

# Oil Shale in North Carolina — A challenge for state development policy

By Brad Stuart

President Carter's recent push for synthetic fuels from oil shale and coal may have long-range repercussions for North Carolina. Under land now used for farming and timber, North Carolina holds deposits of oil shale. At issue is whether this land will be strip mined.

If shale oil is to be produced in North Carolina, it will take years before the shovels begin tearing away the topsoil. But there is a question that should be asked now. Does the state have the body of policy and law necessary to deal with the issues of synfuels and strip mining? The answer now appears to be no.

North Carolina's oil shale was first publicized over a year ago when the Chicago-based Institute for Gas Technology (IGT) applied to the N.C. Energy Institute for a state-funded research grant. The research was to study black shales in the Sanford and Reidsville areas and determine the feasibility of synfuels production. Small samples of the shale had shown good oil content, and an IGT researcher quoted the rough estimate that there may be enough oil shale to support two to three synfuels plants, each producing 50,000 barrels per day of liquid fuels or 750 million cubic feet of substitute natural gas.

IGT's grant request was turned down, researchers say, because the new state Energy Institute was funding projects most likely to bring quick results. Shale oil production will not be quick and sure. The extent of the North Carolina shale deposits is not known and reaching production, if feasible, will probably take a decade or longer.

Despite the lack of state research dollars, the prospects for the production of North Carolina shale oil have been boosted in recent months by federal initiatives. In his "crisis of confidence" speech, President Carter proposed to rally the nation's will, spirit, and \$88 billion of its tax dollars in a massive effort to expand domestic energy sources. Synthetic fuels are at the heart of the plan.

## Western shale, eastern water

There is plenty of oil shale in the western states of Colorado, Utah and Wyoming, which holds the world's largest reserves. But the crucial resource may turn out to be not the oil shale itself, but the water necessary to process it. Water is

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needed in virtually every stage of the production process — to suppress mining dust, to provide steam or hydrogen to synthesize the fuels, and to cool the fuel reactors. A single synfuels plant would consume around 13,000 acre-feet of water per year, enough to fill a 2,000 acre lake six and a half feet deep. In the arid West, water consumption on this scale is not looked upon as benign.

The water conflicts inherent in synfuels production are not lost on western governors, a group of whom met with the President soon after he made his synfuels proposals. The governors' concern was that the synfuels program could dry up water supplies essential for ranching and for the growth of western cities.

Western water shortages mean that the President's ambitious production goal — 2.5 million barrels per day by 1990 — may be impossible to reach without tapping eastern resources, according to IGT researcher John Janka. North Carolina is one of several eastern states whose shale — and water — is being eyed by the budding synfuels industry. Other states include Ohio, Kentucky, Tennessee and Indiana.

How soon might shale oil production begin in North Carolina? There are several uncertain factors.

- **Geology.**

The size, shape and quality of the shale deposits will help determine when — and if — they are strip mined. Dr. John Dennison, a UNC-Chapel Hill geologist who has done preliminary studies of North Carolina's Triassic shale beds, says the black shale appears in "long and skinny" deposits which may be miles long but only a quarter to a half mile wide. This means that the first eastern shale oil will probably come from some other state. Some of the Devonian shale beds in Kentucky, for instance, are very large and more compact in shape, guaranteeing plenty of shale near the processing plant. A compensating factor, however, is that shale in the Sanford, N.C. area appears to be high in oil content — "as good or better than the Devonian shales," in the words of Dr. Janka.

*Brad Stuart is an associate director of the Center.*

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- Economics.

Rough IGT cost estimates in 1978 were around \$3 per 1,000 cubic feet of gas from eastern shales. This is higher than the regulated price of natural gas, but lower than prices of imported liquified natural gas or synthetic gas from coal. A possible economic plus for the Sanford deposits is that they occur along with coal. In fact, this coal was mined from 1775 to 1953, when a history of groundwater flooding, fatal methane explosions and inadequate coal prices finally forced the mines to close.

- Technology.

