The Synfuels Shopping List

With the fading of commercial interest in synfuels, the federal government must choose from a variety of money-losing concepts

This Administration never had much enthusiasm for pumping $15 billion in federal aid into the synthetic oil and gas business. Now, with the 1984 deficit about to surge over $200 billion and OPEC in abeyance, it has become harder to justify the subsidy program of the Synthetic Fuels Corporation (SFC). Thus, in October, the Department of Energy (DOE), through the assistant secretary for fossil energy, Jan Mares, told Congress that there would be no need to add to the $15 billion given the SFC in 1980. (The original plan was to give the SFC another $68 billion in 1984.)

Since October, the expected deficit has grown larger and the SFC's future has grown darker. Officials have begun to talk about cutting back its authority and closing up shop in 1984. A *Wall Street Journal* story on 19 December speculated that the SFC budget may be cut by one-third and that no more than five or six commercial-scale synfuel plants will be built. Mares and SFC officials have been unwilling to confirm this, except to say that an early phase-out will be among the issues discussed at an SFC board meeting in Washington on 5 January.

According to the present schedule, the board is to decide on a number of tar sands, heavy oil, and eastern shale proposals by February and then finish work on coal projects in April. These could mark the close of the SFC's agenda.

If this happens, it will not upset the SFC's chairman, Edward Noble. A skeptic from the start, he has said often that it is better to be too cautious than too adventurous in spending tax money. As the oil market declined, it became clear that the SFC's subsidies would produce only a handful of model plants.

Under Noble, the SFC set out in 1981 to operate like a bank, simply responding to industry proposals. It seemed possible that the SFC might live up to its plan, using federal funds only to stimulate other investors and not spending much money itself. The SFC began slowly, making one big award early, to a shale project in Colorado (Colony Oil Shale) sponsored by Exxon and Tosco. Within months, however, Exxon realized that construction costs were doubling, and in May 1982 it backed out. The money was returned to the government. A chill settled on the industry. The SFC tried to rekindle corporate interest with an "outreach" program and with "targeted solicitations," promising awards to anyone who came up with the best proposal in several categories.

Despite these efforts, more synfuel ventures died in 1982 and 1983. Among the casualties were the Wycoal Gas Project in Wyoming, the Hampshire coal-to-gasoline project in Wyoming (backed by Sohio), the Breckinridge coal liquefaction project in Kentucky (backed by Ashland Oil), and a combined cycle coal gasification project in Massachusetts known as the New England Energy Park Project. In July 1983 Westinghouse said it was ready to sell its synthetic fuels division, its greatest asset being an advanced coal gasification technology. The Santa Rosa tar sands project, a small venture in New Mexico that won an SFC letter of intent to grant aid, fell apart in the fall of 1983 and withdrew from the field. In addition, projects that once seemed to be operating on solid ground found themselves in trouble and came to the SFC for help.

In this way the SFC has changed from a bank into something more aggressive, a direct funding agency with the power to promote a variety of money-losing concepts. Commercial viability is no longer a test of merit, so the SFC stresses other criteria. Above all, the SFC favors technologies that turn solids to liquids, for Noble sees America's oil scarcity as its greatest weakness and its coal abundance as its greatest strength. Second, the SFC aims at diversity. Noble said in hearings on 5 October before the House subcommittee on fossil and synthetic fuels, "Our goal is . . . to support pioneer projects in each of the major resource areas, allowing industry to choose which are the preferred technologies for each resource." Because coal is America's largest resource, the largest amount, $7.6 billion, has been set aside for projects in this category. Nearly $5 billion has been earmarked for oil shale, and $1.6 billion for tar sands and heavy oil. Although the shales and sands make up a smaller resource, they are attractive because they appear to be the cheapest to convert to oil substitutes.

Mares said during the same hearing that the government no longer wants to build capacity, but wants capability instead: the SFC will support "a very limited, diverse number of first-of-a-kind, commercial synthetic fuels plants" in order to provide a "technical basis for an orderly, economic transition toward large-scale synfuel production capacity if and when future market conditions dictate."

What, then, is the synfuels program buying, and what is it leaving behind? For reasons based more in politics than technology, the SFC may give more help to its first child, the Great Plains Coal Gasification project in North Dakota, which was launched with a loan from the DOE. Noble opposes giving it a price guarantee, but he may be reversed. The gasifier design in this case (Lurgi) is essentially of 1930 vintage. By supporting Great Plains the government helps sustain the synfuels infrastructure that Mares often talks about, a cadre of experts, but it does little else. Better gasifiers have been designed and are now in commercial use elsewhere.

For example, the Cool Water project in California, smaller than Great Plains but likewise uneconomic, employs a second-generation gasifier developed by Texaco. Built as an electric power R & D project, it won $120 million to keep running last summer when one of the sponsors threatened to back out. The system uses a more sophisticated coal feeding device, an "entrained bed," and achieves greater efficiency. The same gasifier is used by the Eastman Kodak chemicals plant in Kingsport, Tennessee, to make methanol from coal. Ironically, this truly commercial plant was built with no help from the federal government. Kodak intended to make a process chemical, acetic anhydride, but synfuel tax breaks have made it more profitable to sell methanol in Ohio as a gasoline octane booster.

