railroad was the best payroll, he recalls.

A century of changes

Grand Junction celebrated its centennial this year, and oldtimers and town historians observe that the city has known economic highs and lows that make the latest slowdown look like a mere pothole along the economic byways.

The community was founded in 1882, at the junction of the Gunnison and Grand Rivers. (Later the Grand River was renamed the Colorado.) Peaches, sugar beets and other farm produce, as well as cattle, fed into the Grand Junction market and used the rail lines through the city. Soon Grand Junction became—and with its present population of approximately 28,000 has remained—the biggest city between Salt Lake and Denver.

But during the years, fluctuations in government policy on agriculture, mining and public lands, as well as climatic changes, droughts and freezes, brought boom and bust to the city. Brach recalls the changes in the business community from the 1940s to today: "When I was a young man, the men

of Main St. more or less controlled Grand Junction." When an entrepreneur would try to open a business on the city's outskirts, the downtown businessmen, who served on the bank's boards, stopped him cold.

The small-town elite city fathers were described in a novel, supposedly based on Grand Junction, by Dalton Trumbo. The book, "Eclipse," was banned in respectable circles for many years, and it's still hard to come by.

But today, Grand Junction's businesses are located in many sections of the city, its economy is shaped by businessmen throughout the country, and by financial decisions made throughout the world. In 1980, Mesa Mall, a gleaming shopping center, opened on a western plot of land that was annexed to the city. Penney's and Montgomery Ward's left downtown, and remaining Main St. establishments include boutiques, sandwich shops, banks, savings and loan associations, and a city convention center. Thus, Grand Junction found itself with a problem that faces many larger cities—a declining downtown. But in 1981, it joined "Main Street," a program sponsored by the Colorado Div. of Commerce and Development and efforts are now underway to revitalize the area. (See related story on p. 2.)

Banking on minerals

Increasingly, extractive minerals have played important roles in the local economy: uranium, oil and gas, coal and oil shale. However, Dale Hollingsworth, executive vice president of the Grand Junction Area Chamber of Commerce and a former city councilman, points out that unlike Durango, Aspen, Telluride and many other Western Slope towns, Grand Junction's fortunes didn't begin on the tides of the extractive minerals industry. For example, in recent years the city had attracted high technology manufacturing firms—such as the electrical manufacturer Dixson and the industrial ceramic producer Coors Porcelain.

But as minerals brought rapid growth, the Chamber of Commerce slowed some of its efforts to attract new industry to the area. Many thought Grand Junction was in an economic cocoon. When the housing industry suffered nationwide in the mid-1970s, residential construction was flourishing in Grand Junction.

In 1982, the cocoon frayed. Nearby oil and gas drilling dropped off sharply in response to depressed oil prices worldwide, uranium prices plummeted and resulted in layoffs at the Grand Junction office of the Dept. of Energy, shale activities were slowing down, and Grand Junction began feeling rumbles from the nationwide recession.

For the first time in years, "For Sale" signs became plentiful in front of city homes. Apartments were easy to rent. City building permits reflected a decline: The value of construction in July was down 39 percent from a year ago. City revenue from the sales and use tax dropped in August by 12 percent from projections of a year ago.

Bank deposits no longer reflected the optimism of 1981. Instead, from March to June of 1982, deposits in Grand Junction's six banks decreased by $9.5 million—as compared to the $18-million increase recorded during the same period of time a year ago, according to Bill Gossett, president of the U.S. Bank of Grand Junction. He says that after the shale slowdown, banks became more cautious in their loan policies, real estate values depreciated and spending was reduced in retail sales. Still, the bank executive notes, the economy was cushioned by such actions as Exxon's repurchasing homes from its employees who left Grand Junction. Now the shock of the sudden slowdown has worn off, says Hollingsworth. And the Chamber is seeking new industry once again.

George White, a businessman in Grand Junction for the past 20 years, says, "Half of the economy of our county is the attitude of business, and the attitude is upbeat." White's Grand Junction businesses have included a glass and trophy store, three construction companies, a grocery store and a radio station.

He is now chairman of Mesa County's commissioners. Grand Junction is the county seat and the population center for the county's 81,530 residents (as recorded in the 1980 census). White notes that residential and commercial developments are still being platted, but not nearly as many as a year ago. "We (county commissioners) used to have 25 hearings on developments in a single day. Yesterday we had five. But

Downtown is no longer the city's economic hub, but specialty shops are adding new life to Main St.

Once a jail, this building is next to the site of a new state office building with a projected cost of $4 million.

these aren't speculative. These will really happen."

White acknowledges that businesses did suffer from the shale slowdown. "Supportive businesses, such as engineering companies, old established businesses that borrowed when the interest rates were high, these are the people that have been hurt the worst."

Cushioning economic impacts

But, while businesses may be in tightened straits, White notes that Mesa County and Grand Junction were buffered by impact monies paid by industry to the federal and state governments. For example, the county received $6.4 million last year from the Oil Shale Trust Fund, the state's portion of the money paid by the energy companies to lease the federal tracts C-a and C-b. The Mesa County commissioners, responsible for dispensing that money, allocated $1 million of it to St. Mary's Hospital in Grand Junction to help the hospital in a $22-million expansion project.

The appropriation drew fierce criticism from some citizens. White still defends the action. "St. Mary's is the largest employer in Mesa County, its most stable economic factor," he says. "Besides, guess who would have to pick up the tab if those who administer the hospital called me tomorrow and said St. Mary's was closing the doors. We (the county) would."

White sees other healthy signs in the county-government economy: A 2-percent county sales tax became effective in June. Its revenues will go in part to Grand Junction and other municipalities in the county and in part to some $30 million in capital improvements over the next 3 years. "The bidding climate is extremely good," White notes, and he reports that bridge and road improvements are being bid some 25 percent under 1979 estimates.

Overall, says White, the shale slowdown has given local government a chance to catch up on its capital construction and planning needs. And while the slowdown hasn't resulted in any fewer public meetings, the agendas are shorter.

Concerns switch to jobs

Another change in public concerns is observed by chamber executive Hollingsworth. He notes that the words "energy impact" are rarely heard nowadays. "The concerns have shifted to survival, to jobs," he adds.

One person who has frequently spoken about energy impact is Jane Quimby, former Grand Junction mayor, former president of the Colorado Municipal League and now city planning commission member. Quimby notes that overall, Grand Junction and other Western Slope local governments impacted by oil shale "came out fine" during the recent slowdown. And the reason she cites is cooperation between the state, cities, counties and industry in meeting front-end costs such as housing, roads and utilities.

In Grand Junction she says intensive planning that came during the energy boom has resulted in numerous public projects that are now being built—providing jobs to private contractors. Among those projects: airport improvements, road construction, a state office building, and a new swimming pool jointly built by the city, county and school district.

Cooperation between governmental entities has been an often controversial target of elected officials, though. For example, the city council has sought to review residential housing developments just outside the city limits. Councilmen point out that the road widths in the county are 30 feet—4 feet less than in the city. If such areas are annexed to the city in the near future, as expected, the city must accept "substandard developments that are brand new," in the words of one city official. But Brach and White think such differences can be worked out in a new county land-use policy statement.

Another city-county debate centers on where to locate a joint recreation center. Some city leaders want it in the heart of Grand Junction; county officials are more interested in a high-growth area on the perimeter of the city.

Still, says Mayor Brach, such political disputes aren't "hardball politics." In his view, his monthly salary of $125 mirrors the fact that Grand Junction folk prefer "grassroots politics," not professional politicians.

Another city leader, reflecting on the disagreements between the city and county, isn't as sanguine about the local politics. Mesa County is a commercial developer's paradise, says this leader, since it has an

over-abundance of commercial zoning. In his opinion, such "overzoning" deflates property values.

"Grand Junction is maturing, but it's certainly not as big as a lot of people think it is," says a downtown city leader. "We're still dependent on a lot of outside influences."

Perhaps former Colorado Gov. John Vanderhoof, now president of Club 20, a Western Slope promotional organization headquartered in the city, describes the different viewpoints when he says: "There are two Grand Junctions. One consists of oldtimers and the professionals who have come with the new minerals industries. They have broadened Grand Junction's scope culturally and aesthetically." The other group consists of newcomers in the industries serving the minerals developments. According to Vanderhoof, they haven't integrated into the older society. But they just might. For now, he reports, Grand Junction is a "friendly, agricultural, entrepreneurial city."□

In the middle of downtown, Grand Junction's city hall offers a park-like setting.

