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SHALE COUNTRY

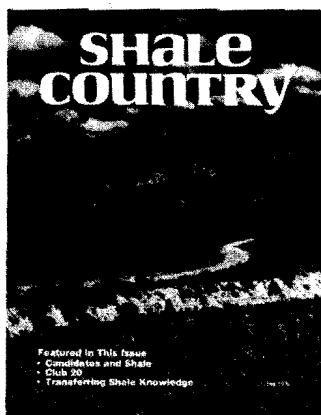
SHELF

Featured In This Issue

- **Candidates and Shale**
- **Club 20**
- **Transferring Shale Knowledge**

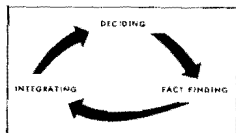
October 1976

THIS ISSUE



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What happened on the way to oil-shale development—this time? The question is being asked by many in shale country and one individual who is particularly well qualified to respond is John Hutchins, president of Energy Development Consultants, Inc., Denver, a firm providing management and engineering services to oil-shale, coal and uranium companies. In recent years, Hutchins also has served as president of Cameron Engineers, Inc., and as manager of Colony Development Operation. A mechanical and an industrial engineer, Hutchins initially became involved with oil shale while serving for 25 years as an engineer/manager for Atlantic Richfield Co.; Arco is Operator of the Colony oil-shale venture. Because of his shale background, SHALE COUNTRY recently asked Hutchins to analyze the present shale situation.

Q. *Mr. Hutchins, what happened to oil-shale development?*

A. The same thing that happened to the Alaskan oil pipeline. In both cases the oil companies made a simple mistake: they *knew* from their analyses that domestic energy supplies were running out rapidly, and they *knew* what had to be done for the good of the country—develop new domestic sources. Unfortunately, they completely overlooked two other factors: the environmental sector didn't want any development; and the public sector as a whole wasn't convinced of the need for new energy sources.

In short, the oil companies failed in the public arena. The industry understood the energy shortage/foreign dependence situation and the government understood—but the public didn't.

Q. *Is the energy situation better today?*

A. No. The energy crisis has *not* gone away. Although there is no oil embargo, we still haven't realized that we no longer have any energy flexibility. The public doesn't realize the absolute certainty of our declining energy resources—and it doesn't understand how long it takes to develop new energy sources. If the public understood the reality of the energy



"If the believability barrier between the public and the energy industry isn't broken, we'll probably have to have another energy 'Pearl Harbor' to get energy-resource development going. It's a crying shame," says John Hutchins, president, Energy Development Consultants.

Industry Interview

Beware the Simplistic— Get Smart

crisis and the time delay of 5 to 10 years needed to get any new supply under way, they would be as scared as I am.

Thus, oil-shale development will come—there will be a time when we will need it so much that there will be great public support for development.

Q. *How do you respond to environmentalists who say the companies should take all the risk for oil-shale development?*

A. I feel that most environmentalists react with standard simplistic answers, and I feel they will say anything to stop oil-shale development. Putting "simplistic" in engineering terms, I mean that many people only discuss the first order of magnitude of the energy equation; that is, they only make one pass at telling the energy story.

For example, they don't say it's the *public* that uses, needs energy and thus must pay for its risks and costs, and they

don't talk about the fact that under our economic system the only reason for any company to be in business—whether it is an oil company or a Mom and Pop ice-cream stand—is to generate responsible profits.

Q. *Where is oil shale now?*

A. Its technical, environmental and economic studies are done; it's ready to go anytime on an entry-type of program. By this I mean the industry recognizes that its present surface-based technology is not the ultimate. Improved surface techniques, and in-situ technology will come along. But we can't skip right now to in-situ. Surface technology has been in the mill for more than 20 years, while real in-situ effort is only just starting.

Q. *If you could run oil-shale development, what would you do?*

A. I'd start on a commercial level (50,000 barrels per day per plant) with a limited number of plants (perhaps five). No two plants would be based solely on the same technology; each would emphasize a different surface-retorting approach. As a corollary, I would encourage more in-situ research. Once the entry-type plants had operated long enough to answer economic, environmental and technical questions, I would bring on another array of plants incorporating the findings. Since the building phase takes about 4 years, and the initial operating stage about 3 years, it would take almost 10 years to get into this "smarter" position. And finally, no energy program is balanced unless it couples development options to a hard and firm energy conservation program so the public can understand that any future energy consumption carries with it environmental tradeoffs.

Q. *Where will oil shale go now?*

A. The only way to get oil shale off the shelf is through public understanding of the need for energy-resource development. How long this will take I can't predict. I do know, though, that the public communicators—the TV stations, the newspapers, the magazines that inform the public—hold the key. A.N.

Industry Update

No big blow, but no big plus

"Not really negative, but certainly not very positive." That's how oil-shale industry spokesmen greeted the news that the U.S. House bill which would have provided \$4 billion in federal guarantees for the synfuels industry had been defeated — by one vote. As Charles Brown, senior vice president, Tosco Corp., put it: "It's just a further delay in demonstrating the technology that would unlock this valuable resource. We've waited 15 years and we can wait this one out."

In short, most oil-shale companies indicate that the bill's demise didn't change anyone's immediate plans; no specific shale project was spelled out in the bill. However, the event does have long-term implications. As one executive said, "It's getting harder and harder to have positive thoughts about oil-shale development."

However, others point out that the close vote may portend better things for synfuels legislation next year. They note that the bill was defeated on a procedural point; that it was brought up just as everyone was readying to race home and campaign; and that it actually would have been impossible to mesh the different versions of the bill into a sound piece of legislation before session closing time. Thus, a one-vote defeat in these circumstances was hardly the blow that the 123-vote defeat was last year on a similar bill.

The *hope*: in 1977, the new Congress will come up with a strong synfuels bill — and the Administration will develop a solid energy policy.

Paraho proceeds

Paraho Development Corp. has confirmed receipt of a Navy contract for another extended run at its oil-shale facility — the Anvil Points Oil Shale Research

Facility located on the Naval Oil Shale Reserve near Rifle, Colo. The facility, where two Paraho retorts are installed, has been under lease by Development Engineering, Inc. (DEI), a Paraho subsidiary, from the Energy Research and Development Administration (ERDA) since 1972.

Paraho recently completed a 3-year, privately-funded, \$9.5-million oil-shale demonstration for a large group of energy-oriented companies. The demonstration represented the only large, semi-works-scale, aboveground, oil-shale retorting plant in operation in the United States in the past 2-3 years.

The contract to refurbish the Anvil Points facility is the first step in the \$12-\$15 million joint Dept. of Defense-ERDA plan announced last May by ERDA to provide 100,000 barrels of Paraho crude shale oil for refining and subsequent testing of synthetic military products. The production run is scheduled to start this fall.

In-situ task force gears up

Possible in-situ (in-place) development of oil shale in shale country recently took a step forward with the organization of a governmental task force to prepare a supplemental environmental-impact statement (EIS) for four tracts in Utah and Colorado. Three of the tracts are in Uintah County, Utah, and the other is in Rio Blanco County, Colo. Each covers about 5,000 acres.

The task force, organized by the U.S. Geological Survey, of the U.S. Dept. of the Interior, includes representatives from several government agencies. The force is headed by David Schleicher, a USGS geologist, and is headquartered at the Area Oil Shale Office, Grand Junction, Colo.

Tentative date for completion of the

draft EIS is March 1977. The final statement, scheduled for completion by Aug. 31, 1977, will be considered by the Interior Secretary when selecting two of the tracts for lease for the development of oil shale using in-situ technology. This technology involves underground heating of oil shale to produce liquid shale oil, which is then pumped to the surface.

OSEAP kudo

The federal prototype oil-shale leasing program may not have produced any barrels of oil yet, but it already has spun off many concepts of significance. Key example: the Oil Shale Environmental Advisory Panel. At a recent OSEAP meeting, Assistant Interior Secretary Jack Horton noted that this Panel has been one of the best advisory committees the Department has ever had. Thus, Interior now feels OSEAP could serve as a prototype model for other programs. In fact, it is now seriously considering developing a similar group to advise on the Western coal-leasing program. Horton asked Panel members to give Interior their thoughts on such a "sister panel," with particular emphasis on size of group, balance of interests, perimeters of region.

By the way, OSEAP has just issued its Second Annual Report. The yearbook summarizes the Panel's activities, reports, recommendations and advice from April 15, 1975 to April 15, 1976; and it discusses the plans for the Panel's third year — namely, to review the Detailed Development Plans and provide advice to the Area Oil Shale Supervisor on them, as well as to review and advise the BLM District Managers on various off-tract permits and authorizations related to the oil-shale leases.

The next meeting of OSEAP is tentatively scheduled for January 1977. A.N.

Looking Ahead

Bonus Bid Monies Bolster State Coffers

In early 1974, the times seemed ripe for oil shale. The Arab oil embargo, hour-long gasoline lines and the spectre of cold homes and closed factories were still fresh in the nation's memory. And, in this first gloom of the energy crisis, the U.S. government opened up rich oil-shale tracts for bids by private companies wishing to develop this untapped resource.

The bids for the tracts went even higher than expected: in Colorado, tract C-a was leased for \$210 million, tract C-b for \$117 million; in Utah, tract U-a went for \$75 million, tract U-b for \$45 million. Under the terms of the oil-shale leases, the companies were bound to pay these bonus bid monies to the federal government in five annual installments; however, there was a government set incentive to offset the last two payments with certain approved development expenditures. The lease also stated that the affected states would receive 37.5 percent of the bonus monies—for the construction of roads and schools only, as specified in the Mining Act of 1920.

Today, in the fall of 1976, oil-shale development has fallen on hard times. All the companies in the federal prototype program have requested suspension while they seek resolution of a myriad of problems. But, while work on the tracts has lessened, the states are considerably richer. The first three installments of the bonus bid payments have been made—meaning a healthy addition of more than \$73.5 million to Colorado's coffers and about \$27 million for Utah. (This, in fact, represents the total bonus bid money the states expected to receive, because the lessees can offset fourth and fifth payments with approved on-site development costs.)

Free money?