Besides water, the chief factor in drawing commercial interest to eastern shales is a new technology that can squeeze out twice as much fuel from a ton of eastern shale as can be extracted by conventional methods. Called "hydroretorting" the process was developed by IGT — a research arm of the natural gas industry — and differs from the conventional "thermal retorting" used on western shales principally in the use of hydrogen. While the thermal retorting process cooks shale oil out of the rock, hydroretorting does so in an atmosphere of pure hydrogen. This helps in hydrogenating the heavy organic compounds in the shale, turning them into lighter compounds which make up liquid and gaseous fuels. Hydroretorting

seems particularly well suited to eastern shales, making their improved fuel yields — 25 to 30 gallons per ton — more comparable to those of high-grade western shales, from which over 40 gallons of fuel may be obtained per ton of rock.

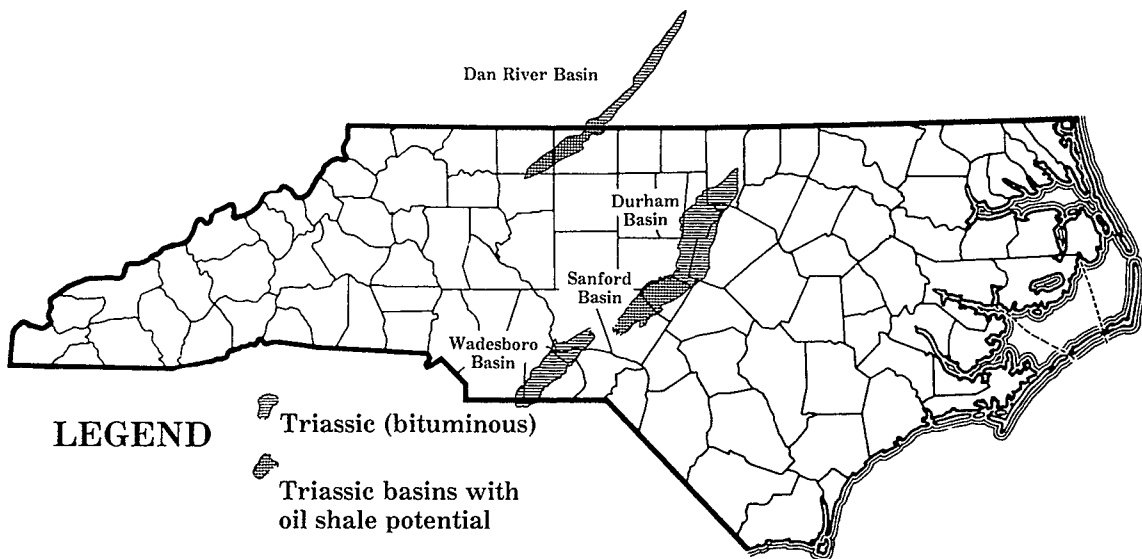
The hydroretort process has been operated so far only on a small scale, one ton per hour. The most optimistic estimate of the time necessary to design and build a commercial-size (90,000 tons per day) plant is five and a half years, according to Janka, who notes that previous attempts to commercialize synfuels technologies have often met with failure or delay.

### A challenge for development policy

The potential for synfuels and strip mining in North Carolina raises a challenge to improve the state's development policy. Current laws and procedures are inadequate to properly deal with the issues of synfuels production.

Water consumption is only one of the major environmental and economic issues. Groundwater pollution from mining, carbon dioxide emissions, and cancer-causing air pollution from synfuels plants are among the concerns of environmentalists who have warned against Carter's synfuels push. In addition, land use is a particularly pressing issue in the East, where land is both more populated and agriculturally more productive than in the western shale areas.

Balanced against these considerations is the fact that major fuels production would, in itself, be a great boon to North Carolina. Our state has suffered along with the rest of the nation from



Source: "Research Proposal for Feasibility of Hydroretorting Triassic Shale of North Carolina," Institute of Gas Technology, Chicago, 1978.

fuels shortages, OPEC prices and the security dangers imported with every barrel of oil.