Finances: Cloudy and Bright

Like a vague weather report ("scattered cloud cover, sunny with a chance of afternoon showers"), the economy of Grand Junction is giving mixed signals.

Rapid growth seems to have stabilized. In the last decade, Grand Junction population within the city limits increased by 40 percent to 28,148 in 1980. But since the shale slowdown started last year, there are fewer newcomers. School enrollment in District 51, covering most of Mesa County, was 16,000 students during the first week of school this fall—roughly the same enrollment as 1 year ago. In contrast, in the 1981-1982 school year, enrollment jumped by 900 students. This year, district officials expect "zero to moderate growth," according to Gary Carr, school community relations officer.

However, Carr says, catching up with the growth that the district has already experienced was the idea behind a $23.5-million bond issue that passed in 1980. Eight school projects were financed by that bond issue—including three grade schools that opened this year. One of them, Thunder Mountain Elementary, opened year-round in July just after the shale slowdown, and classrooms were filled as expected. Some 65 new teachers were hired to staff the three new schools.

Other major capital construction projects in Grand Junction include the airport expansion, financed in part by $3.96 million in state Oil Shale Trust Fund money, and a $4-million, 50,000-sq.-ft. state office building that is to be built downtown. Last year the Oil Shale Trust Fund administration shifted from the state to the respective counties, and Mesa County received a total of $6.4 million to be expended in the next 3 years. Among other projects, these monies will finance widening Horizon Dr., the main artery off I-70 leading to the airport to the west and the city to the east, into four lanes.

According to Greg Inman of the state Office of Impact Assistance, over the years Grand Junction has received impact monies that include $1.8 million in mineral-leasing and severance-tax grants. Among the projects funded by these monies has been $1.5 million for a sewer system.

In the private sector, major commercial construction projects include a $19-million Hilton Hotel being built along Horizon Dr., a just-opened 160-room Rodeway Inn that is now for sale, also on Horizon Dr., and plans are underway for a hotel at the airport—the Ramada Rennaissance. Says Skip Grkovic, director of the Downtown Development Authority, "It's not unusual in rapidly developing growth situations to have overbuilt office space, hotel rooms and retail space." He points to the excess of condominiums in Vail, Aspen and other ski areas in Colorado in the mid-70s as a similar situation.

One indicator of the slowdown is utility hookups in the Western division of the Public Service Co., from Glenwood Springs to the town of Mack. The number of gas and electrical hookups for 1982 is projected to be about 2,000—one half the previous year's number, according to division manager Jim Temple.

Nonetheless, business leaders affirm that Grand Junction's economy is relatively well off. While unemployment climbed in Mesa County from 4.8 percent in April to 6.4 percent in August, the jobless levels aren't close to the double-digit rates in Detroit and other Frostbelt cities.

Still, the Colorado Job Service office isn't courting the unemployed from other areas. Says a recent newsletter written for those making job inquiries in Colorado, "The local labor force in Garfield and Mesa counties is more than adequate to fill all available oil shale construction jobs."□

Situation Report

Shale Research Takes Off with a Bang

Oil shale research can be a blast—at least according to Wayne Morris, oil shale project manager for Los Alamos National Laboratory in New Mexico. In more technical terms, Morris and a team of scientists are conducting a series of experiments on problems of blasting as it applies to "rock fragmentation," a step that must occur before the oil can be removed from the shale by some retorting methods.

Los Alamos National Laboratory, which is operated by the U.S. Dept. of Energy (DOE), began investigating oil shale fragmentation in 1978, at the Colony mine near Parachute, CO, then owned by ARCO and Tosco. Two years later, when ARCO sold its interest in Colony to Exxon Corporation, field research moved up the road to DOE's mine at Anvil Points, outside Rifle.

This year's program is being sponsored by a consortium of companies: Scientific Applications, Inc., SUNEDCO, Phillips, Mobil, Sohio, Cities Service and Getty. Explains Morris, "Scientific Applications provides program management and scientific instrumentation and personnel; other sponsors contribute funds for salaries and supplies. We supply the laboratory technical knowledge and specialized scientific equipment, some of which is not available commercially."

Out in the shale field

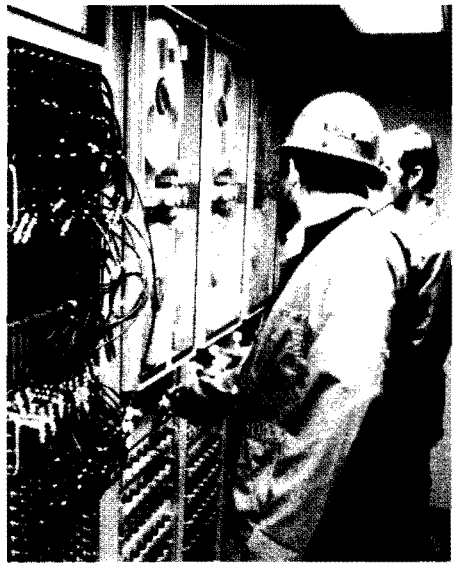
Currently the fragmentation experiments relate only to one retorting process—Modified In-Situ (in-place). With MIS, a void is created in an underground column of shale by removing part of the rock—about 20-40 percent—and hauling it to the surface for above-ground retorting. Explosives are then detonated in holes above the void to fracture the remaining shale, and the crushed rock is ignited. As the flame front moves along, it heats the shale and the oil is baked out and pumped to the surface.

This simple-sounding method becomes complex when shale geology is factored into the process. "Oil shale is almost impermeable," Morris reports, "and in order to burn it you must find a way to send a large volume of gas and air through it. Fracturing the shale (breaking it up) distributes the air space, and to distribute it evenly, the shale must all be the same size—you can't have big pieces and little pieces. If you have big pieces and powder, the flame front will burn down one side of the column and not the other, and you'll lose too much of the resource. Also, the fines (tiny pieces of rock) become soggy and plug up the operation when the oil begins to flow.

"When you detonate, the intent is to get the explosives to fracture the rock so that it's all broken evenly. You can't expect every piece to be exactly 6 inches in diameter. But you can expect not to have pieces 3 feet in diameter and too much powder. Actually, if we could get all the pieces the size of a grapefruit, we'd have it made.

"It's a simple concept," Morris continues, "but fracturing oil shale is not easy because of the nature of the shale and the variance of the grades. Rich oil shale is very tough and rubbery, while lean shale is very brittle. And in one section you can have several grades. So what we're doing is tailoring the explosive pattern to grade. This process may make mining engineers shudder because it's very impractical and uneconomical. Still, many people are hanging in there and saying that MIS can be a viable technology if we can solve a few problems.

"What we're really doing is taking the slow, scientific route to busting up the rock. The main objective is to apply very precise, scientific principles to the process. For instance, we're finding that detonation timing is crucial: When do you set off one charge and when do you set off another? Most mining is not concerned with such critical timing, but we're timing detonations within 10 milliseconds (10 thousandths of a second) to see what the effects are on the shale."



The on-site instrumentation trailer that controls the experiment detonates the explosive and records scientific data.

Back in the research lab

To help predict rock behavior during an explosion, Los Alamos is also designing blast patterns via computer modeling, and these patterns are then verified in the field. Using these models, scientists can determine where to place the explosives, how many there should be and when they should be detonated. Input information includes such variables as the rock's physical strength, density, shale oil content, the size of the charge and the type of explosive used.

Morris explains, "You can run a lot of problems through a computer and it doesn't cost as much as a field test—you can predict what will happen under various conditions and then test certain ones in the field. For example, the shock wave from the explosion breaks up the rock, and the gas that's released travels farther and breaks up more rock. Thus, the model can help you determine what works and how the variables interact—it's a tool designed to help you understand what goes on in those first 5 milliseconds after the explosion. You can also look at the interaction between two adjacent explosions so that you can decide how close together and how far beneath the surface they should be.

"The computer enables us to set up a field experiment so that it can be recorded and measured accurately. This is important to us because we want to know if the explosive burned the way the manufacturer predicted it would, and how the shale responded to the explosive shock wave." *K.C.* □

Focus

Landlocked Rangely Breaks Loose

Rangely, CO: Population approximately 2,500 and still growing, thanks to energy development. But, with the White River to the north, and 44 percent of the town surrounded by U.S. Bureau of Land Management (BLM) lands, until recently the community had limited room for expansion.