If the oil-shale boom had materialized as expected, this money would certainly be needed to meet the costs of an in-

creasing shale population. But the increase has been at least postponed and the states are in the enviable position of having the money without the expected shale-related costs. In addition, there are very few restrictions on how the states can use the money. For example, the money can be spent anywhere in the state—it is not limited to the shale region. And, the money can now be used for a number of different purposes, instead of the original restriction to roads and schools. In 1975, Colorado passed a law saying that the interest garnered from the bid money could be used for any public purpose. And, in the summer of this year, the federal coal-leasing bill, which Congress passed over President Ford's veto, included a clause that removed the restrictions on how the states can use the oil-shale leasing bonus bid money itself.

To date, the Colorado state legislature has appropriated nearly \$15 million of the money (much of it from interest payments) for use in fiscal years 1975, 76 and 77. The vast bulk of this money went to Planning Region #11, the shale area, although some money was appropriated for coal-impacted counties. And, since



"Continue to prepare the shale area for growth," says Burman Lorenson, Colorado Socioeconomic Coordinator.

most of this money was appropriated before the restrictions on its use were removed, most of it is earmarked for schools and roads.

Build for the future

For the future, the state of Colorado has no immediate plans for the use of the remainder of the money—although it is being eagerly eyed by a wide range of applicants. However, Burman Lorenson, the state's Socioeconomic Coordinator, notes that: "At the very minimum, I would want to continue to prepare the shale area for growth. We now have the time to do this," he says, "and we should continue to build the shale area's communities potential for dealing with growth." Lorenson also believes that "any other use of the money will run into some political battles." However, he adds, "If we can't develop other sources of funding for coal-impacted areas, we may have no choice" but to dip into the shale funds. But, as Lorenson notes, the state is still a long way from making any concrete decisions on the use of its bonus bid monies. Utah faces a somewhat different situation than Colorado. To date, the state has not touched a penny of its bonus bid money—because the money is being held in escrow, pending the resolution of a federal/state legal battle over who owns the shale lease tracts. The battle centers around a long-ago land tradeoff between the state and federal governments under which the state claims that it has a right to the shale lands.

A recent federal District Court decision, in fact, awarded the land to Utah. The U.S. Interior Dept., however, has announced its intention to appeal this decision to higher courts. If, in the end, Utah does win its case, it will get considerably more than the shale lands: it will also get 100 percent of the bonus bid money—about \$72.5 million—instead of the prescribed 37.5 percent. However before spending a cent, Utah must await the outcome of its court case—and that could be several years in the future. *E.D.*



A Look At

Election Special: The Candidates and Shale

By Evelyn DiSante



It's Fall again, with changing leaves, first snows, football games . . . and elections. Once more the nation is caught in the throes of its political system and candidates, positions, slogans, signs and appeals seem to have taken over the country. And, for oil-shale proponents (and opponents), this election year may hold special interest since the outcome of the November general elections could have a great deal to do with the future of the oil-shale industry.

The link between oil shale and politics is clear. In the spring and summer of 1976, the federal oil-shale lease holders asked Interior Secretary Kleppe to approve a suspension of their operations on the shale tracts. And, as of this writing, 1-year suspensions had been granted in Colorado, with Utah's expected shortly. The reasons for these requested suspensions can be attributed at least partially to prevailing political winds. For example, before proceeding with development plans, the shale companies need government resolution of such problems as air-quality standards. In addition, with the current economic uncertainties, most would-be shale developers believe they will need some special financial incentives—such as tax breaks, risk-sharing financing or industry/government ownership—before embarking on expensive and lengthy development.

Thus politics—and the attitudes of office holders elected this November—may hold the key to whether or not oil shale is developed in the foreseeable future. Unless lawmakers decide to

enact laws helping the shale industry, signs are that it will not proceed for some time. Unfortunately for the industry, the outlook from the top level of candidates is not too encouraging. For example, in February of this year, President Ford called for guaranteed federal loans to help the synfuels industry get on its feet. But, by late summer, although he continued to support loan-guarantee legislation, he was talking about the need to proceed slowly in shale development. And, on the other side of the fence, the Democrats, led by Gov. Jimmy Carter, did not even mention synfuel development in their national party platform.

This, however, does not mean that shale is dead. In fact, the future of the industry may depend more on the attitudes—and actions—of lawmakers from the shale states. Thus, to assess the prevailing political climate in these states, SHALE COUNTRY has conducted its own election year poll—a poll designed to draw out the candidates' stands on oil shale. For this purpose, a short questionnaire was sent to every federal candidate from the states of Colorado and Utah and to each state candidate in the shale area itself. The replies of each candidate who responded to the questionnaire are provided on the following pages. (For Question #1, you will find listed the candidate's name, party affiliation, state and position sought. Thereafter, only the candidate's name is listed. An incumbent is noted by an asterisk.)

Q 1 Do you think oil shale should play a significant role in the nation's long-term energy program?

***Frank E. Moss (D-Utah; U.S. Senate):** There is no question about it. If the U.S. is ever to have a viable domestic energy policy it must come about from the development of our own natural energy resources. Shale offers one of the biggest potentials. (Republican opponent for this Senate seat: Orrin Hatch)

Don Friedman (R-Colo; U.S. House, District #1): Oil shale offers the largest single opportunity for this nation to achieve energy independence.

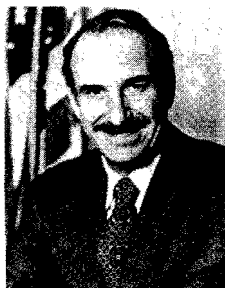
***Pat Schroeder (D-Colo; U.S. House, District #1):** I don't think the question is whether oil shale should or should not play a significant role in long-term energy programs. It most likely will play a part as we continue to deplete our other hydrocarbon fuels. The question is *when* will market demand make shale a viable alternative energy source.

Ed Scott (R-Colo; U.S. House, District #2): There is no question that the United States must intelligently develop alternative sources of energy to our present reliance on oil and gas. Today 78 percent of our nation's total energy is supplied by oil and gas; yet, we now have only 8 years' reserve of oil and

between 9 and 10 years' supply of natural gas.

Coal, an important energy source with supplies greater than oil and gas, is moving upward and in a dominant energy supply role. And oil shale also is expected to account for approximately 45 quadrillion BTU/year. Oil shale, then, can and should play a significant role in the nation's long-term energy program.

***Timothy Wirth (D-Colo; U.S. House, District #2):** The question of whether to proceed with the perfection of shale oil extraction technology continues to meet with a range of answers. At the extremes are those who would plunge ahead now with the construction of commercial-sized facilities, and, on the other extreme, those who would do nothing. I do not think the answer of either group is responsive to the needs of the State of Colorado or of the nation. And the lesson of the Arab oil embargo has taught us the danger of doing nothing. I believe the Science and Technology committee has avoided these extremes in adopting the (modular) approach to oil shale which I suggested (in H.R. 12112).



***Frank Evans (D-Colo; U.S. House, District #3):** In a few short years this nation's dependence upon foreign oil has grown from 30 to 40 percent for total oil use—an intolerable situation.

Thus, since oil is and will continue to be for decades to come a major source of our energy, and since there are billions of barrels of oil locked in our oil-shale pockets, I believe it to be imperative that the technology be developed for the extraction of this oil from the shale in ever-increasing quantities.

Melvin Takaki (R-Colo; U.S. House, District #3): I am firmly convinced that oil shale, in partnership with other petrochemical sources and alternative energy applications (solar, geothermal, wind, etc.), will form the backbone of an intel-

ligent, progressive energy source utilization campaign to keep this country moving forward.



***James P. Johnson (R-Colo; U.S. House, District #4):** Oil-shale development is inevitable in my opinion. The resource will be needed sooner or later. The real question which has yet to

be answered is when will it be developed and under whose auspices? (Democrat opponent: Dr. Daniel Ogden, Jr. Independent opponent: Dick Davis)

***William Armstrong (R-Colo; U.S. House, District #5):** Yes, the nation needs the energy which can be provided by oil shale. With the gap between domestic energy production and consumption growing wider each day, and the nation becoming correspondingly dependent on OPEC, the need to develop alternative energy sources is crucial.

Dorothy Hores (D-Colo; U.S. House, District #5): The federal government has a responsibility to explore all of the energy alternatives and not to concentrate so much of its interest, time and money into one, as is now being done with nuclear power.

***Allan T. Howe (D-Utah; U.S. House, District #1):** I don't think there is any question that oil shale will play a key role in our nation's energy future. The 600 billion barrels of recoverable oil stored in the rock of "shale country" is a national resource of highest value and crucial to the achievement of energy independence. The use we make of this resource will largely determine our ability to become energy self-sufficient and avoid the hazards of another energy emergency. Oil shale could very well prove to be the prime link between our short- and medium-term fossil fuel needs and our long-term effort to develop alternative sources of energy. (Republican opponent: Joe Ferguson)

Dan Marriott (R-Utah; U.S. House, District #2): National and worldwide oil

reserves are being rapidly depleted, and before they become too scarce, we need to develop technology that will make other energy sources viable.

I believe that oil shale represents one source of energy which needs more support from government in the areas of research and development. We need to ascertain whether or not oil shale has the potential of providing an economic energy alternative.

***K. Gunn McKay (D-Utah; U.S. House, District #2):** I have long maintained that development of our oil-shale resources should figure prominently in our nation's long-term energy policies. Currently petroleum production is declining nationwide. This national decline is resulting in an expanding dependence on oil imports which increases U.S. vulnerability and the potential for major deficits in the U.S. balance of trade payments. In my judgment, oil-shale production is superior to other synthetic fuel options.



Scott Matheson (D-Utah; Governor): Energy demand in the United States is expected to rise dramatically. This increase in demand, combined with our national goal of energy self-

sufficiency, will put great pressure on all our domestic sources. Oil shale is one of those energy resources which, if developed in an orderly manner, can significantly add to our energy pool.

Vernon B. Romney (R-Utah; Governor): I think we need to carefully examine every possible new source of energy. This applies specifically to shale oil. While I think the actual development in any large quantity is a generation away, I think we must begin now to find these new sources.

Charles Stoddard (R-Colo; State Senate, District #31): This nation cannot forever depend on foreign oil imports. Development of oil shale under a planned program should help make the nation independent and capable of supplying the demand.

Dick Soash (D-Colo; State Senate, District #31): In terms of the national energy crisis it is essential that we use our oil-shale reserves. Continued dependence on improved crude oil from the Middle East places our economy in a precarious position, vulnerable to the whims and internal politics of other nations.

Development of oil shale, however, should be combined with significant efforts to conserve energy and develop alternate energy sources.