Methanol from coal, a promising synfuel, represents an important path not followed by the SFC. Because methanol is a liquid that burns easily and cleanly in combustion engines, it would seem a natural for SFC support. But it is cheaper now to make methanol from natural gas, and the methanol market is glutted. Furthermore, the U.S. automobile, fuel transport, and gasoline marketing systems are not equipped to accept this new fuel without expensive modifications. Thus, the SFC has not yet promoted any large-scale coal-to-methanol projects.

But one major proposal in this category, the North Alabama Coal Gasification Consortium, promising 14,000 barrels of methanol a day in the late 1980's, awaits a review by the SFC in the spring.

By far the largest chunk of funds committed by the SFC has gone into one company's shale-retorting technology. Of around $5.6 billion committed or promised by letter to investors since 1981, around $4.8 billion has gone to two Colorado shale projects (the Union mine in Parachute Creek and the joint Occidental-Tenneco Cathedral Bluffs project), both using an above-ground retort developed by Union. Underground in situ retorting, once considered the bright hope of the shale industry because it was expected to be more efficient, has not been used in any large-scale projects. But one small project (Seep Ridge, in Utah, sponsored by Geokinetics) has been promised $45 million in SFC aid for a 1000-barrel-a-day pilot project using an in situ process.

Union originally won a price support and a purchase commitment from the Carter Administration to develop a 10,000-barrel-a-day plant in Parachute Creek. The SFC picked up this commitment, which set the price guarantee at around $45 a barrel. The oil was supposed to begin flowing in late 1983, but mechanical problems have developed. In the same week that Union announced the delay, it won a new price guarantee from the SFC to expand production by 40,000 barrels a day. Reflecting harsh experience, however, the new price was set at between $60 and $67 a barrel. With conventional oil selling at $29 a barrel, the agreement illustrates how uncompetitive the cheapest synfuel is.

In addition to these, the SFC has tentatively promised $465 million to a controversial peat-to-methanol project in South Carolina that faces strong environmental opposition; $47 million to a field refining plant for heavy oil in California; and $77 million to another California project using a proprietary steam-drive process to recover heavy oil. Each of these will produce less than 10,000 barrels of product daily.

Thus the SFC saved the hardest decisions for last. In the next few months it will have to decide just how adventurous it will be in promoting far riskier but, by its own definition, more important coal conversion projects.—ELIOT MARSHALL

National Science Board Rethinks Charter

NSB seeks to improve performance as policy board for NSF, also find ways to contribute to national science policy

On paper, the National Science Board (NSB) is accorded a powerful voice in U.S. scientific affairs. The charter of the National Science Foundation (NSF) gives the NSB the statutory responsibility not only of setting policy for NSF, but also of helping to make national science policy.* But just how it should discharge its broader responsibilities has never been clear, and its voice has consequently been muted. However, under its current chairman, Lewis M. Branscomb, the board has cautiously been trying to find a niche for itself in national science policy-making. So far, its efforts have met with mixed results.

Like its antecedants, the current board expends most of its effort in overseeing NSF. In fact, the board has never ventured very far into the science policy arena. In the foundation's early days it was judged imprudent for a fledgling agency to try to dictate to larger agencies with which it was in competition for funds. Later, Congress often egged on the board to take the lead on national science policy questions, but the Office of Management and Budget and the Office of Science and Technology Policy (OSTP) in the White House have by and large been cool to such initiative. An exception was President Carter's OSTP director and science adviser, Frank Press, who urged the board to involve itself in broad science policy matters. However, the current science adviser, George A. Keyworth, II, made clear from the start that he thought NSB should do a better job of minding its own business, which did not include global science policy.

Under these circumstances, it is not surprising that the board has proceeded cautiously and avoided actions that might provoke the Administration. Nonetheless Branscomb, IBM vice president and chief scientist, has led the board through a systematic consideration of its role and mission.

"Where we came out," says Branscomb, "is that the first priority was indeed to set policy for the foundation. Second, the board did have a responsibility to deal with the issues in their full national context." He emphasizes that the board feels that "we should limit ourselves to those national issues in which NSF has a significant stake. For example, I don't think we should try to invent a post-shuttle space strategy or create a breeder-reactor strategy."

Branscomb indicated that he saw the recent report of the board's Commission of Precollege Education in Mathematics, Science and Technology as a prime affirmation of the NSB formula. "I see the value of having taken an issue and dealt with it in its full context as a means of understanding what our piece of it should be in the foundation." He also is confident that the report, whose focus is much broader than NSF's program, will help other government agencies and nongovernment groups "to find an education strategy in general."

Other issues with which NSB is currently concerned that have obvious implications beyond NSF are international science, the problem of adequate access to computing for researchers, and the dissemination of science information.

Certainly, in essaying a broader policy role the board has not courted controversy nor challenged the Administration. For example, a proposal for establishing a Department of International Trade and Industry by a reorganization of the Department of Commerce would have significantly affected NSF; the NSB response was almost inaudibly low key. Under the proposal originating in the Senate and endorsed by President Reagan, the National Bureau of Standards and other technical agencies in Commerce would have been merged with NSF. The matter came up at the board's August meeting in a discussion that revealed a wide range of attitudes. Later, in a letter written in response to a request by House science subcommittee chairman Representative Doug Walgren

*In the latter case the charter says, "The board and the Director shall recommend and encourage the pursuit of national policies for the promotion of basic research and education in the sciences."