In fact, housing was becoming the town's most critical problem. Not only were rentals scarce, but should you be lucky enough to find a house to buy, costs were prohibitive—last year, a 1,000-sq.-ft. home was selling for about $65,000. Because of the housing shortage, people were living in mobile homes, trailers, and doubling up in apartments. This situation is now on the road to change, though, because last April the BLM officially transferred the deed for 106 acres of public land over to Rangely—in return for a check in the amount of $521,000.

Pinning down the price

Actually, such a transaction, although a first for Colorado, is not unique. According to Colorado BLM director George Francis, "BLM has the authority to conduct such a sale under the Federal Land Policy and Management Act of 1976. Throughout the West, federal lands are on the outskirts of many communities, so we utilize this authority quite often. In Rangely's case, we recognized the town's master plan (a guideline for residential and commercial building) in our overall land-management plan." He adds that BLM has reserved some 2,500 acres for Rangely's expansion, which will become available as the town expresses a need for additional property. He also points out that BLM retained the land's mineral rights; currently there are some active oil and gas leases on the property, so royalties from this source will continue to revert to the federal government.

Rangely began serious negotiations for the sale with the BLM in the spring of 1981, and eventually purchased the land at a fair market value of $4,500 per acre for 80 acres of residential property and $6,000 per acre for 26 acres of commercial property. But when the asking price for what little nearby private land was available reached approximately $45,000 an acre, how was the fair market value determined? According to Francis, the decision was made by experienced BLM appraisers, who used towns such as Craig and Meeker for comparison, since a more open market prevailed in those communities.

The transfer, of course, did not take place without some controversy, and last spring 12 private landowners filed a lawsuit with the U.S. District Court in an attempt to stop the transaction. The suit was dismissed on the grounds that the parties could not prove that they would be hurt by the sale of the BLM land.

Rangely's town manager, Don Peach, reports, "There was some private land that could have been purchased, but it just wasn't reasonably priced. Since BLM land became available, private land prices have dropped substantially, and private land has become obtainable for development."

Coming up with closing costs

Financing for the land exchange was provided by Western Fuels—Utah, Inc., which is developing the Deserado Coal Mine 7 miles east of Rangely. Western Fuels is also covering the cost of legal fees for defense against the lawsuit and for negotiations with the owners of the oil and gas leases on the property, who will be allowed to continue operations.

The town intends to sell the land to developers at the appraised BLM price plus reasonable, documented administrative costs. A contract between the town and the developers will control the housing mix and profit margin. So far, Western Fuels has purchased 41.5 fully developable acres of land at $11,000 an acre. It plans to build 120 homes and use 1-1/2 acres for offices. The town is taking the lead in finding developers for the rest of the property, and Peach says, "We're trying for moderate-income rental housing, which is an area that has been neglected by the private sector. We're looking at about 150 to 250 rental units to be developed."

Peach emphasizes that Rangely was not much affected by the shale slowdown and despite the slacking of other energy activities, the town has yet to feel much of a decline. "The population of Rangely is approaching 3,000, up from about 2,200 a year ago," he notes. "Of course, the downturn in oil and gas exploration meant the loss of about 80 jobs, but the Western Fuels' coal mine took up the slack and then some. We also anticipate that oil and gas will pick up—even if it takes awhile."

Although Rangely has no plans to ask BLM for more land in the immediate future, Francis adds, "We at BLM are pleased to be able to cooperate with the city in efforts to make this land available. We were very impressed with the work that went into the city's comprehensive master plan, because with the kinds of planning the town has done and the housing it is considering, Rangely will not become a tin city." *K.C.* □

Mayor Peggy Rector accepts the land patent to 106 acres of land adjacent to Rangely from George Francis, state director of the BLM.

Environment

Rebuilding the Environment—Science and Art

By Nancy L. Sullivan

Permanent revegetation preparation has been completed along this access road at the Colony site and the slopes are ready for reseeding.

It takes about 110 permits to build an oil shale mining and processing plant in Colorado. About 10 of those are directly related to extensive environmental requirements. Today, land areas "disturbed" by mining processes must be returned to an appropriate state of usefulness—that is, reclaimed. In Utah, the permitting process is just as extensive because the philosophy behind the law in both states is similar.

"Colorado law requires that the operator return disturbed land to beneficial use," says the director of the Colorado Div. of Mined Land Reclamation, David Shelton. "The choice of what that land use will be is made by the operator and local government (county commissioners); but, usually, land is returned to what it was before mining—range land and/or wildlife habitat. Once the specific land use is chosen, then the operator comes to us with a reclamation plan detailing how he thinks he can achieve that beneficial land use."

Building a base for regulation

That plan—or more accurately that process of creating a new environment out of the old—is a combination of "art and science," theory and practice with a dash of crystal ball prophesying thrown in. Officially called "reclamation," the process will take place during a project's operating life and beyond, and it will require the efforts of hydrologists, engineers, engineering geologists, soil and revegetation scientists, and wildlife experts from both government and industry.

"Reclamation is not just throwing a few seeds out and if they grow it's a success and if they don't it's a failure," emphasizes Shelton. "Reclamation includes topsoil salvage and shaping the land—that is, creating new landforms that are stable, won't erode, and will protect ground- and surface-water conditions. It means designing physical, chemical and biological systems that will succeed by building new three-dimensional landforms that can function in the environment. But you've got to build a good foundation before you revegetate, and then you have to plant vegetation that makes sense given the wildlife and livestock you are trying to support," says Shelton.

Colorado's major legislation that controls and regulates all mineral mining and reclamation (excluding coal) is the Mined Land Reclamation Act, which is administered by the seven-member Mined Land Reclamation Board. Shelton heads a staff of seven professionals in this program that analyzes reclamation plans to see how technically feasible and reasonable they are and then recommends them to the board for approval or disapproval. The staff, however, also works extensively with an applicant, providing expertise, data and advice as the plans are developed.

Before applying for a reclamation permit, an operator confers with local officials to determine the most appropriate use for the land once the mining operation is finished. Once it is decided how the land will be used, the operator usually discusses with Shelton's staff what the critical issues might be for his mining area and reclamation goals. Using these issues as a guideline, the operator gathers data and prepares the application, which is reviewed by the staff to see that it's complete and meets the law's requirements.

Once the staff has what it believes is a workable plan, it then goes before the board and describes the reclamation issues at hand and how the plan proposes to resolve them and recommends approval. A financial warranty is also set for the estimated costs to reclaim the area should the company default for any reason, and the board then votes on the plan. (Warranty is a financial guarantee by the operating company for the money necessary to reclaim its mining area. This usually takes the form of corporate surety or of self-insurance—that is, the company meets certain financial conditions that show it is good for the money. If the company should default, the state would then use the warranty money to contract out reclamation work.)

Factoring in site specifics

The *way* in which an operator chooses to reclaim an area will depend not only on the choice of technology used to mine and process oil shale, but also on the topographical conditions in an area. Bluffs, canyons, plateaus all present individual problems in reclamation work.

For example, presently, most aboveground retorting operations will leave large amounts of processed shale (rock that remains once the oil is removed) on the earth's surface. Retorted shale piles will be formed into stable land masses and revegetated. The ideal place to deposit retorted shale usually is the head of a drainage area—such as the head of a canyon—to minimize the water carried over the deposit as well as associated problems like erosion.

Of course, each project has its own

Most of this Parachute Terminal area at the Colony site will be revegetated.

unique differences. For instance, on federal tract C-b in Colorado, a canyon that can be used for disposal is available in an area called Sorghum Gulch, but an even better solution, from a reclamation point, would be to utilize an additional 600 acres at the head of the canyon as well. The problem is that the land is "off-tract" and the decision to allow off-site disposal in this particular area rests with a bill before Congress.

"If plans for leasing that site for shale disposal go through," notes Ed Baker, environmental manager for C-b's Cathedral Bluffs Shale Oil Co., "we can reduce the height of the spent (retorted) shale pile that is planned for the canyon area and can then move that excess material onto the off-site acreage. We can then design the shale piles to reduce the amount of rain runoff, and the whole area will be better off in the long-run."

Because reclamation of large oil shale operations is essentially still an experimental art, flexibility is built into the laws and regulations. This flexibility and the lack of any existing large reclaimed areas to use as a prototype mean there is broad discretion in designing reclamation projects.