Robert F. Burford (R-Colo; State House, District #54): I believe that eventually technology will solve the problems inherent in oil recovery from shale—moving huge tonnages, waste disposal, water—possibly with an improved in-situ process. Certainly it should be encouraged, as it will be needed in the long term.

Mark Williams (D-Colo; State House, District #54): Yes, but I'd like to see it put to high technological uses.

***Nancy Dick (D-Colo; State House, District #57):** Yes. (Republican opponent: Bill P. Inscho, Sr.)

***Daniel Dennis (R-Utah; State House, District #67):** The liquid reserves are going to expire at some future date and we must look to other sources to meet our needs and shale must fit into this needed supply. (Unopposed)

Q 2 How much emphasis do you think the federal government should place on oil-shale development in the next decade?



Moss: Without some sort of federal incentives on the one-hand or complete non-interference in the entire oil industry on the other, the resource will remain undeveloped.

Friedman: Unless the federal government creates the proper climate for development, oil shale will not be able to help this country solve its energy problem.



Schroeder: I believe in an even-handed approach by the federal government to the development of alternative energy sources. In other words, as much emphasis should be placed on oil

shale as is placed on solar power and nuclear power. In any event, government help should only extend through the early R&D stages, to the point where commercial demand of the energy source is established. It's not up to the government to make an energy source "commercially" acceptable.

Scott: The federal government does have a role to play in the development of oil shale over the next decade. For example, what are the socioeconomic impacts of shale development on federal lands? What are the impacts on water supply and quality, and how does that relate here in Colorado to East Slope water requirements and compacts with Mexico? What are implications of oil-shale development on air quality? And what are the economic requirements and effects of oil-shale development?

Evans: Unlike oil which may or may not be in the ground, and which if found is found only after drilling nine to fifteen dry holes for every successful well, oil-shale deposits are known to exist in exact locations and in easily determinable quantities. With oil shale, the major problem is effective and inexpensive technology to extract the oil from the shale. If these technologies can be moved to success, these billions of barrels of oil existing in the shale can make a significant contribution to the energy needs of this nation.

Takaki: As a Coloradoan and a candidate for federal office as an advocate for my district and my state's rightful place in the dynamics of America, I naturally favor maximization of federal government emphasis on oil-shale development over the next 10 years. However, I believe that this maximization should be tempered by sound ecological considerations in development of this vital resource. Probably the most important

role the federal government can play in the development and utilization of oil shale as a viable energy source, would be in the government's ability to spur energy conservation and provide tax relief for those who practice energy conservation, so that oil shale, like all other energy sources, will be as effective as possible in meeting the increasing demands of an energy-oriented nation.

Johnson: I believe the federal government should encourage the development of oil shale and that it will. A loan program for retorts is probably imminent.

Armstrong: In my judgment, the most important single action the federal government can take to promote development of shale (and to otherwise stimulate energy production and conservation) is to deregulate. Total deregulation of price and operation would stimulate both near- and long-term solutions to the energy crisis facing the country.

Hores: Oil-shale technology is in such a primitive state that the federal government over the next 10 years should develop, along with industry, the technology necessary to remove the drawbacks from oil-shale development—the low net energy gain, the large amount of water required, the air and water pollution caused. The shale lease program would be desirable when all the problems are solved.

Howe: I believe the federal government should have placed the emphasis on oil-shale development during the past decade that we now find we need during the coming decade. I know that it is easy to say *if* but in this case we are clearly saying that we should have developed commercialization capacity for oil shale by now so that we could presently be producing at least a half-million barrels per day. Since we are not, the federal government, as I view it, has to place a major national emphasis on oil-shale development.

Marriott: Medium emphasis.

McKay: Major.

Matheson: The federal government cannot afford to overlook any major sources of energy. Oil shale is an economically feasible fuel. Research indi-

cates that the technology will be available to extract and refine oil shale without permanent damage to area ecology, provided the state carefully monitors the development processes. The refined product is high-grade oil, and the shale has a high yield. The federal government should encourage use of this resource as an additional alternative to foreign petroleum.

Romney: I think all levels of government should be involved in trying to develop oil-shale activity in the next decade.

I believe the federal government should do so in a way, however, which will not interfere with the rights and obligations of the states and local jurisdictions.



Stoddard: Major. Since the government now controls prices, and oil shale is on federal lands mostly, the federal government is too deeply involved to do anything but place a high emphasis on this development.

Soash: Major. The federal government should make a direct effort to encourage the development of oil shale. Passage of the synfuels bill would be a step in the right direction. It is my opinion that the federal government should participate financially in the development and operation of a number of modest-sized operating modules with private industry, using the existing technologies. Further, the federal government should set specific environmental requirements for oil-shale developers and give assurances that if these requirements are met, they will be allowed to operate.

Burford: Major emphasis.

Dick: Major.

Dennis: Major. This should be directed through private industry and deregulation to allow supply and demand to establish price and development. Tax incentives and research funds could be provided with no strings attached.

Q 3a Do you think the federal government should provide any special incentives (for example, financial support, special tax breaks) to help the oil-shale industry get started? (Question for federal candidates only.)

Moss: I favor loan guarantees and various tax incentives rather than outright grants.

Friedman: The federal government must either provide a guaranteed price for oil shale or guarantee loans for the development. This question is now being ducked by many politicians because it inherently means a higher price for oil. But I believe that we will either pay a higher price or we won't have adequate energy. A Congress that understands the economics of oil and oil shale must recognize that no rational company will spend billions of dollars to develop shale oil which will cost, for example, \$13 a barrel which could be economically wiped out by \$1.50-barrel Arab oil. And I feel our tax structure should favor domestic energy development—and not foreign development.

Schroeder: The oil-shale industry already has a 15-percent depletion allowance, and large investment tax credits at its disposal. This is more support than we are giving to oil and gas development. And we still control the prices of oil and gas from wells, while synthetic fuels prices have not been regulated. I believe the incentives for getting this industry started are more than satisfactory already.

Scott: On principle, I am opposed to H.R. 12112, a bill to guarantee loans for demonstration of new energy technologies, because I support the removal of controls. However, I am also a realist. The promise of oil shale, particularly here in Colorado, is undeniable. And, there is no guarantee that Congress will move to take controls off the industry next year. So, barring removal of controls, I would consider support of legislation that would provide a federal role in financial assistance to those in the oil-shale industry.

Wirth: The language of Section 17 (of H.R. 12112) is designed to accomplish several desirable ends, which emerged clearly in the hearings held on this bill. Testimony



made clear the fact that technical experts, financial experts, and a majority of the potential applicants for assistance in the development of oil shale technology recommended construction of a "modular facility" prior to making any decision regarding construction of a full-sized plant.

Testimony also suggested that where a modular facility is built, loan guarantees may not be the appropriate financing mechanisms because by definition such a facility might not generate funds to repay a loan. Thus, if modules are to be built, availability of alternative funding mechanisms such as cost-sharing grants is required.

Evans: If we are to have a national policy aimed at energy self-sufficiency (and I think we should), some means must be found of attracting sufficient capital into the improvement of technology for extracting oil from shale so that this source may make a significant contribution toward self-sufficiency.

Several methods could be used to make this capital available. We can match federal dollars with private funds for research and development. We can enact loan guarantees or tax incentives. We could have a mix of these three and others. In carrying out our national policy any incentive for oil-shale production can and should be carefully monitored so that the public's interest would be protected.

Takaki: Not only am I in favor of the incentive offered by a depletion allowance, I firmly believe that one of the most important mandates of the federal government is to spur private industry, not hinder its efforts to continually explore for, develop and market new energy sources. To this end, not only would I vote in the House of Representatives for a reinstatement of the oil-depletion allowance, I would make an active commitment toward federal tax incentives

for the development of any new, viable energy source.

Johnson: I believe the government should provide land for off-site disposal of spent shale for the prototype lease program; should provide rapid writeoff for costs of development rather than long-term depreciation; there should be no price controls on the product; and there should be expedited land exchanges. Evidently none of these procedures will be adopted in the near future, therefore I will support the guaranteed loan program when it comes up later this year.

Hores: The federal government has the responsibility to financially assist industry in the development of capital-intensive energy resources.

Howe: Since the Bureau of Mines estimates that the oil-shale industry would need to invest \$4 to \$5 billion to bring a million barrels of oil into daily production, I feel the loan guarantee approach recommended by the Science, Commerce and Banking Committees, is probably the most timely means of federal support now under discussion. However, looking ahead, I am not sure that loan guarantees alone will do the job. Some measure of price support as a companion to loan guarantees appears necessary under present market conditions before the private sector will risk the costs involved. Although I am against the federal government getting into an oil pricing game with oil shale, I do think it is reasonable for the government to assume some responsibility, preferably in the form of a price cushion, to help the shale industry remain competitive in the event world oil prices drop. The Commerce and Banking Committee's bills recognize this problem and grant ERDA the authority to enter into price agreements with industry.



Marriott: Due to the high costs and uncertain returns associated with oil-shale development, it is not practical to expect private industry to shoulder the entire financial burden.

I support legislation such as the Federal Non-Nuclear Energy Resource and Development Act, which would provide assistance to private industry through oil-shale loan guarantees. Following this path should help in the initial production of commercial demonstration facilities.

McKay: Since approximately 80 percent of the oil-shale deposits in this country are owned by the federal government, I believe as a matter of self-interest the federal government should provide incentives enabling the oil-shale industry to get off the ground. In recent months I have pressed vigorously for measures aimed at assisting the industry in their efforts to obtain necessary capital.

Q 3b Do you think the state governments should provide any incentives to help the oil-shale industry get started? (Question for state candidates only.)

Matheson: The state government is charged with the responsibility of balancing energy development and environmental safety. To this purpose, the state should carefully plan for resource development ahead of time, and should clearly outline the conditions under which development can and cannot occur. This provides an incentive of certainty to the shale-oil industry. They will know, prior to commitment of large capital expenditures, exactly what conditions will be placed upon their operations, and can more accurately and efficiently predict the economic advantages of shale-oil development. One area where Utah has and can continue to play a major role is in the current litigation which calls for transfer of vast oil-shale lands from federal to state ownership.

Romney: I think the best thing they can do is to provide a good tax climate, good working conditions and such other reasonable help as can be given in this area.

Utah's constitution, however, prevents the extending of the state's credit to private businesses, so anything that is

done by Utah must be in conformity with our constitution.