Is strip mining and synfuels production the best use of the affected land, water and air in North Carolina? The fact is that the state government does not have a formal process to deal with this issue. This despite the fact that the state constitution and the state Environmental Policy Act both charge the government with the responsibility to protect the state's resources and environment.

- Item: The state would not be required to do an environmental impact study for privately or federally financed strip mining operations. The Environmental Policy Act requires an impact study only if major state funding is involved.

- Item: Consuming 90,000 tons of ore per day, a synfuels plant would be a prodigious consumer of land. Though Governor James B. Hunt, Jr. has often spoke of the need for land use planning as a means to preserve prime farm land, the Governor has not submitted legislation for statewide land use planning and no such legislation is on the horizon.

- Item: Although competition for water has become a rising issue in North Carolina — affecting the politics and future growth potential of cities including Greensboro, Southern Pines, Durham and Chapel Hill — the state does not have a practical way to fairly allocate water among competing users. According to John Wray, chief of water planning for the Environmental Management Division, "Anyone can withdraw any amount of water they want to without any permit." The exception is the water user in a "capacity use area," a legal creature born of the Water Use Act of 1967. The Act is so cumbersome to implement that Wray says it is "not practical to use." Only one capacity use area has ever been designated in North Carolina, and the reason is not a plentitude of water but a fear of red tape. Wray says he personally would like to see legislation that requires that all large users first obtain a state permit. This would give the state the power to impose conditions or to deny large water withdrawals if they would pose a hardship on other users. Such law, common in the West, does not yet exist in North Carolina.

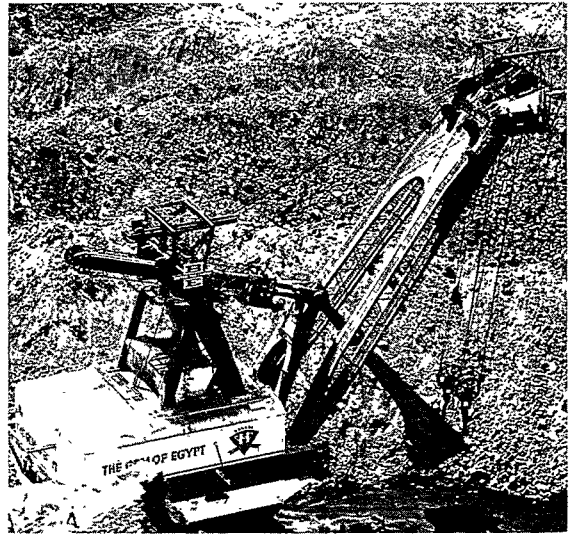
State law would not leave us totally unprotected from environmental hazards. Although he feels strip mining highlights the need for land use planning, the Attorney General's environmental law expert, William Raney, believes the state does have a respectable strip mine reclamation law in the Mining Act of 1971. Some other environmental problems besides reclamation might be dealt with by the patchwork of state and federal pollution regulations.

But until the state has better development policy than is now on the books, the possibility of

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shale mining will be greeted by legitimate fears and perhaps strong opposition.

Milton Heath, an environmental policy expert of UNC's Institute of Government, is among those who understand development issues and know the gaps in state development policy. Told that there may be a major reserve of oil shale in North Carolina, Heath replied, "Oh no!"

If North Carolina's shale oil doesn't pan out — which is quite possible — this does not mean that the development policy issues raised by shale strip mining are academic. Shale oil is only one of several new mining possibilities for the state, and others raise equally profound environmental problems. In a May, 1978 speech at an energy symposium in Raleigh, Dennison reported that around 20 companies were prospecting for uranium in North Carolina. "I expect commercial uranium production . . . within ten years," he said. Uranium production, as with oil shale, would be through strip mining. □

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### **Fred Harwell Is New Center Director**

Fred R. Harwell, Jr., an associate director of the Center since 1978, became Executive Director on October 15. Harwell is a native of Washington, N.C. and a graduate of the University of North Carolina at Chapel Hill with degrees in law and journalism. He succeeded Mercer Doty, who had been the director since July, 1978.

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