"The law," points out Shelton, "gives general performance standards. The advantage is that *any* design can be judged by these general criteria, but on the other hand, interpretations of these standards are not black and white. For example, the law says an operator must minimize disturbances to the hydrological balance in surface and subsurface waters. But that means different things to different people, and the application of that idea is going to be different from one project to another. Essentially, the idea behind the law is that the operator has a duty not to needlessly disturb the hydrologic regime and to minimize the long-term effects of the mining operation," he concludes.

Creating new ecosystems

Yet, that flexibility becomes particularly important because the embryonic stage of oil shale development means there are no proven techniques for reclaiming spent shale piles on a large scale. "The operator says that he'll do x, y and z, but there are no hard data, no precedent to argue over if we question whether he can actually do that," says Shelton. "This is an experimental industry and we still have a lot to learn about the effects of disturbing large areas. So what happens is the operator goes out and begins the first part of his operations—and it becomes a demonstration. We look at what is being achieved on the ground and if it meets the expectations and predictions of the permit, fine. If not, we and the operator must look at alternatives.

"Our goal as staff to the board is to look at each plan when it is submitted and ask, does it deal with the issues—hydrology, erosion, slope stability, topsoil management, plant life. But all of us, the staff and the operators, are really looking into a crystal ball and trying to determine how an area will behave in the future as we change it in certain ways.

"You have to realize an area will not be as it was originally," Shelton continues, "although it may serve the same purpose. We are creating something new: a new ecosystem. We are looking at the physical, chemical and biological systems and trying to predict how they will behave 30 years down the road. It is somewhat of a science and somewhat of an art. But that is also the fun and the challenge."

Much of that challenge for the operator will be in using his imagination, knowledge and inventiveness, not only to preserve the environment, but even to outwit some of the state's perennial problems. An example is the extreme dryness in many areas. An outgrowth of shale reclamation could be new approaches to replenishing an area's groundwater (water below the surface that is the source of wells and springs). In the end, some areas might be better off than they were originally.

For example, "In the dry country at Cathedral Bluffs," explains Baker, "groundwater is not replenished by summer rains—it is recharged from runoff from the high country. So to utilize the moisture that falls right here, we are designing the shale pile to capture and hold the rainfall." Baker adds that this type of design contributes to the ability of the reclaimed area to maintain itself, perhaps in a better fashion than surrounding land areas.

Baker, who has a degree in range and forestry management, notes that most companies rely heavily on civil engineers to contribute their skills and knowledge to reclamation design. "You want to design a landform that will be stable and avoid shifts or erosion. The civil engineer can calculate

This series shows a revegetation demonstration plot on TOSCO II processed shale at the Colony site. The sequence, from left to right, is from the years 1971, 1973 and 1976.

what the slope of a shale pile should be, based on the size of particles and how uniform they are. It really takes a team effort."

Shifting gears

In Colorado the law also allows for changes in technology or in the pace of commercial oil shale development to be incorporated into existing reclamation plans. As an example, it may eventually be possible economically and environmentally to place up to 70 percent of spent shale from a mine back into the underground mine areas. Under the regulatory processes now used, a company can go back and formally amend its reclamation plan if an option like this should become feasible. Baker points out this amending process also covers changes such as the application for the additional 600 off-tract acres for spent shale disposal at C-b.

The phasedown of operations at the Colony Shale Oil Project near Parachute, CO, has also necessitated a change in site reclamation. Exxon Company, U.S.A., has sharply reduced its construction activities for the next 2-3 years, but is managing the Colony site in such a way that it can accelerate construction if conditions require. In the meantime, Exxon has filed an "Interim Site Plan" with the board, which is an application to modify its original reclamation plan.

Gerald Ortloff, regulatory affairs manager for Colony, says, "Since we have very little development activity going on now, we are asking to reclaim in a way that will stabilize all disturbed areas but still allow us to come back later. For example, any areas we don't expect to disturb again by construction, we will permanently reclaim in compliance with the original plan. This amounts to about 300 acres and includes roadside slopes and other areas where construction work is completed. We will spread topsoil and then revegetate with approved seed mix.

"In areas where construction work is not completed we will use temporary methods," he continues. "In some places that will mean revegetating without spreading topsoil and in areas where we can't get plant growth, we'll just be using a dust suppressant to keep the dust from creating a problem. These temporary reclamation and stabilization measures will be used on about 400 acres."

This interim reclamation planning, Ortloff points out, is almost as extensive a process as designing the original plan. "We described the site area by area and did a complete inventory of land disturbance by aerial photos and maps. We planned out exactly what we would do, and which areas would be permanently reclaimed or temporarily stabilized."

Ortloff says Exxon hopes to have most of this interim reclamation work completed this fall but that construction and new reclamation activity will continue in 1983 and 1984. "Our plans include building a dam to protect our mine bench from floods," notes Ortloff, "and we are going to build a water in-take structure in the Colorado River for water we will need to run the shale processing plant." He adds that the current estimated cost to reclaim areas that have thus far been disturbed is $30 million, the amount of Colony's financial warranty posted with the board.

Team work

Both Baker and Ortloff point out that the staff at Mined Land Reclamation has encouraged companies to find the best solutions to whatever reclamation conditions affect their areas. Shelton says, "Because oil shale is an experimental industry, these companies can't tell us exactly what they are going to do over the next 30 years. It's obvious there are going to be some changes, and we don't want to discourage that. If the companies can come up with a better way to reclaim, or a way that is not only better but cheaper, by all means we want them to go ahead. Flexibility has to exist for an experimental industry."

In fact, Shelton's biggest concern is that the current slowdown in shale activity means the opportunities to test out theories and to see what really works are fewer and further between. "One day the federal government could walk in and say, 'Mine it!' because of world petroleum conditions, and we might not have had the chance to learn the things we need to know. I know it's very expensive to run an experiment on the scale of an oil shale project, but the best learning opportunity is the real thing, and at some point you have to say let's test our theories in the real world. Our crystal ball is still fuzzy; I'd like it to be clearer." □

Personality Profile

Shale Country Residents Look Back at Old Times

By Heather H. McHugh

Things are changing fast around shale country these days, but there are still a lot of folks in Western Colorado and Eastern Utah who can recall what used to be. Colin Clem, Enid Hatch and Carl Ahrens are just three of those long-time residents whose memories reveal the hard-working zest for life and the spirit of the people who have made shale country what it is today.

Ranching on Parachute Creek

Colin Clem lives on the family ranch 5 miles outside of Parachute, CO, or as he still calls the town, Grand Valley. Parachute may have wanted to update its image a couple of years ago when it changed its name from Grand Valley; but if Clem wants to go by the old-fashioned name, why not—he's lived there for 72 years.

"My folks came here in 1902 from Missouri," he explains. "They got married in the morning and got on the train that afternoon. When they got to Colorado they moved to a log cabin a few miles from here on Battlement Creek.

"I don't think my mother was ever happy here, though," he continues. "Her dad was a doctor so she'd never lived outside of the city. She just never could get used to country life.

"Actually, it was my dad's brother who got them to move out here," Clem continues. "He came to Rifle to stay with his uncle who owned the Winchester Hotel. He became New Castle's town barber and later owned a livery stable in nearby Rifle. Then he traded the stable for 160 acres of land on Battlement Creek and convinced my father to move out here. That land has been in the family ever since. In fact, I still live on it. My uncle used to call this place 'no rocks.' I'd like to see how rocky Missouri is if this place hasn't got any rocks!"

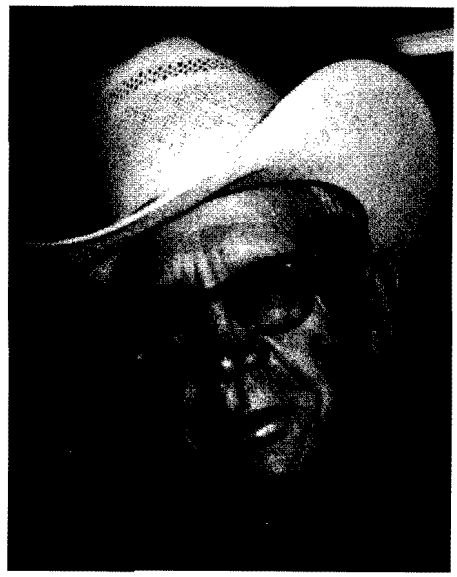
Clem was born a few years after his parents settled in Colorado and the young boy was raised on the family ranch. "I went to school for 8 years on Morrisania and then for 4 more years rode my horse to the high school in Grand Valley," he explains.