Stoddard: Only turmoil will result if both the federal government and state government get involved. Since the bulk of oil-shale leases are federally owned, the incentives should come from them. I might think differently if the feds were out of it!

Soash: The state, just as the federal government, should establish its environmental standards and guarantee that if industry meets these standards they will be allowed to operate. The state also needs to enact a mineral policy that indicates the intention of this state in regard to the development of mineral resources in Colorado. Also, if a severance tax is enacted in Colorado, that tax should not apply to the oil-shale industry until it has reached a commercial stage and is in a profit-making position.

I feel that while the state should insure that local governments are given proper financial protection in industrial development areas, we must balance our efforts and also encourage industrial development in rural Colorado to insure a healthy economic base for these communities.

Burford: I believe most incentives should come from the federal government as the whole nation will benefit. State encouragement, if any, should be in the form of tax incentives. However,



the developing companies and the federal government must realize that the growth impact caused by development must be funded by that development. The existing tax bases in growth areas cannot be expected to absorb the additional burden.

Dick: I am not sure what the states' role in this area could be.

Dennis: They can give assistance in research through their universities. Also a possible moratorium on (severance) production-type taxes until industry is well established could be considered.

Transferring Shale Knowledge

By Alys Novak

Do you know something I don't know—but should know? Dealing with that age-old question is vital when energy information is involved

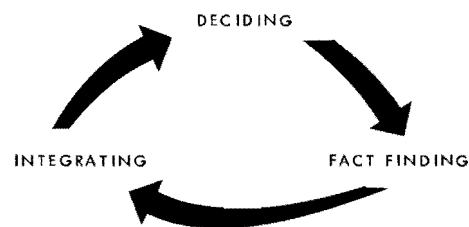


Figure 1—The problem-solving circle.

About 18 months ago, a short article appeared in the local newspapers announcing that the Denver Research Institute (DRI) had received an \$83,000 grant from the National Science Foundation to analyze energy-related communications. The object of the work: "to learn how scientific and technical information are used in solving societal problems in areas like energy, transportation and environment."

That simple statement, however, doesn't do justice to a very significant study. Reason: when policy making is involved, assuring that the right information—scientific, technical, economic, social, political—gets to the right people at the right time must be a priority goal if resource development is to occur with maximum societal support and with minimal redundant and/or misdirected efforts. As John Welles, a member of Colorado's Energy Policy Council, put it recently in *SHALE COUNTRY*: "... the biggest problem of all in energy and minerals development is communication. It's tragic how easily and often misunderstandings arise because some information is not communicated."

Thus, to find out how this study turned out, *SHALE COUNTRY* recently interviewed the DRI project managers of this research, James E. Freeman, Senior Research Scientist, and James P. Kottenstette, Research Engineer/Economist. And it discovered that the project is most relevant to oil shale—in fact, shale gets star billing.

The researchers began the discussion by explaining that for many years they have specialized in the fields of scientific and technical communication and technology transfer. Simply put, these areas of research identify and track the ways that knowledge—information and data—gets transferred from those who have generated it to others who can use it. Kottenstette says, "We've been particularly interested in understanding information and data flows in energy problem areas where decision-makers require inputs from scientists."

Freeman adds, "Scientists often have told us they have not been prepared for the task of communicating the results of their work—either through their written or oral reports—to interested laymen. Similarly, laymen indicate difficulty in obtaining or in understanding information and data developed by scientists in response to societal problems. And, in between the knowledge generators and the public, are the decision-makers in government and industry who daily confront the difficulty of interpreting and acting on the problems posed by experts and interested laymen. The energy area provided a timely and relevant focus for our research. It contains the two critical elements we needed: the scientific and technical information and the major stakeholders—the scientists and engineers, the interested laymen, and the managers in between."

He continues, "So when we got the grant, we took a look at several aspects

of energy development—solar, coal, nuclear and oil shale. We wanted to pick two or three cases for analysis in which multiple interests use scientific and technical information. We winnowed the possibilities down to two major cases. One was analysis of the formal information and data flows in the U.S. Dept. of Interior's oil-shale prototype leasing program. The other was focusing on the energy-related information needs of the top-level decision-makers in Colorado state government."

Asked to elaborate on why the oil-shale program was chosen, Kottenstette said, "We really believe the leasing program is unique. The program brings together not only the lessees and the Area Oil Shale Supervisor, but also, through the mechanism of the Oil Shale Environmental Advisory Panel, other stakeholders—a variety of federal, state, local government agencies and citizen groups. Because of this structure, there is integration of knowledge *before* development decisions from *all* perspectives of the multiple interests."

"The leasing program also is unique," emphasizes Freeman, "because it dramatically illustrates how scientific and technical information are blended together with other classes of information—economic, social, political. In addition, it shows how three relatively new societal values—national energy self-sufficiency, citizen participation in decision-making and environmental protection—can be blended into

predevelopment decision-making in a program of magnitude and national importance."

Freeman adds, "Interestingly, everyone we've talked to that's involved with the oil-shale leasing program—from Pete Rutledge, the Area Oil Shale Supervisor, to Bill Rogers, the OSEAP Chairman, to industry and citizen representatives—realizes that the program is a benchmark. However, because it is a first-of-a-kind, most people don't find it easy or necessarily enjoyable; but everyone seems to be constantly challenged by it."

How does it happen?

Asked how they actually went about studying the energy information and data flows in the leasing program, Kottenstette said this involved many interviews with lessees, contractors, OSEAP members, AOSS officials, as well as much observation and analysis of the interactions of all the interest groups. The DRI researchers point out that a basic premise of the study involved making a distinction among the activities that are involved in problem-solving. As shown in Figure 1, they say problem-solving can be represented as a circle that includes three components: fact-finding, integrating, deciding.

These interrelated items deal respectively with three key questions: What are the facts? How do the facts fit together? What ought to be done given what is known? In any problem-solving situation, all the interested parties engage in all three activities, say the DRI project managers. But, in terms of the leasing program, when viewed in its entirety different parties have particular responsibility for only one of the three activities: the lessees and their contractors for fact-finding; OSEAP and its member groups for integrating; and the Interior Dept. and the Area Oil Shale Supervisor for deciding.

Another way the DRI researchers studied the information flows was as a vertical structure. As can be seen in Figure 2, the leasing program, in fact, illustrates what Freeman and Kottenstette call a vertically integrated energy information and data flow. That is, the parties are

involved consciously over time in many energy problem-solving activities but these are all part of *one* well-defined energy program. In contrast, horizontally integrated energy information and data flows across two or more vertically integrated energy problem areas. Example: all energy-related activities of the Colorado state government.

What does it all mean?

Anyone who has ever attended an OSEAP meeting may have come away with the feeling that *no* information got transferred—much less used—but that's hardly the case, say the DRI researchers. What may look like casual, or even confused, conversation is actually the process of integration of information—of receiving information in the form of scientific and technical reports, of analyzing it through discussions, of melding it with other information gathered in the past and seeing how it fits together—and then of making, or not making, a decision.

The researchers stress that the focus of the study was on stakeholders—not on personalities—and that, in fact, energy information and data flows can be viewed independently of individuals. Kottenstette also emphasizes that the

leasing program's insistence on having participatory and integrating roles for *all* interested parties is significantly different from traditional programs. In the past when a development was planned, only fact-finding and decision-making occurred and only a few industry and government officials were involved. He adds, "You can see the significance of participation and integration when you watch how Bill Rogers orchestrates the integration of the 32 OSEAP organizations—they're all getting involved in exchanging information and advice *before* any dirt is turned for development, instead of fact-finding *after* the 'dam' has burst, so to speak."

This research study has already sparked ideas for related projects, say the DRI managers. For example, they would like to see several new information-transfer aids developed. They also see a need to train scientists to communicate more effectively with non-scientists.

One way they hope to do this is through KNUTAP (Knowledge Utilization through Administrative Action Program). This new DRI program, of which Freeman and Kottenstette are co-managers, is essentially aimed at providing public and business administrators with feedback on the impacts of their communication and information activities. It also assists in designing and testing ways to make knowledge transfer and utilization programs work better.

Summing up the significance of their present energy-communications study, Freeman says, "From our perspective, we expect it will contribute most directly to designers of information systems. It will help them to consider the adequacy of existing information systems for managers and researchers and to consider what might be done with future programs."

He adds, "If, as many people expect, the problem-solving patterns established in the oil-shale prototype program are germane to other resource development areas, then perhaps our discoveries can contribute to the efficiency and effectiveness of the energy information and data flows that will occur in the years ahead."

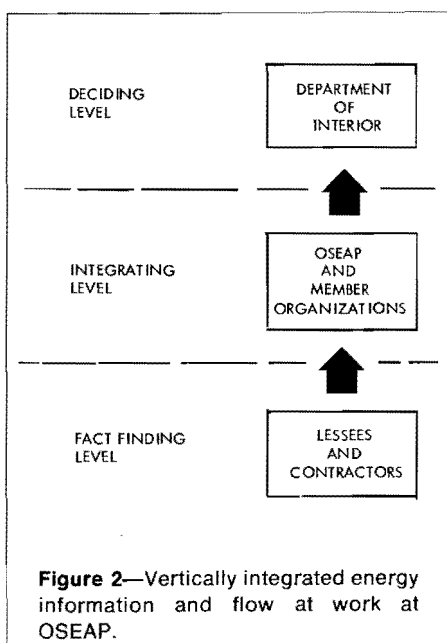


Figure 2—Vertically integrated energy information and flow at work at OSEAP.

Where Does Your Garden Grow? In Shale Country, Site Really Matters

Tosco and Forest Service conduct shale revegetation study

Xeric" is a harsh-sounding word used by Tosco in its description of the environment of the state lands it is leasing for oil-shale development in Utah. The word refers to habitats that are low or deficient in rainfall, and the desert-like, barren landscape in northeastern Utah is testimony to the aptness of that word. The 14,688 acres Tosco is leasing are referred to as Sand Wash; the area is located 12 miles southeast of Ouray, 34 miles south of Vernal, and 7 miles east of the White River Shale Project (which is on federal land).

The vegetation in the area includes sagebrush and saltbrush shrub, rabbit brush, shadscale and Russian thistle. Deep loamy soil, clay and alluvium provide the soil medium. The White River offers the meager amount of water found on the tract; it meanders 4 miles through the eastern section of the leases. But so sparse is vegetation that oil-shale lands in Colorado's Piceance Basin are, by comparison, lush gardens.

Yet revegetation experts are enthusiastic about someday exacting productive growth from piles of processed shale that must be disposed of after production of shale oil on these lands. Why the enthusiasm? Initial investigation seems to indicate that "Processed shale is more like the native soils at Sand Wash than those on the top of the Roan Plateau (in Colorado)," in the words of Tosco revegetation specialist Ed Baker. Roan Plateau is one of the sites Colony Develop-

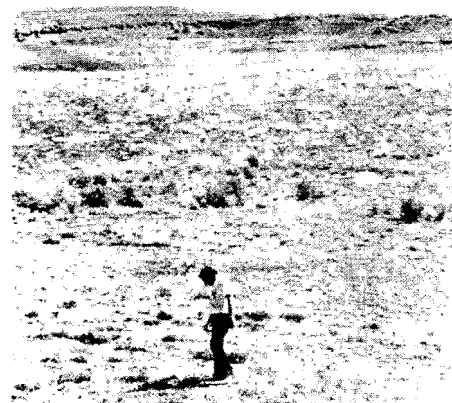
ment Operation has studied in more than a decade of extensive revegetation experiments conducted in the oil-shale region. Tosco is a partner in the Colony private venture.

The reason processed shale seems to more closely resemble Utah native soils is its high alkalinity ratio and high salt content. While such high salt content is not the norm on the Colony lands, it is a fact of life for plants at Sand Wash in Utah. On the Colony soils in Colorado, native plants include oak brush and mountain mahogany, growing at higher altitudes (8,000 feet), and these plants are sensitive to salts. In contrast, the Sand Wash soils (at 5,000 feet) are home for saltbrush, which tolerates a higher salt content.

So, it appears unlikely that the extensive leaching of salts, required at the Colony site before planting, will be necessary in Utah. Indeed, the Sand Wash plants themselves are, according to Baker, less thirsty, since they grow in a desert climate, where annual precipitation is 7 to 8 inches. This is slightly less than one-half of the rainfall at the Colony site.

5-year joint study

Such factors will come under extensive examination during a 5-year, industry-government revegetation project on the Sand Wash and Colony sites. Partners in the program are Tosco and the U.S. Forest Service, with funding



Moonscape?—Tosco senior engineer Kenneth D. Van Zanten examines terrain at Sand Wash Project in Utah.

help from the Environmental Protection Agency. The project team includes Dr. Neil C. Frischnecht and Bob Ferguson of the Forest Service's Intermountain Forest and Range Experiment Station in Provo, Utah. The project got underway last spring when different species of transplants were started in processed shale. So different are the two sites that of the 66 varieties planted in Colorado, only one was usable at Sand Wash. Instead, the experimenters chose for Sand



Growing—Various mediums were tested for plant growth at Davis Gulch. From left to right are 6 inches native soil over processed shale, processed shale alone, native subsoil with no processed shale. A 1/4-inch mesh wire, buried 6 inches in the ground, serves for rodent control; an 8-foot fence for large-animal control.

Wash more of the drought-tolerant plants native to Utah and even included species native to arid sections of Russia.

While the experimenters will be able to test the effect of Utah climate and topsoil on the revegetated spent-shale piles, most of the spent shale itself will come from the Colony site in Colorado. However, a small portion of Utah shale from the core holes drilled at Sand Wash has been sent to Tosco's Rocky Flats Research Center near Denver, where it is being retorted. Then the processed shale, about 100 pounds, is being returned to Utah and placed in an environmental chamber in Tosco's Vernal offices. Such a chamber is an incubated, carefully-controlled environment, where researchers can fix temperature, humidity, moisture and sunlight and thereby mimic various seasons and climatic conditions. Four species are to be tested in this chamber.

Among the factors experimenters will be investigating are the concentrations of metals and minerals that are picked up by the vegetation from the processed shale; nothing toxic is expected. Baker says some interesting factors may emerge from these studies. For exam-



Beginning—Forest Service and Tosco planted more than 1,000 transplants on the Sand Wash plot in May of 1976 (left). Individual emitters drip water on each plant (right).

ple: in the Utah soils, it seems some of the native plants have a tendency to concentrate salts in their leaves.

Behavior of plants in revegetated processed shale at Sand Wash may, then, be somewhat different from plant behavior at Colony's lands, the researchers say. Significant differences could also be found between various sites at Colony. For example, during this program, the researchers will be planting seedlings on a Colorado site at a higher altitude than most previous revegetation experiments at Colony. The new site is in Davis Gulch located atop the Roan Plateau where the

processed shale is slated for disposal during commercial operations. In addition to being at a higher elevation, the plateau receives more annual rainfall than the other Colony site at Piceance Creek.

So, the initial experiments in both Colorado and Utah are underway and more experimental plots are being planned. The common aim at both sites is to use native or adapted species to revegetate the area. But the two sites, as different as say, a sego lily is from a columbine, may require vastly different gardening techniques. *C.E.*

Tosco: Learning the Answers at Sand Wash

Revegetation experiments at Tosco's Sand Wash Project 35 miles south of Vernal are a vital part of Tosco's development plans, which are taking place under a special agreement with the state of Utah. The agreement calls for the firm to spend at least \$8 million over the next 8 years to prepare for an eventual commercial oil-shale complex. In return for what is effectively a single 20-year lease of the 14,688 acres of land, located on five non-contiguous blocks, the company has promised to spend \$2 million every 2 years from 1976 through 1983 on project development and studies covering such factors as air quality, water quality and quantity, geology, engineering, soils, plants and animals . . .

Part of those initial expenditures began this year. Soon after the State Land Board approved the agreement, Tosco opened a project office in Vernal, where Dr. Joe Merino and Ed Baker are coordinating

work on the site, including geologic and hydrologic evaluations, photography, mapping and environmental baseline studies. In the latter category, Merino is initiating a study of the wildlife on the tracts, including live trapping to calculate population densities and reproductive histories.

In sum, Tosco describes the environmental work as "comparable to those (programs) carried out on our other shale projects and on the federal lease tracts. However, because of a less hurried time schedule than is required under the federal leases, we expect to acquire data over a longer period of time prior to finalizing development plans." Tosco officials are also examining the possibility of sinking a shaft to the oil-shale deposits, which are located about 2,000 feet below the ground, and creating a pilot mine.

The proposed schedule of activities calls for construction and startup in the seventh to tenth year, when as many as 3,000 workers might be employed. Permanent operating staff would be some

1,000 to 1,500 workers.

If development plans move ahead, Tosco will eventually be operating a commercial oil-shale complex on these Utah lands, and will be producing about 75,000 barrels of oil per day for about 20 years. And the last calculations, made in 1974, indicate royalties from the operations would yield a handsome sum to the state. Utah's direct royalty income, earmarked primarily for school funding, would be more than \$14 million each year—assuming a \$12 price for the oil and the minimum 5-percent royalty provided in the leases.

Where is the project now? In the words of Morton M. Winston, Tosco president, "We are not, of course, nearly ready to build a Sand Wash commercial plant—there are far too many unanswered questions as yet. However, we are sufficiently encouraged about the prospects for favorable answers to these technical, environmental, economic, legal and other questions that we are prepared to begin the large expenditures that will be necessary to learn the answers." *C.E.*

Club 20: Mirror, Friend for Western Colorado

Taking up the cudgel for energy-impacted towns



Coordinator—"Club 20 is attempting to be a . . . disseminator of information, not a spokesman," says its President John Vanderhoof, former Colorado governor.

The story of Club 20, a unique organization representing the interests of 20 counties in western Colorado, is a story of a new era for both the organization and the cities and counties it serves. As the sparsely-populated Western Slope has grown, and as energy development has waxed and waned, so has Club 20 changed.

When the organization was founded in 1953, energy development was not really in the picture. The group's purpose, still contained in the Club 20 constitution, stated its aim, in part:

"To formulate, through careful analysis, plans and programs for the development, improvement and general welfare of all Colorado territory west of the Continental Divide, including western portions of counties straddling the Divide; to promote, develop and improve, through coordinated action, all resources; and to promote harmonious relationship of intercommunity planning."

For most of the past 23 years, the clause boiled down to promoting a strong tourism program, lobbying for improved roads, seeking economic development and supporting a natural-resources program geared primarily to water. Now, that clause means much more. Now, it means that Club 20 has taken up the cudgel for cities and counties in western Colorado that are being or will be impacted by energy develop-

ment. And, to the five persons in the organization who are most directly involved in this new role, the change is both fitting and proper.

From its president to its chairman of the board, Club 20 leaders today describe the organization as an intermediary, a guardian of the 200,000 persons who live in the vast western Colorado area. As energy development impacts the area, residents face a classic problem: few votes, little clout but massive needs.

Meeting the crunch

For more than a year, John Vanderhoof, president of the organization, has been leading a three-pronged effort aimed at easing the crunch facing local governments. First, he has made more than 50 major addresses throughout Colorado and surrounding states seeking, in his words, "public support and understanding" of western Colorado problems and concerns. Mobilizing locally elected city and county officials is a second prong. Third, Club 20 has been pushing for severance-tax legislation that would return 80 percent of the revenue to the area impacted by the development that created the revenue. As proposed by Club 20, the severance-tax money would provide for the sharing of funds not only with a town or county where a plant is located but also with neighboring counties that can show the

effects of impact. The proposal was chopped to a 40-percent local share in the Colorado Senate during the past legislative session, then died the last day of the session.

Another Club 20 perspective on the politics of development in western Colorado—a long-range one—comes from former Fourth-District Congressman Wayne N. Aspinall, now a consultant to Club 20 and recently named chairman of its natural-resources committee.

Aspinall observes that the big question on spending money for impact is *when*. Money shouldn't be spent when development doesn't take place, but a delay in spending could cause communities to be overwhelmed by growth, he notes. Aspinall calls the boom-bust cycle dangerous, but observes, "That's been the history of mining all through the history of the United States. The government can take chances with money; private investors can't."

In regard to oil shale, Aspinall blames the government in part for development delays. In particular, he stresses that the \$5 a barrel gap between the world market price and the cost of producing oil from shale will have to be closed before there is any appreciable development.

As for Club 20's thrust in the midst of such energy development, Aspinall hopes to tie his natural-resources committee more closely to the organization's

economic-development committee. He states, "We're on the ball—trying to alert communities." Among the alerts: there is a more immediate problem with coal than oil shale, since coal is being developed commercially now.