The town really bustled in those days, according to Clem, more than it does today. "It was a nice town when I graduated from high school in 1929. There was a silent movie theater, a drug store, three grocery stores, a nice hotel and a bank. We had Saturday dances that everybody in town used to go to. Of course," he adds, "none of that is left today.

"I graduated from high school during the big Depression," Clem remembers, "and I found work wherever I could. If I could get a dollar a day and board I was happy. Then my dad died unexpectedly in 1933 and my brother and I took the family ranch over. We ran cattle for 3 or 4 years, then we had sheep for a couple of years, then we went back to cattle."

Those years were full of activity for Clem, who met Winifred, his bride-to-be, in the early 1930s. "I used to do a little rodeoing and I kid her that she heard about me and came out to Colorado to see me," he chuckles. "Actually, she moved out here with her cousin who was teaching school on Parachute Creek. Winifred only meant to stay here a couple of months but she and I met that summer at one of the town dances. Well, my dad was on the school board and so I got him to arrange another teaching job for her cousin. So they came back the next year and we got married in July of 1934. She's lived here for 50 years, but she still thinks of herself as a city girl."

Winifred got her sole taste of married city life when she and Clem moved to Denver during World War II, but it didn't last long. "During the war my wife and I moved to Denver where I worked at a munitions plant for 26 months," Clem explains. "It was my first and only time living in a city and I hate to admit it in front of my wife, but I didn't like it much. I had to drive all across town to get to work and I never could get used to the traffic.



Colin Clem has lived near the town of Parachute for nearly 72 years.

"My brother was killed in a car accident in 1943," Clem continues, "and so Winifred and I moved back home to manage the ranch. We haven't left since although our two sons are both living in Denver now."

Living off the land has been no easy task, but Clem says, "I've enjoyed it here. I was a water commissioner for the state Water Resources Board for 32 years after I moved back from Denver, and that was fortunate. Ranching is a good occupation as long as you can make a living at it. I was lucky to have something on the side to keep me going."

And life hasn't been any easier for friends and neighbors near Parachute. "When I was growing up," Clem remembers, "the people around here mostly made their living from farming fruits and berries. I wouldn't say they got rich, but they made a living, and back in those days that was doing good. Later, of course, some of them got jobs in oil shale at Anvil Points and around De Beque. Most of those folks are getting close to retirement age now."

The town of Parachute may have changed considerably during the years, but Clem's part of the world is much the same as it's always been, oil shale or no oil shale. "The oil shale projects have brought a few

more businesses into town recently and they're tearing up all the streets in order to get them paved. And of course one of the biggest changes lately is that they've run a highway through the middle of town," he concludes.

"But from up here on my ranch, oil shale hasn't changed things much. From our back window we can see the bachelors' quarters for workers on Union Oil Co.'s Parachute Creek plant. And from the front room we can see the road to Rulison. That's all the excitement we get. For us up here the oil shale development hasn't caused too much uproar.

"I tell people that oil shale is the first word I ever learned to speak," he says. "There's always been so much of it around here. This time the plans for development went farther than they ever have before, and I think that the oil shale companies will be back again. But only time will tell."

Mrs. and Mr. Boyd Hatch, at their 35th wedding anniversary.

Confectionaries and kids in Utah

Enid Hatch knows how to enjoy herself. Born in Vernal, UT, in 1921, her earliest memories are of play. "We kids who lived in town used to especially enjoy following the old man who kept the street clean," Hatch recalls. "He'd get up early in the morning with a wooden contraption to clear the streets of snow and then in the summer he'd water down the roads. Kids today just don't know what they're missing.

"I really enjoyed the town when I was young. We played in the city park on the swings and slides and merry-go-rounds," she says. Even school was fun for Hatch. "When I was in grade school everybody would line up outside the building and then a couple of girls would play a duet on the piano and we'd all just march right inside," she recalls. "Then, whenever the basketball team won a game or something, they'd ring the school bells to let the town know."

But Hatch's fondest memories are, not surprisingly, of summer vacations spent visiting her grandmother in the nearby town of La Point, 15 miles west of Vernal. "La Point was tiny then," she says, "just a post office and two or three confectionaries."

Hatch's grandmother ran one of those confectionaries. Hatch describes the store: "It was a rugged old building. It had a potbelly stove and a marble-top counter for making confections with a big mirror hanging behind it. One or two days a week the farm kids would come into town to buy cream and their mothers would give them a nickel or dime to buy the handmade ice cream or pop that my grandmother also sold in the store. I remember there were a couple of boys who used to bring in snakes to try to scare the girls," she adds with a laugh.

Vernal was a much smaller town when Hatch was growing up than it is today. Most of the people made their living in farming or livestock raising. "There was one big store called the Co-op that sold all sorts of things," Hatch explains. "And of course, there were lots of confectionaries, some of which were actual drug stores with pharmacists, unlike my grandmother's confectionary, which only sold patent drugs.

"My paternal grandfather had the big Palace Meat Market in Vernal," she continues. "Most of his sons, including my father, worked there at one time or another. What was special about them was that they raised their own cattle and sheep for butchering in the shop, and they also had their own slaughterhouse." The meat market must have been quite successful, since Hatch points with pride to the fact that "My father's family were some of the first people in Vernal to have brick homes and automobiles."

Even the best-loved childhood must come to an end and in Hatch's case that happy adolescence blossomed into a fruitful maturity. "I was married in 1940, a month before I graduated from high school. Two of my friends," she adds, "had already gotten married the fall before and they seemed to have made it all right so I decided that I would try it.

"My husband was working on his family's ranch at the time, which was 15 miles north of town," she continues. "He didn't have a car so I'd borrow my parents' horse and ride out there to see him on weekends and at spring vacation. But I finished high school. That was one of my big ambitions.

"Education is important to me," Hatch explains. "Every one of my children finished high school and at least 2 years of college, and I have eight children!

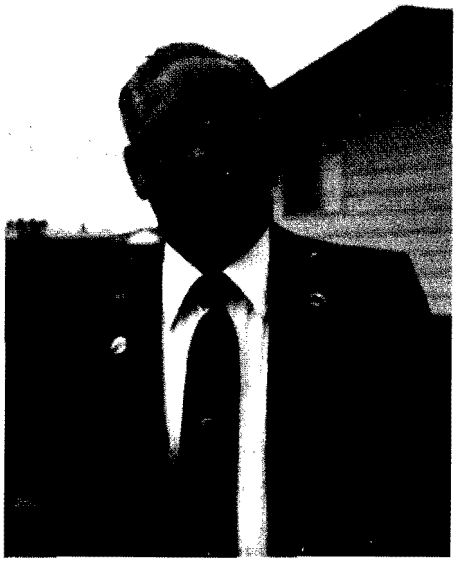
"After we married," she says, "my husband worked on his family's ranch and then as a carpenter and contractor. Finally he went to work for the Forest Service. For 22 years he was only home on weekends. It's pretty hard to raise eight kids, especially teenagers, that way."

And how did she cope? "You do what you have to do," she says calmly. "The boys would get up and milk the cow before school until we decided that we didn't need to keep a cow anymore. And several of the kids got jobs after school to help pay for college.

"Those kids are just like money in the bank today," she smiles, "because they all bring their children to visit me. Six of my kids are married and I have 25 grandchildren. That's like icing on the cake!"

The town that Hatch's grandchildren have come to know is quite different from the Vernal of their grandmother's childhood. "Vernal has changed immensely in the last few years," she says. "They're building houses everywhere. We've got condos, trailer courts, just about everything." And even though two of Hatch's sons and one of her sons-in-law now work in the energy industry, "The new development," she says, "hasn't affected my husband and me very much."

Hatch and her husband now live in a house her husband built "in his off hours." After working for several years "writing a kind of gossip column for the 'Vernal



Carl Ahrens, a Grand Junction resident, has always been a traveler.

Express,'" Hatch and her youngest daughter now have their own collection business. When she's not working or playing with her grandchildren, Hatch also tends to her duties as president of the local chapter of the Daughters of the American Revolution.

And we mustn't forget her wood-cutting chores. "Around where we live," she says with a laugh, "it isn't prestigious to get a new home or a new car. What's prestigious is to have a stack of wood in your back yard. So my husband and I go out every weekend to chop wood." Enid Hatch provides living proof that energy can come from within as well as from without.