"A co-ed league"

Also stressing the need for an articulate, unified voice for western Colorado is Eve Homeyer, Club 20 chairman of the board and former Aspen mayor. Referring to the day when Aspinall was in power, she observes that western Colorado no longer has its own congressman. Instead, "We have two pieces of two congressmen," in the Third and Fourth Districts. She feels the area needs a single intermediary with clout.

Homeyer sees Club 20 as such an interceding friend, an *amicus curiae* of western Colorado, digging up facts, finding out what can be done and moving into a mass educational program. She describes this effort as a kind of "Co-ed League of Women Voters," and notes another organization that fills a similar role, the Aspen Valley Improvement Assn., which takes on problems that Aspen and Pitkin County can't handle by themselves.

In coping with particular problems, Club 20 is limited by funding, Homeyer observes. Thus, she is interested in seeking grants for several projects, such as finding compatible industries that could utilize temporary energy workers.

Another viewpoint on specific energy developments and on Club 20's stance comes from Henry Fausson, chairman-elect of the Club 20 board, and president of Mutual Savings and Loan in Grand Junction. He observes, "Club 20 has taken a very positive but middle-of-the-road position, recognizing that it (oil-shale development) will come when the economics are there for it. I see no heavy, immediate impact or dramatic changes." He is more concerned with coal, which "can be a very quick impact." Fausson thinks Club 20 must follow energy developments carefully, and "smooth out and attempt to help local government over the rough edges." With regard to the boom-and-bust cycle of oil shale, Fausson said that



On the ball—"We're . . . trying to alert communities," says former Fourth District Congressman Wayne N. Aspinall, now a consultant to Club 20.

from his vantage point in a Grand Junction lending institution, the bust is primarily in publicity. He said Mutual Savings has yet to encounter a total of 10 customers related to the oil-shale industry who have had to leave the area because of a so-called bust. He called oil-shale development "a slow, planned process."

Cataloging existing woes from impact in Routt County (Steamboat Springs area), is another Club 20 participant, County Commissioner J.A. "Doc" Utterback, chairman of Region XII of the natural-resources committee. He indicates a preference for the old days when companies built the towns and most of the schools. Today, he says, the primary responsibility is placed on existing residents. And he lists the current problems this causes: land speculation creating an unrealistic market that prevents con-

Bust in publicity—Henry Fausson, chairman-elect of the Club 20 board, says news media have exaggerated current boom-bust cycle of oil shale.



struction of moderately-priced housing and unduly raises the value of all properties; the tax-exempt status of various entities, such as the Platte River Service Authority, which construct plants in western Colorado to serve the Front Range; demands made by a growing recreation industry; and, threats to the control of precious water supplies.

'Cry-wolf syndrome'

In general, then, Club 20 is seeking to fill the vacuum, namely the absence of any type of citizen's organization covering the entire Western Slope and any type of universal communications medium for the Slope. In particular, Vanderhoof points out that the Rocky Mountain News or the Denver Post or any of the four Denver television stations all have the staff and capabilities to collect and distribute the news to all of eastern Colorado and beyond, while there is no such organization in Colorado West. Therefore, "Club 20 is attempting to be a coordinator, a catalyst and a disseminator of information, not a spokesman. It is the only such vehicle that exists at this time," Vanderhoof says.

The former Colorado governor expresses fear of the "cry-wolf syndrome" brought about by the boom-bust cycle. He feels it is difficult to move government toward a cooperative approach of easing impact when suddenly the impact isn't there. Says Vanderhoof, "If all of the sudden the wolf isn't there, they're going to say the hell with it and drop the program. Anyone who has studied shale knows it's going to go. I've tried to tell Congress, 'You can't take us up the rocky trail.'

"We have worked closely with industry and found they share the same concerns we do and have a general desire within the realm of reason to help local government cope." Vanderhoof also says that in continuing to provide information to industry and lawmakers, Club 20 can help citizens better understand and support programs such as bringing severance tax back to the areas of impact. He states, "We are in a position to react to a moderate approach that assures a gradual buildup to full-scale development. We can meet that."

His task is often like presiding over an acrimonious session of the United Nations. Yet, somehow he manages to seek—and, in the eyes of many, achieve—a consensus on the Oil Shale Environmental Advisory Panel. He is William Rogers, special assistant to the Secretary of the U.S. Dept. of the Interior in the Missouri Basin Region, a 10-state area with headquarters in Denver. The panel members, who represent more than 30 governmental and environmental groups, advise the Interior Secretary on environmental facets of oil-shale development.

One of Rogers' favorite declarations at an OSEAP meeting goes something like this: "Any objections to this proposed advice? Hearing none, I declare we have reached a consensus." Actually, such a statement from the chairman usually signifies that the panel has survived a swampland of bickering—and has managed to reach a middle ground of agreement.

The man, who panel members say presides with humor, fairness, and firmness over oil-shale matters, has also sat through many a meeting on other subjects where consensus seemed distant. As special assistant to the Interior Secretary, his daily task is to accommodate diverse interests that are served by the Interior Dept. in a 10-state region. Among those interests are Indians, and Rogers observes, "There's no meeting like an Indian meeting from the standpoint of provocative statements made by participants and the resulting emotions."

Before his current post, Rogers served as Deputy Assistant Secretary on Indian Affairs in Washington, D.C. He has also worked as Deputy Under Secretary, responsible to the Interior Under Secretary for supervision of coal mine health and safety, water desalinization and pollution control.



Favorite words: "Any objections to this proposed advice? Hearing none, I declare we have reached a consensus," says Bill Rogers when he presides at oil-shale panel sessions.

Vignette

Bill Rogers: Harmonizer

Prior to joining Interior in 1970, Rogers, who has an engineering degree from the California Institute of Technology, was an executive for the Aerojet-General Corp. in southern California for more than 27 years. Among the posts he held at this firm: vice president and general manager of the company's electronics division. Rogers reports that during his tenure with the company, it was particularly involved in developing the MK 46 torpedo for the Navy, and demonstrating the application of infrared systems to space sensors.

Born in Pendleton, Ore., where his father worked as an automobile service manager at a garage, Rogers was raised in the West and Midwest—Walla Walla, Spokane, Butte, Boise, Lewiston and other towns. Today he and his wife, Marolyn, live in Evergreen, a suburb of Denver, and it is obvious Rogers relishes living in the West, where he and his wife have fished many a stream.

Truth can't be totaled

His current major responsibilities with Interior include chairmanship of OSEAP

and membership on the Region VIII Federal Regional Council in Denver, and the Missouri River Basin Commission. When Rogers first received his appointment to chair OSEAP, "I did some very heavy thinking," he recalls. "I thought about how the panel could be effective on a long-term basis, avoiding factionalism."

So, at the first meeting, he announced his intention to operate by consensus, whenever possible, rather than by calling for a vote. He still supports that method, which allows members an opportunity to give specific advice rather than simply to take a yes/no stand on an issue. His reasoning: "Would it really help the Oil Shale Supervisor to have the panel come out with a vote saying 51 percent of the members were in favor of off-tract disposal for tract C-a?" Instead, the panel members each offer their reservations or observations in their field of expertise.

Rogers put this philosophy into words recently when the panel was debating the lessees' requests for a suspension of their operations, "Our function is to provide Pete Rutledge (the Area Oil Shale Supervisor) with cogent advice about what he should take into account if he is considering a suspension request, and I think . . . that we can separate our feelings as to what the conclusions (as a group) should be from what we as (individual) experts of a sort would advise Pete to consider in the final decision." And OSEAP did just that. Among the panel concerns, later incorporated by Interior in the suspension approval, was provision for the continuation of "an adequate environmental monitoring program, which can be integrated with the existing baseline program . . . during the lease suspension," in the panel's words.

What makes OSEAP tick? Rogers observes, from 2 years' experience, "What-

ever good the panel does comes from the quality of its membership. We have extremely well balanced and competent people representing violently different points of view. And I think we have proven over and over again, if we get all of the viewpoints out on the table, we can reach a consensus."

Besides, he notes, the prototype oil-shale program has few easy answers. "It's a continuous process. It's more than a research program. The prototype program was designed to be fully representative of all the facets and problems

of continuous production. But we'll never have a total answer. I don't think life works that way."

Analyzing the current hiatus in the prototype program, Rogers states his opinion that it stems from "the climate in this nation," including public apathy about energy development and Congress' insistence on price controls on oil. Says Rogers, "As long as that climate exists, I don't have much hope for a full-scale prototype oil-shale program." As to the future of the panel he chairs, Rogers says that the OSEAP will meet

less frequently and will probably center its efforts on monitoring the results of environmental baseline data collection and assisting the Area Oil Shale Supervisor with analysis of that data.

The future of oil shale itself is murkier, he feels. While he is confident oil from shale will eventually be developed, Rogers states that commercial development awaits a "keen appreciation" by the public of the importance of developing alternative sources of energy. What's needed, he notes, is a consensus on energy.

C.E.

From 'Shale-ese' to English

While they speak in English, members of the Oil Shale Environmental Advisory Panel sometimes use words that impart their own flavor and reflect the diverse backgrounds of panel members. The result: a language that is a unique mixture of jargon spouted by various experts, saturated with bureaucratic numbers and acronyms, and punctuated by certain clichés—plus jests.

Members sprinkle their comments with such phrases as "for the record," "the state of the art" and "baseline data." They speak of "modeling," "task forces," "parameters," "due diligence" and "best available technology." One panel member may refer to "page 3 dash 4 dash 13." Other panelists speak of EPA, BOR, BLM, U-a and C-b, PSD (prevention of significant deterioration). They refer to PL-92-500 (the Clean Water Act) and toss off references to 209 and 303 (sections of the Clean Water Act).

While they slip in and out of this jargon with ease, sometimes panel members catch themselves and try to translate such terminology for the public. And sometimes they laugh at themselves. The humor can also be a way to spar with one another, to relieve tension and to make points. For example, Gordon Harmston, head of Utah's Dept. of Natural Resources, noted at one meeting that Mother Nature herself seemed to violate the air-quality particulate standards that the government was trying to enforce. He recalled a dust storm he observed at Lake Powell, and said the swirling red desert dust might inspire the Environmental

Protection Agency "to make nature conform a little bit more." Then, he added, "I think that it's too bad that we cast a pall on industry and that it's always them in the black hat."

This was like waving a red flag (or a dead eagle) in front of Audubon Society, and OSEAP, member Vim Wright, who answered, "It surprises me, Gordon, that a very religious person would take an Act of God to task."

Cooling off the repartee with a more neutral joke, OSEAP member Bob Kessler, of the U.S. Dept. of Transportation, suggested that in the absence of the passage of an Act of God or in the event of a failure to control Mother Nature, he



Jargon and jokes highlight most Oil Shale Environmental Advisory Panel meetings, but in some cases—like this one—OSEAP members concentrate on looking at, not talking about, shale matters.

and the Solicitor General intended "to submit something that will at least attempt to fool Mother Nature." His suggestion: the Uniform Oleomargarine Act. "And I hope you will all support us in our endeavors," Kessler urged.

As the incident suggests, panel members are good at goading one another. Environmentalist Wright is also fond of needling industry. At one point, she called actions of an oil-shale project official "petulant." This provoked panel member Mike Strang, a Colorado rancher, to respond with a comment about "the myopic approach of limousine liberals." He stated, "The hostility behind the various comments seems to deal solely with the fact that we need to get more money out of them (industry) but we are not particularly interested in where they are going. I hope this attitude isn't prevalent in the panel."

Wright responded by pointing out she didn't drive a limousine but "a smashed-up Mustang." But Harmston could not resist a retort: "Is that Mustang a fugitive from BLM?"

Lest the reader think these quotes indicate bitter enmity, he should be reassured that Wright, Harmston, Kessler and Strang speak amiably with one another during coffee breaks. Their comments do, however, reflect deep divisions in outlook about the prototype oil-shale leasing program. But, as the panel chairman Bill Rogers points out, the discussion allows all members to air their views, and he finds, on occasion, "Representatives of vastly opposing factions will say, 'You know, that fellow's a pretty reasonable guy.'"

C.E.



Guest Column

Water Quality: An Equal Dilemma for Oil Shale

By Office of Energy Activities Staff
U.S. Environmental Protection Agency

"EPA establishes water-quality criteria, then it's up to the states to establish water-quality standards," explains Terry Thoen of the U.S. Environmental Protection Agency.

Water quality is just as important a consideration to oil-shale development as air quality. Thus, to get some insight into this topic, the following "backgrounder" given by Terry L. Thoen, an EPA staff member, at a recent Oil Shale Environmental Advisory Panel meeting is presented.

The law is . . .

The principal segment of national legislation pertinent to water quality is the "Federal Water Pollution Control Act Amendments of 1972." This legislation is also known as "Public Law 92-500," the "Federal Water Pollution Control Act," "FWPCA" or the "Clean Water Act." The Act originated in 1948 with modifications in 1956, 1965, 1966, 1970 and most recently in 1972 when major revisions were adopted.

The objective of the "Clean Water Act" is to restore and maintain the chemical, physical and biological integrity of the nation's waters. Several sections of the Act address water-quality planning and management to some degree, however, sections 208 and 303 relate more specifically to issues concerning oil-shale and associated development. As these sections state, some of the factors that must be considered in the planning process are:

—Each state shall have a continuing planning process that is consistent with

the Act.

—Each state shall submit to the EPA Administrator for his approval a proposed continuing planning process and the Administrator shall from time to time review each state's planning process to insure that it is consistent with the Act.

—The Administrator shall approve any continuing planning process submitted to him under this section that will result in the establishment of plans for all navigable water within such state, which include, but are not limited to effluent limitations, compliance schedules and implementation.

Section 208, "Areawide Waste Treatment Management," of the Act specifies the development of designated areas and plans for water-quality management. In terms of oil shale and water-quality planning, federal oil-shale tracts C-a and C-b are in a designated 208 planning area identified as the "Colorado West Area" that encompasses the counties of Moffat, Rio Blanco, Garfield and Mesa. This 208 area has ongoing contracts at the present time that address land and population impacts. The 208 area has previously evaluated the existing water-quality data for the area and has developed recommendations regarding both parameter coverage and station location.

Utah federal oil-shale tracts U-a and U-b are in a designated 208 planning area identified as the "Uintah Basin"

area, which includes Duchesne, Daggett and Uintah counties. This planning area has prepared population projections in draft form and those projections are currently being reviewed. The "Uintah Basin" also is in the process of evaluating streams and stream segments for both water quality and data adequacy, but has made no recommendations on either the stream quality or data coverage to date. Waste load allocation studies are planned for the future and will be considered in the overall 208 planning.

The standards are . . .

Water-quality standards also are addressed in section 303. A key statement: If any state fails to submit water-quality standards within a specified time or such standards are determined to be inconsistent with the requirements of the Act, the EPA Administrator shall establish water-quality standards.

Colorado has promulgated such standards and they were approved by EPA in August 1974 with two exceptions:

1. The salinity control policy, procedures and requirements for establishing water-quality standards for salinity control in the Colorado River System are those established by federal promulgation.

2. In the "Flow Criteria and Exceptions" section, the EPA has excepted from its approval the sentence, "Exceptions on specific parameters may be al-

lowed through discharge permits.”

In Colorado, streams may be classified as one of four designations, which rate the waters in terms of suitability for different types of use. Utah has eleven stream classifications.

Utah adopted water-quality standards in 1965 and EPA has approved them with the same salinity exception as for Colorado. Utah further has a similar antidegradation policy.

The two Colorado federal oil-shale lease tracts are in the Colorado River Basin-White River Sub-Basin. Potential drainage from both tracts will discharge to the reach of the main stem of the White River. From the mouth of the Piceance Creek to the Colorado-Utah state line, this reach is classified as B₂ or suitable for customary raw water purposes *except primary contact recreation*, such as swimming.

Oil-shale tracts U-a and U-b are in the Colorado River Drainage Basin. Two streams in and around the two tracts, Evacuation Creek and the White River, are classified as CW, or suitable for warm water fisheries.

Water-quality standards for ground waters in Colorado are not well defined at the present time. However, they do fall into the category of “State Waters” and thus should meet the basic standards. The state is currently revising water-quality regulations with respect to ground water.

Utah also has no specific water-quality standards with respect to ground water. The State Dept. of Health does have regulatory and statutory approval authority for all wastewater control facilities, and expected discharges from such facilities to aquifers that serve as potable water sources must not degrade aquifer quality below applicable drinking water standards.

Federal regulations that may pertain to ground waters are addressed in the Safe Drinking Water Act. The Act has most recently been interpreted as applying to well injection of waste into aquifers that do or might serve as sources for public drinking water.

Section 303 of the Act requires adoption of salinity water-quality standards applicable to interstate waters. Pursuant

to that requirement, the EPA, on December 18, 1974, promulgated regulations that required the Basin States (Arizona, California, Colorado, Nevada, New Mexico, Utah and Wyoming) to adopt ambient water-quality standards for salinity and an implementation plan to achieve the goal that . . . the flow-weighted average annual salinity in the lower main stem of the Colorado River be maintained at or below the average value found during 1972. It was further required in this section of the Act that such numerical standards and implementation plans be established on or before October 18, 1975. In order to prepare a uniform response to this requirement, the seven states formed the “Colorado River Basin Salinity Control Forum,” an interstate body made up of state water pollution and water-resource officials. In June 1975, the Forum submitted proposed “Water-Quality Standards for Salinity Including Numeric Criteria and Plan of Implementation for Salinity Control.”

Components of the implementation plan of interest to oil-shale development are a “no-salt return policy wherever practicable” for industrial discharges, disposal of blow-down water from power plants in a manner to avoid return of salts to the river system, use of saline mine drainage water for compacting processed shale as well as in-plant processing operations and control of drainage water from spent-shale deposits. In large part, the philosophy is concerned with reducing the dissolved solids content of waters over which one has control because of use in some industrial or agricultural process. A concurrent and major effort in controlling salinity in the Colorado River is reduction in salinity produced by natural sources.

There are many other standards relating to water quality, and thus oil-shale development, including those relating to thermal discharges and effluent limitations. In addition, there are discharge permits that must be carried out through the “National Pollutant Discharge Elimination System” (NPDES). It should be noted that oil shale or synthetic fuel production has not yet been identified in any of the industrial categories consid-

ered under effluent standards.

So what does it mean?

Some of the water-quality measurements that have been made on the federal oil-shale tracts exceed the EPA standards *before* oil-shale development. Thus, in summary, there are some concerns in regard to water quality and oil-shale development. One of the major concerns is the Colorado River salinity situation. There have been established numerical limits of total dissolved solids on the Colorado River at three different points, namely, below Hoover Dam, below Parker Dam, and at Imperial Dam down at the border. It is law that these levels have to be met sometime in the future. There is not a timeframe established now, but it is the goal to get back to those numerical standards.

How does this affect the oil-shale program? Simply, any oil-shale development has to be in concert with meeting those total dissolved solids regulations.

TDS levels are affected by a couple of things. One, if there is going to be any discharge, which none of the oil-shale tracts anticipates, the development would have to make sure that total dissolved solids levels were not increased. Second, it is necessary to look at the potential interaction between the ground water and surface water. For example, in C-a’s presentation, they indicated that because they are going to be using some of their ground water—fairly high saline ground water—that saline ground water is not going to get to the White River and they predict, in fact, a beneficial impact on the White and Colorado Rivers.

The third thing, though, is that if a tract is contemplating use of that surface water, even though there is no discharge, when the water is used, this takes up a certain assimilative capacity. Briefly, this means that since upstream water is of better quality than downstream water if some of that upstream water is taken away, potentially the downstream water could be made worse. So one of the key areas EPA is focusing on in regard to oil-shale development is total dissolved solids and the whole salinity program.

Potpourri

A Summer with Shale— Part I: Students Explore Energy Fuels

Question: where would you go to set up headquarters for first-hand study of basic geological concepts and contemporary resource development? Answer: shale country. In fact, a geology professor from the University of Oklahoma states: "Nowhere else in the United States is there such a combination of desirable energy resources that are being developed and experimented on."

The words come from Dr. Kenneth S. Johnson, economic geologist with the Oklahoma Geological Survey. For 3 weeks this summer he and 12 students made Grand Junction, Colo., their base camp for a study of energy resources, particularly oil shale. Their study, entitled "Energy Fuels Field Course and Workshop," is offered for 3 graduate credit hours through the University of Oklahoma. Each year the students live in a Mesa College dorm while they study energy-fuel resources in western Colorado and eastern Utah. And on 4 nights, they camp out near the energy sites on the Colorado Plateau.