Riding the Rio Grande

"I'm just a golden teenager," chuckles Carl Ahrens, who still delights in his work after more than 40 years on the Rio Grande Railroad. As a conductor on the Rio Grande's Zephyr line between Grand Junction and Salt Lake City, Ahrens sees plenty of action, although he admits that he might retire next spring. "The railroad has been good to me," he says, "and I've tried to be the same to them. But I've worked for a while, and I guess it won't hurt me to take some time off and loaf around a little bit!"

Ahrens, it seems, has always been a traveler. Even his earliest memories find him on the road. "I was born in 1919 on a ranch northeast of Loma, CO, which is about 20 miles west of Grand Junction. The area was all farms when I was a kid. We didn't even have any roads then. My brother and I would ride double on the horse to school in Loma each day. The school had a stable just like they have garages for buses today. In the winter we would tie a rope to the saddle horn and one of us would ski behind the horse while the other rode. The skis were made out of barrel staves. I still remember when they built the highway through Loma. It was impassable in the winter but nobody had a car to drive on it anyway. Mostly we just rode horseback or used a horse and buggy."

Ahrens' preferred mode of transportation eventually shifted from horses to trucks, but his days on the highway were destined to be short-lived. "In 1941," he remembers, "I was working for the Los Angeles Produce Co. making deliveries in the valley surrounding Grand Junction. It looked as if we weren't going to be able to replace the tires on the trucks, because rubber was all tied up for war materiel, so that May I went to the Rio Grande Railroad and asked for a job. They offered me a spot as a brakeman, and I've worked for them ever since.

"On my first railroad job I worked the freight train running between Grand Junction and Helper, UT. Helper is the division point 177 miles west of Grand Junction where freight is collected and sorted and sent over to Salt Lake City. We hauled coal and fast freight. We call fast freight 'red ball,' meaning that it's a hot train," he explains with a grin.

For 3 years, Ahrens divided his time between Colorado and Utah. "I spent half my days in Helper and half in Grand Junction, which wasn't so great since my family was only in Grand Junction," he says. "But in 1955 I was promoted to conductor." Since then things have been smooth sailing.

"There used to be one Zephyr and five regular passenger trains each day. I tell people it's a tri-weekly system. I go over to Salt Lake City one afternoon, spend the night and return the next morning, so I'm home every day."

And what does Ahrens do when on the job? "The conductor," he explains, "tries to keep people happy and keep tabs on the train. My biggest responsibility is to get the train safely over my portion of the tracks. The Grand Junction to Salt Lake City run is on a good fast portion of the track since it runs on the desert, so I don't have it too hard. Things get a little more complicated when you have to go through the mountains."

Time and trains have changed since Ahrens started with the railroad. "We used to have steam engines, and we took our directions from hand signals all up and down the track. The trip was much slower then. Now the operation of the track is done by centralized traffic control signals sent from a dispatcher in Denver. All we do is follow those signals. And, of course, the trains are all diesel today."

Although the Zephyr makes fewer runs today than it did in its heyday, the railroad certainly isn't suffering from lack of business. "After World War II the jet age came about and everybody started flying," Ahrens notes, "and of course most of the people who make the trip between Grand Junction and Salt Lake City today drive their cars. Most people would rather have their own private transport. But the train had a busy summer; we have lots of rail nuts who ride the Zephyr just because they love trains."

And as for Ahrens' long-time home in Grand Junction, time has brought changes there, too. "I moved to Grand Junction when I started with the railroad in the early 1940s. It wasn't a thriving community then," he recalls. "The population wasn't very big and mostly depended on farmers who came to town on weekends to trade their eggs for groceries. The area has changed naturally over the years until recently when oil shale really picked up. The change was pretty drastic during the past 4 or 5 years, but now it seems to be slowing down again.

"Energy development has created a lot of congestion here," he continues. "I built a house 7 years ago in the middle of a pear orchard. Now there are houses all around me. I never expected that. But Grand Junction has businesses and industry that we never dreamed were possible. Anytime you have money coming into a community it's good. And I expect that although I probably won't see it, someday they'll develop this oil shale in a big way." □

Potpourri

MEI— Matching Buyers with Suppliers

Energy companies need to buy crushers, conveyor belts, pumps and pipes, but they also need mountains of pens, pencils, paper, letterhead and business cards to supply their offices. Daniels Office Supply, a minority-owned business in Denver, has doubled its receipts in the past 2 years, largely by selling such materials to various energy companies. K C Morris, Daniels' vice president, credits a non-profit organization called Minority Enterprise, Inc. (MEI) with helping her and president Mel Daniels, make profitable contacts in industry.

Founded in 1974 by six Colorado corporations, MEI has two major functions, according to Gordon Ipson, president of the Denver-based organization. First, it encourages big business in the Rocky Mountain region to adopt policies and programs that will assure the purchase of goods and services from minority-owned businesses. Second, it sponsors activities to further economic development of the minority business community, such as programs on industries, and sales and management training workshops.

With MEI's help, in 1980 Daniels made contact with L.E. Dickson, Amoco's senior buyer in Denver, who invited the firm to bid on filling Amoco's office-supply needs. Morris recalls winning several contracts for some of Amoco's supplies, and Daniels has since then expanded to supplying other energy companies in the Rocky Mountain region and as far away as Alaska.

Opening corporate doors. MEI helps minority-owned businesses open doors to major corporations via the donated facilities and staff time of its members. For example, in addition to his work with MEI, Ipson is socioeconomic programs administrator for the Solar Energy Research Institute in Golden, CO.

However, to keep it running smoothly, MEI has a one-person staff—executive director E.E. "Van" Van Stee, a retired procurement manager with 30 years of service at Dow Chemical Co. Mountain Bell, another MEI member, contributes Van Stee's telephone and office in the telephone company's 17th St. building in Denver.

MEI operates according to an old saying with a new twist: "It's who you know *and* what you know" that accounts for success. Minority-owned new or small businesses often lack personal contacts in the majority network, and they also need solid information about the requirements of the business community they hope to serve. Corporations, in turn, need information about minority-owned businesses.

MEI, which has members from both groups, facilitates such an information exchange. When a new minority owner joins MEI, Van Stee visits the business, then writes a 2-page resume of it in the "Minority Business Profile," which is mailed regularly to corporate members, now numbering more than 50 large businesses, plus the University of Wyoming and the cities of Boulder, Aurora and Pueblo. Regular program meetings, open to members and nonmembers alike, provide personal contacts.

Stopping by the fair. Perhaps MEI's most successful match-making activities occur at quarterly minority business fairs, held at corporate facilities, area hotels, and public facilities such as the Denver Center for the Performing Arts. Ipson estimates these fairs draw about 90 percent of the vendors invited to participate, and 100 or more corporate and government representatives, usually buyers.

While minority businesses east of the Rockies are increasing sales through MEI, few Western Slope minority-owned businesses are on the roster yet, probably because most of MEI's activities have been concentrated in the Front Range. But that's a situation Van Stee would like to change.

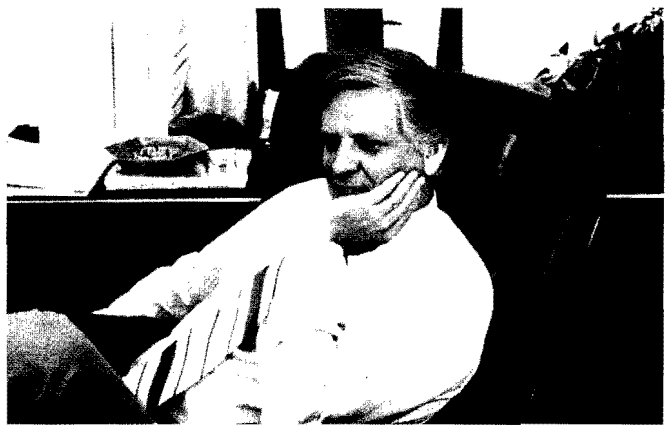
"We're looking for minority-owned businesses on the Western Slope and north of the Colorado border," he says, adding that many corporate members have extensive operations in both areas. To belong to MEI, corporate or sponsoring members pay $300 annual dues, while minority-owned businesses pay $25. Dues, donated hours and workshop fees support MEI's activities.

MEI's goal of bringing the minority business community into the economic mainstream has not yet been reached, according to statistics Van Stee cites when seeking new members: "In this country today minority businesses constitute 3.8 percent of all firms, while they generate only .05 percent of all business receipts. The top minority businesses employ an average of 178 people, mostly other minority individuals. All minority businesses combined provide only .06 percent of all U.S. employment."

Van Stee says MEI is raising those percentages in the Rocky Mountain region. He invites inquiries, c/o Mountain Bell, 1005 17th St., Denver, CO 80202 or (303) 624-1385. *K.B.S.* □

Vignette

Larry Lukens: Striving to Launch Synthetic Fuels



"... **it's important** that we don't lose even more time before we get synthetic fuels launched," says Lukens.

Whose trail leads through the U.S. Navy, the Dept. of Defense, the Dept. of Energy and the U.S. Synthetic Fuels Corp.? And whose trail now leads to the president and chief executive officer's office at Paraho Development Corp. in Denver? Why it's Larry Luken's trail, of course, but don't expect him to sit still now that you've tracked him down. For Lukens is hot in pursuit of the elusive oil shale beast and he won't slow down until he sees streams of oil flowing from a commercially successful oil shale facility.

A 20-year Navy veteran whose career includes a variety of top-level positions in the federal government's energy programs, Lukens is now leading Paraho in its efforts to create a commercially viable oil shale development, the Paraho-Ute Shale Oil Facility, on Paraho's property in Utah. And he'll keep at it until the domestic synthetic fuels industry gets off the ground.

Drydocked at Annapolis

"I've had a long-standing interest in energy, going back to my graduate experience," says Lukens, who, while in the Navy, earned master's and doctorate degrees in mechanical engineering from Purdue University during the late 1960s. "After college I went to sea for a couple of years as a lieutenant junior grade in the Navy," he reports. "But then, in 1973, the summer before the Arab oil embargo, I was assigned to the Naval Ship Research and Development Center based in Annapolis, MD.

"I immediately sought out Cmdr. Paul Petzrick," Lukens continues, "who had been assigned by the Secretary of the Navy to look into the energy problem to decide what the Navy should do about it. I asked permission to work on the problem with him and for the next couple years we developed a research and development program."

The program was aimed at determining how conservation and synthetic fuels could be used by Navy ships, and Lukens turned out to be the right man in the right place at the right time. The oil embargo had galvanized the country into re-examining its energy policies and developing a new set of priorities geared at promoting energy independence. And Lukens' growing expertise in creating programs designed to enhance America's energy self-sufficiency proved to be just what the government was looking for.

"Having been in on the ground floor," explains Lukens, "I got quite involved in the national response as energy-related crises developed throughout the 1970s. I feel very fortunate to have been able to participate in that response, particularly as it relates to synthetic fuels."

Lukens' movement through a series of top-level Washington, DC, appointments began in 1975 when he joined the Navy's energy and natural-resource research and development office. Here he helped to create yet another research and development program, this time designed to increase the energy self-sufficiency of Navy ships, aircraft and shore-based facilities. At the same time he also developed a synthetic fuels program for the Dept. of Defense (DOD) that examined the capabilities of military fuel derived from coal, oil shale and tar sands.

Accumulating oil shale hats

In 1978, Lukens undertook still another assignment, this time as an energy advisor to the deputy undersecretary of defense for research and technology. Lukens performed strategic planning for the development and use of domestic alternative fuels for the military, as well as served as a policy advisor to the office of the Secretary of Defense, the Joint Chiefs of Staff and the offices of the Secretaries of the Navy, Army and Air Force. He also oversaw the creation of the DOD Oil Shale Task Force Report for the Secretary of Defense, which recommended ways that the DOD could support commercialization of synthetic fuels.

Lukens remained in the Navy but left DOD in 1979, this time settling in at the Dept. of Energy (DOE), where he took on new responsibilities as deputy assistant secretary for industrial planning and development. In this position he directed the offices of planning and budget for a variety of projects including the synthetic fuels commercialization program, and the Naval petroleum reserve programs. Among his responsibilities was overseeing the planning and implementation of the alternative fuels production program, a $5.5-billion government financial assistance program designed to accelerate commercial development of synthetic fuels.

By 1980, Lukens, with a seasoned grasp of the ins and outs of synthetic fuels, was perfectly suited for a move to the newly formed U.S. Synthetic Fuels Corp. (SFC), a quasi-governmental agency formed by Congress to provide financial assistance for private development of synthetic fuels. Lukens participated heavily in initial organizational planning and staff recruiting, and also helped create the corporation's systems for soliciting proposals, awarding contracts and evaluating requests for financial support. But in 1981, after 20 years of service, Lukens was ready for a different kind of challenge, and he retired from the Navy.

At home in the Rockies

"I had spent a lot of time over the years in Colorado in connection with my work for the government," says Lukens, "and my family and I had always hoped that we would be able to settle here after we left the Navy. The qualities that attracted me to the state are the same ones that appeal to everyone else—it's the garden spot of the country."

Lukens and his family moved to Denver last year. "My wife and I have a new home and four active children between the ages of 8 and 14—we certainly keep busy." The family enjoys the outdoors, especially tennis, hiking and skiing, although Lukens admits that "one never gets as much time to relax as one would like."

Clearly, though, he relishes his new job at Paraho and the change from the public to the private sector. His major responsibilities include directing Paraho's worldwide marketing effort and expanded research and development program, but "Our major objective is to get Paraho's technology proven on a commercial basis. We are currently involved in negotiations with the SFC for our $1.3-billion loan and price guarantee request. We are planning for construction to begin on the first phase of our 39,500-barrel-a-day Paraho-Ute facility in spring of 1983 upon satisfactory completion of negotiations.

Lukens' enthusiastic efforts at Paraho spring from his continuing belief in the importance of synthetic fuels to America. "I think that the energy crisis is a sleeping giant," he says. "The current reduction of oil imports is largely the result of our economic recession. Conservation has certainly had an effect on lowering consumption and I don't want to understate its importance. Overall, however, its contribution is not as significant as people would like to believe.

"Hopefully," he continues, "our economy will begin growing again soon, and when it does, I think we will see an increasing demand for energy. The nature of the energy crisis, namely our dependence on Mideastern oil, is such that when our demand for energy increases our difficulty in satisfying that demand is likely to increase as well.

"So it's important for the long-term economy and defense of our nation to get into an energy-independent posture. And to do that we certainly can't turn our backs on synthetic fuels, especially oil shale and coal (liquids and gas). Given the technology, comparative economics and size of the resource base, development of commercial synthetic fuels is bound to be vital to our nation's economic and industrial future."

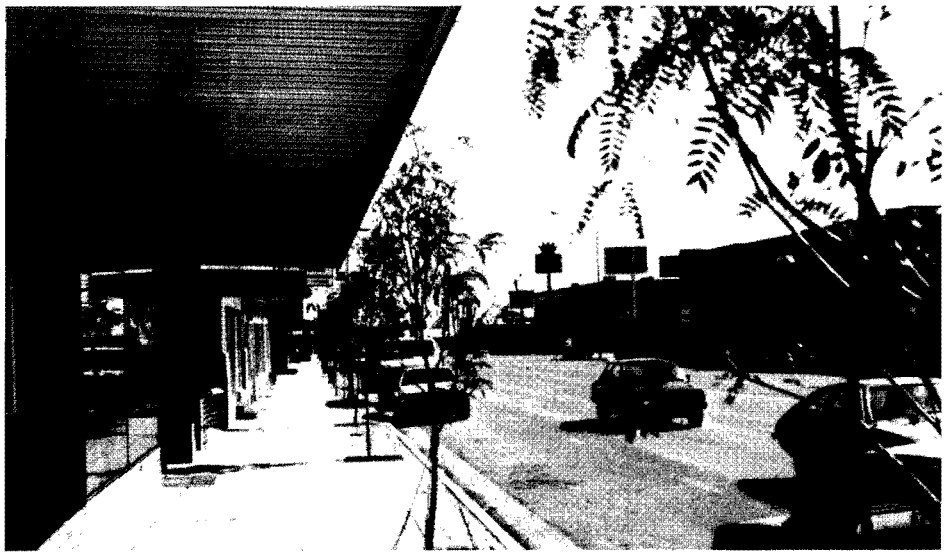
Looking down the road

"My major concern about the future of oil shale," Lukens notes, "is that in today's economic climate it's very difficult to get a project going. When the economic climate improves, and with the inevitable increase in oil prices that will follow, we will have to return to developing domestic energy sources. Meanwhile, it's important that we don't lose even more time before we get synthetic fuels launched. I would like to see us overcome that lack of concern now so that we can continue to make steady progress.