The course, offered each summer for the past 7 years, was started by the late Dr. Carl A. Moore, who sought a central locale for study of energy activities, and decided on Grand Junction. That he picked his site well is proven by the ongoing energy projects the students are able to visit. For example, this year's students observed operations and experiments on oil shale, coal, tar sands, uranium, oil and gas, gilsonite, as well as various geological formations exposed in the Colorado National Monument and Arches National Monument.

The course also gives students an opportunity to rub elbows with industry personnel, who, while they may not dis-

close their "innermost secrets," do describe their projects and problems, says Johnson. For example, the students toured the Gary Western Refinery west of Fruita, near Grand Junction. The refinery, formerly owned by American Gilsonite, refines crude oil and last year engaged in a special effort: refining 10,000 barrels of shale oil produced at Paraho Oil Shale Demonstration's project at Anvil Points. Two plant officials gave the students a 90-minute tour of the refinery. Then they took time to express some of the frustrations facing today's energy developer—such as the snowballing of federal and state inspections related to pollution control.

Assimilating the information from these tours is accomplished in an unusual manner: the students write their own textbook. Each student selects two topic areas for reports, which Johnson edits



Away from the text—Seeing for themselves the complexities of refining crude oil are these students from the University of Oklahoma. They toured Gary Western refinery (in background) near Fruita; the company has also refined shale oil.

and the university prints as a manual, which is distributed to students in the program. For example, one of the topic assignments related to oil shale calls for a thorough discussion of surface retort methods, covering mining, retorting, economics . . .

Conclusions? Johnson says one of the "fantastic" outcomes of the program is the students' realization of the interrelationships between the various energy fuels. For instance, chemists at the Gary Western Refinery laboratory pointed out to the students that gilsonite displays some of the same characteristics in refining as oil shale.

From Oklahoma City to Cairo

The students come from diverse home bases and their reasons for taking the course vary. For example, the one woman in this summer's course, Lura Rosewitz, of Oklahoma City, said the course would assist her as she explored a career in minerals or petroleum geology. And, she also simply "liked the area," which she had first visited as a child. Most of the students were geology undergraduates or graduate students; three petroleum engineer majors were also enrolled. One student was a citizen of Libya, two from Iran; one hailed from Cairo. An offshoot of such a cosmopolitan enrollment: the students enjoyed a Libyan dinner and a Persian lunch, as well as pizza and Coors beer.

As they wrapped up their course, Johnson noted the students were expected to gain a "broad framework" from which to view energy-fuels development. But after observing not only the technological and geological factors related to energy-fuels development, but also the economic complexities, Johnson says the group is not directed to any one particular conclusion about energy-resource development. "We just expose them to what's going on in energy research so they can make their own decisions about the problems and merits of developing various fuels." In general, though, the students seem to find, in Professor Johnson's words, that "We don't see white hats and black hats; it's all shades of grey." *C.E.*

A Summer with Shale—Part II Student Introduces Tourists to Energy Facts

Just imagine you're a college student and on your summer job you suddenly have major responsibility for arranging a tour of an oil-shale facility for the President of the United States; it's enough to blow your mind. Fortunately, Harry Pforzheimer III felt reasonably well prepared for that assignment when the President, members of the U.S. Senate and the House, government energy officials and the press visited the Paraho Oil Shale Demonstration in August 1975.

As the son of a Sohio Petroleum vice president who's also the Paraho program director, Harry has grown up in the energy business. However, he says, being part of the international petroleum "family" isn't necessarily a bowl of cherries, adding, "Since grade school, people have put me on the spot about oil companies. But that just inspired me to do my own research, to find out the answers to questions about energy supplies and sources. Today, I am firmly convinced that there is an energy crisis and that America must develop its own domestic resources."

Harry has had the opportunity to become an oil-shale expert while working for Paraho the past three summers at its Anvil Points facility near Rifle, Colo. The first summer he mostly handled data-processing projects; the second and third summers he performed public-relations and community-affairs tasks. Primarily, he says, this has meant providing information to the press and others about the project and about oil shale.

Who comes to see the Paraho operation in shale country? "More than 600 people asked to see the facility this summer," reports Harry. "They came

from Taiwan, Germany, Japan, and from all parts of the United States."

Since Paraho concentrates on research and development and does not seek to be a tourist attraction, how do people find out about it? "Lots of them have seen SHALE COUNTRY magazine," says Harry. "Others drive by, see our sign, and come up. But, with people arriving at all times, running tours has been almost a full-time job. Next year, I hope to set up regularly scheduled tours."

Why PR?

Harry, who will graduate from St. Johns University, Collegeville, Minn., this year with a degree in psychology and a basic interest in public relations, says, "From my standpoint 'public relations' is vital for any industry, and by PR, I mean 'information.' Here at Paraho, for instance, we are committed to the idea



High point of a shale summer—Harry Pforzheimer III served as one of the President's tour guides when Ford visited the Paraho Oil Shale Demonstration.

of openness—we have nothing to hide.

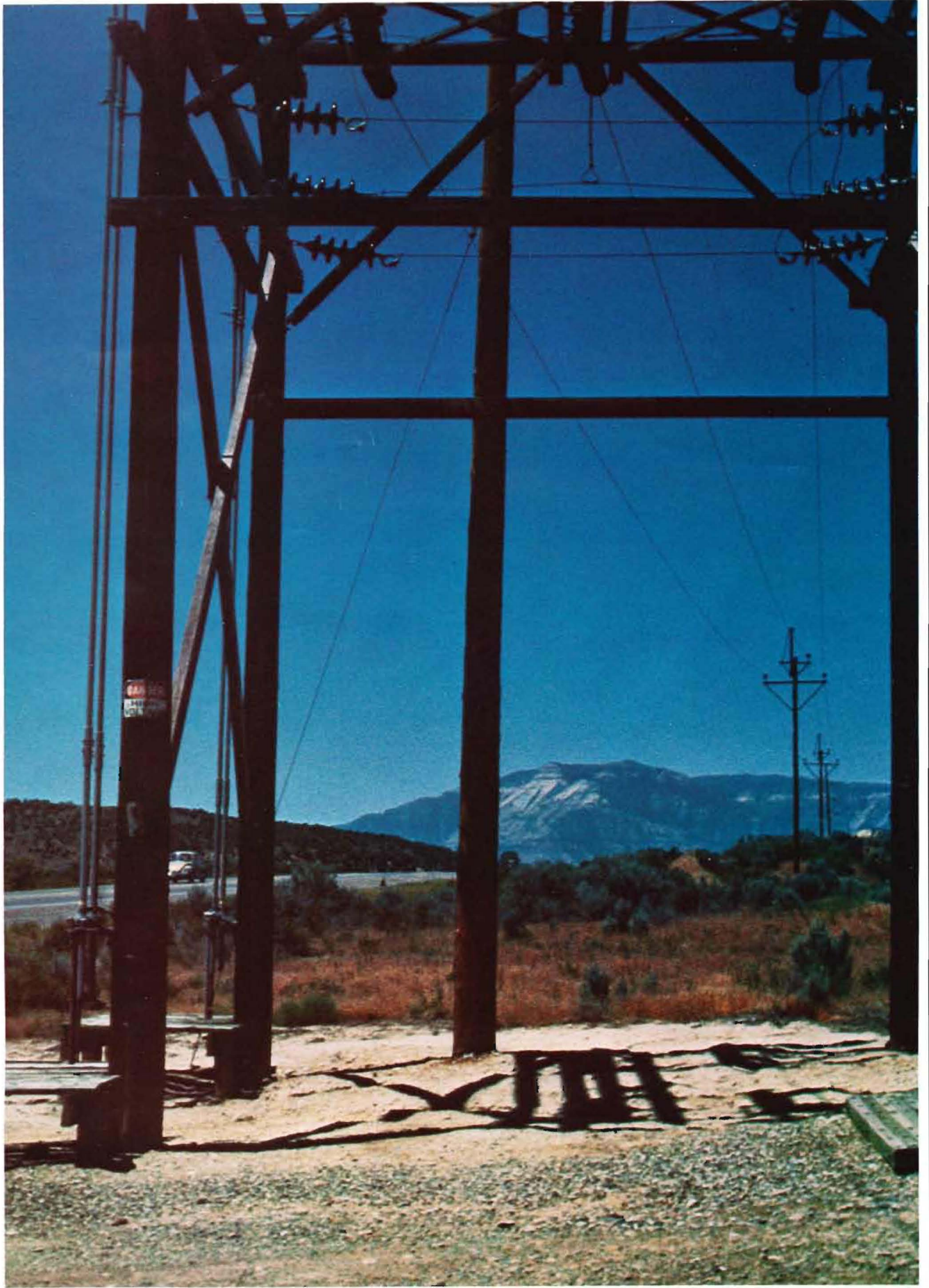
"Along with public relations, of course, there is a need for community relations. We feel it is absolutely necessary that the shale-area community in Colorado and Utah—the area that is going to be affected by development—know what we are doing. And we need to know what the shale-area residents feel about development so our planning is in tune with local needs. This means, of course, that my job is not just providing information, but also spending much time listening to people."

What does Harry do when he is confronted by those who feel that the oil industry intends to rip off shale country? "I calmly respond that I don't feel that is true at all. Then I emphasize that I *know* that oil shale is being developed with environmental controls and is being developed at a careful rate. However, I also stress that America can't afford to overdo controls to the point that our resources cannot be developed.

"The biggest problem I see is that people are uneducated about oil shale and its important role in our future energy mix. But I do feel that people are slowly realizing that there is an energy crisis and that we must develop our own resources in order to reduce our dependency on foreign oil."

Harry adds, "Thus, we at Paraho feel there is a good chance that this project is going to have a long existence in the oil-shale industry—and we *do* feel there will be an industry. First, however, some changes must be made. The country needs a national policy conducive to energy development; oil shale needs more Congressional support; and the oil-shale companies need to stop fighting among themselves. We all must unite and work for the same cause—to help make America more energy self-sufficient."

What will Harry do next summer? Hopefully, he and his wife, Barbara, will once again be back at Paraho, and he'll be showing visitors the project's next planned stage—producing 100,000 barrels of shale oil under a program proposed by the Energy Research & Development Administration and the Defense Dept. A.N.



Anvil Points in graphic frame

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