"The United States had a number of crises during the 1970s, and during that time both government and the private sector made progress in the area of synthetic fuels. We now have the tools in place to foster cooperation between government and industry. I think the risks involved in bringing a commercially viable synthetic fuels plant into being are much too great right now for the private sector to go it alone. Therefore, the need for a partnership between industry and government to develop synthetic fuels is as pressing as it has ever been.

"In fact," he adds, "that's one of the most instrumental factors in my decision to accept my job at Paraho. Given today's economy as well as the capriciousness of the world oil scene, it seemed improbable to me that the private sector was going to take on a major oil shale project on its own. I believe that the cooperative approach, in which a number of private companies and the government form a consortium to develop the oil shale resource, is the best way to get a project going. And Paraho has a history of advocating that approach—they've always done their business that way, serving as a catalyst to bring companies and government together to develop oil shale. I hope that I can help Paraho to continue that tradition.

"A lot of my friends thought I had let Colorado's high altitude get to my head when I accepted a job in the oil shale industry last May," he chuckles, "but I was itching to get back into the shale business. I believe we can do it." *H.H.Mc.* □



Vernal's downtown undergoing a beautification and tree-planting program.

Real Estate Corner

Designing Directions for Growth

Despite the current slowdown in energy activities, Uintah County, UT, expects to experience continuing pressure to accommodate new homes and businesses, as the White River Shale Project (federal tracts U-a/U-b) begins to gear up. Thus, last April the county adopted a new master plan, which according to Bob Nicholson, city/county planner based in Vernal, "will be used as a guide for making decisions about how and where these developments should be built." And if the master plan works as well for Uintah as such plans have for two counties in neighboring Colorado, Uintah should be able to face the future with its feet firmly on the ground.

Fine-tuning the guidelines

A master plan does not direct the course of development by itself, however, and zoning ordinances must also be revised to provide detailed enforcement of the general policies outlined in the plan. A master plan, for instance, may designate setting aside a certain area for housing, but zoning regulations prescribe accepted density levels, plot sizes and other site specifications.

In Uintah County, many zoning revisions that went into effect after the new plan was adopted relate to Vernal where most of the county's population is centered. One of the most significant modifications, called conditional uses, gives county commissioners greater discretionary control over certain kinds of developments.

"A typical zoning regulation," says Nicholson, "lists uses allowed in a particular zone. A conditional use, on the other hand, is one that may be allowed in some locations and not others. For example, in an area zoned for commercial use a bar may generally be appropriate, but it is probably not appropriate for a developer to locate the bar next to the community youth center. The conditional-use provision doesn't outlaw a particular kind of development, nor does it automatically okay it. Instead, it gives the county commissioners, or city council, as the case may be, the discretion to decide whether certain specified uses would be appropriate in certain locations."

Other changes in the zoning regulations make it easier to create housing in Vernal. Two new residential zones, one for high-density, multifamily developments, and one for mobile-home parks, were created. And regulations governing planned-unit developments have also been revised to give developers more flexibility. As Nicholson explains, these are "housing projects other than typical subdivisions; they can include multifamily dwellings, cluster homes and condominiums."

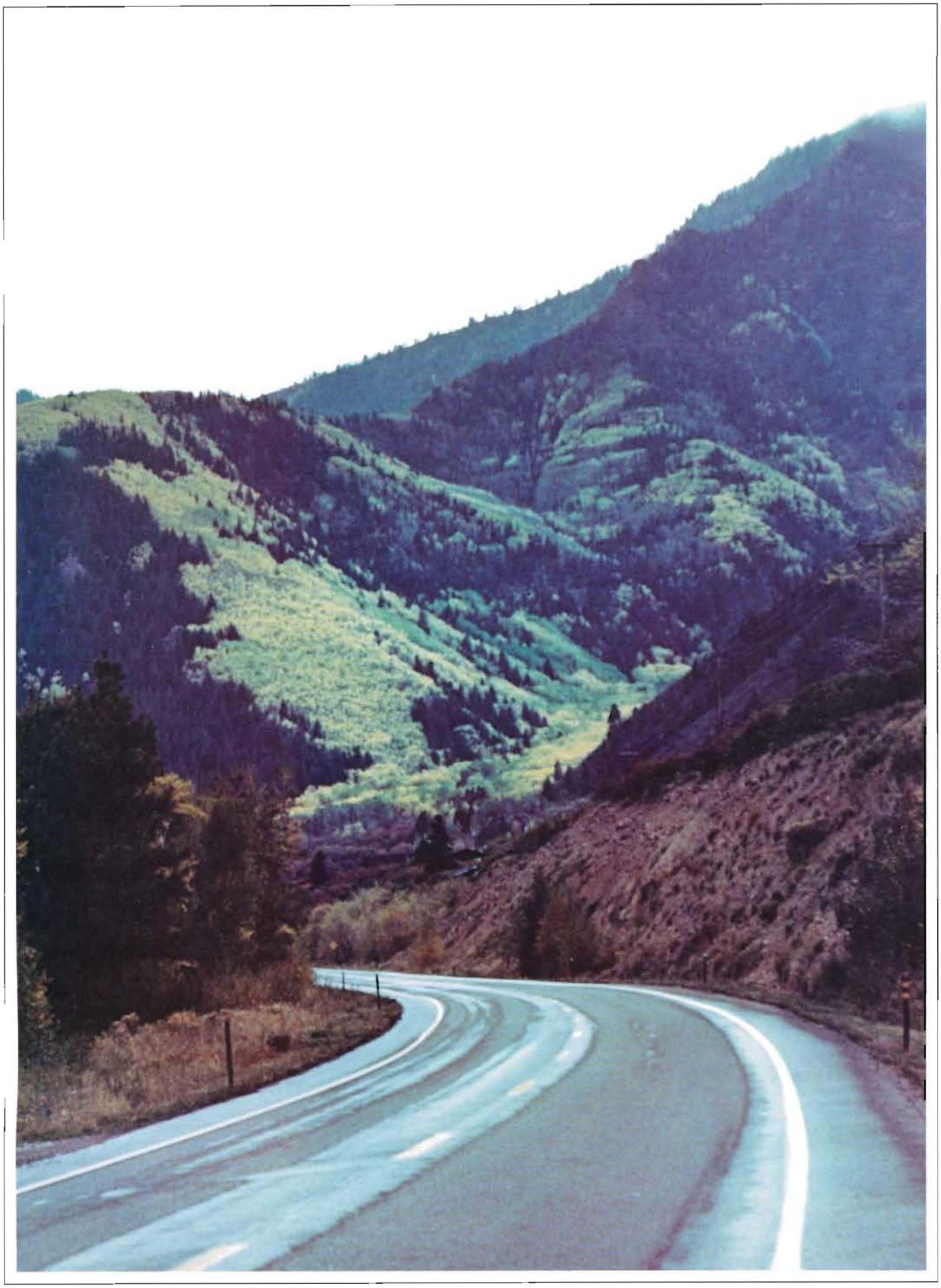
Sticking with the tried and true

While Uintah County has been installing its new master plan and revised zoning laws, two Colorado shale country counties have reassessed their existing plans and regulations—developed several years ago—and found that they are working just fine. Garfield County, with master plan and zoning regulations firmly in place, is making mostly minor revisions to current regulations. However, according to Dennis Stranger, Garfield County planning director, the county is considering one significant addition to its zoning ordinances. "We are in the process of creating new requirements for major developments," he says. Still in the formative stage, the new regulations would require large-scale projects, such as a coal mine or oil shale project, "to provide an analysis of the impacts, including social, economic and housing, that the development would have on Garfield County and adjacent jurisdictions."

Rio Blanco County has also found that the plan now in the books is adequate to meet current needs. Glenn Payne, county planning director, notes that, "We're working now to make minor revisions to the master plan but the basic policies have served us well."

Rio Blanco's zoning regulations have also withstood the test of time. "New subdivisions and mobile homes have come into the county, partly in response to oil shale," Payne continues, "but we haven't needed to revise current regulations to accommodate them.

"Right now we aren't seeing much of that kind of development moving in," he adds. "There might be some need to change zoning regulations to accommodate growth in the future if oil shale gears up again. But a slowdown is, in one sense, an opportune time to make necessary modifications so that we'll be better prepared later on when growth returns." *H.H.Mc.* □



The hills around Redstone proclaim autumn's arrival.

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