Reincarnation of Zimmer: Is it worth the price?

The decision to switch from nuclear to coal fuel at the Wm. H. Zimmer Power Station near Cincinnati has not ended the controversy. While the anti-nuke protestors have been quieted, there still are some tough questions to be answered.

By Lynn Wasnak

Twenty-nine miles east of Cincinnati on U.S. route 52, just outside the corporation limits of Moscow, Ohio, Sunday drivers come upon the gigantic still life in blue and grayish white known as the Wm. H. Zimmer Power Station. Viewed from the west, it sits majestically atop a steep embankment on the right side of the road. The site is deceptively peaceful and serene, framed this bright autumn day by blue skies and a hillside scattering of goldenrod and wild sunflowers.

From across the wooded hills, a line of enormous steel electric power transmission towers bear down on the complex, ready to convey Zimmer's energy—when it's finally produced in the 1990's—to the service areas of all three partners in the plant. These include The Cincinnati Gas & Electric Co., which owns 46.5 percent of the project; Dayton Power & Light Col, which owns 28.1 percent; and Columbus and Southern Ohio Electric Col, a subsidiary of American Electric Power Co., which owns the remaining 25.4 percent.

This visible Zimmer plant is Zimmer in its first incarnation—a nuclear-powered electric generating plant that was halted when construction was 97 percent complete. But since January 1984, plans are moving ahead for a reincarnated, rejuvenated Zimmer Power Station, fired by coal. It will be bigger, producing 1,300 megawatts instead of the 800 megawatt nuclear design. It will be environmentally sound, fitted with state-of-the-art scrubbers to remove sulfur dioxide from the 3.5 million tons of Ohio coal a year that will fuel its boiler.

It will utilize the already-constructed cooling tower to prevent hot water from upsetting nature's balance in the nearby Ohio River. In addition to the cooling tower, the station will use a substantial portion of the existing nuclear plant's equipment, including its low-pressure turbines and generator. American Electric Power Co., parent of Columbus and Southern Ohio Electric Co., and probably the world's most experienced builder of 1,300 megawatt, coal-fired plants, is responsible for the design, construction management, and operator training at Zimmer. AEP is also furnishing some of the components.

Total estimated cost of the conversion is $1.7 billion.

Zimmer's History

The Wm. H. Zimmer Nuclear Power Station was born in 1969, in the days when Ohio's economic growth was spiralling upwards at a steady 7 percent per annum. Those were the halcyon days, before the accident at Three Mile Island. When the Zimmer partnership first broke ground, nuclear power was viewed by many as Good rather than Evil and there were "only" 71 volumes of regulations imposed by the Nuclear Regulatory Commission (NRC) to guide utility companies in their construction of nuclear plants. Zimmer's cost originally was pegged at $230 million.

Public criticism and scrutiny of nuclear facilities escalated sharply following the Three Mile Island debacle in 1979. Instead of being considered a progressive, cost-efficient source of electric energy, "nuclear power" became a pariah. Nuclear units all over the country, including Zimmer, faced serious delays, cost overruns and the ire of rate payers. At the same time, economic disasters wreaked havoc among Ohio's industrial electric customers. Power demand took a nosedive.

Consumer groups in Ohio and elsewhere blamed utilities for botching the work. In turn, the utilities blamed the NRC and the fates. Questions raised during this period will keep attorneys on all sides gainfully employed for many years. But one fact is indisputable: as it stumbled over itself to prevent any recurrences of the Three Mile Island problems, the NRC revised its regulations over and over again. By 1984, this process had resulted in a jump from 71 volumes to more than 120 volumes of increasingly rigid construction and operation guidelines. As guidelines changed, components of Zimmer had to be removed, redesigned and replaced—once, twice, or three times. Each revision was costly in terms of time and money. And utility management had no way to guess where the next new regulation would impact.

By January 1984, Zimmer's costs had ballooned to $1.7 billion and the plant was years behind schedule. Quality assurance issues had plagued the plant. After numerous hearings, Zimmer was shut down by the NRC for alleged safety infractions when it was 97 percent complete.

Financing any nuclear plant in 1984 is a dubious undertaking. The partners were painfully aware that investors took a jaundiced view of the Zimmer situation. The price tag to complete the remaining 3 percent of construction and meet new NRC standards was more than $3 billion on top of the previous spending. And even if the Zimmer plant could have been finished as a safe, efficient, nuclear-fueled facility (which to this date, all the partners staunchly maintain is true) there was no guarantee the NRC would license the plant at this point.

Like its notorious predecessor, the new Zimmer has been a subject of considerable discussion. After all, no utility in the country has ever attempted to convert a nuclear facility to coal. Before the technical details were released, some engineers maintained it was impossible—that a nuclear plant was designed to operate at much lower heats and pressures than its fossil-fueled brothers. They believed the end result would be inefficient and cost-prohibitive. Several Ohio consumer groups, while cheering the demise of the nuclear-powered Zimmer, seem reluctant to end their involvement in the question. The public has paid close attention to the pronouncements of these groups, most notably the Ohio Consumer's Counsel, led by William E. Spratley. Some of the most pointed questions follow, with answers from those sitting in the hot seat of power—the Zimmer partners themselves.

Q: Do the utilities involved really need another source of generated power?

The facets of this question include: If we needed the power, how have the utilities managed to get by during the repeated Zimmer delays? How accurate are the utilities' load projections? Isn't Ohio's demand for electricity dropping, as our heavy industrial base erodes?

In answer to the primary question, spokesmen from all the Zimmer partners—C&SOE, DP&L, and CG&E issue a resounding "Yes. We need the power."

True, the demand for electricity is not what it used to be, and that's what has saved the Zimmer partners from a crisis due to delays. With the possible exception of a few devoted Chambers of Commerce members, few Ohioans expect a return to the annual growth rate of 7 percent-plus we

once enjoyed. But as CG&E's W.D. Waymire, manager of the general engineering department says, "I certainly don't think anyone in this area is anticipating zero growth." CG&E's load forecasting is based on an annual growth rate of about 2 percent for its service area. Applying that modest figure, it expects additional capacity to be required by 1987, in order to maintain the necessary reserve margin of 20 percent.

Reserves Needed.

The partners stress the necessity of generating adequate reserves to provide reliable power during routine maintenance procedures and unforeseen mechanical or weather conditions. As much as 300 megawatts per year can be considered weather-sensitive where air-conditioning is prevalent, as it is in southern Ohio. "We are definitely looking at increased loads on our system," says John Brennan, senior vice president of American Electric Power Service Corp., adding that predicting power usage is as difficult as predicting interest rates. "Those people who criticize us for having too much power will be the first ones to criticize us if we don't have enough."

The coal-fired Zimmer unit is expected to begin producing power in 1991. Thus there will be a four-year lag time when CG&E and DP&L will need to purchase power to maintain suitable reserve capacity. Short-term purchased power is certainly part of the Zimmer plan, at least for these two participants.

Q:Is coal-conversion of Zimmer the least-costly alternative to obtaining needed power? If some power can be purchased at reasonable rates, why not all of it? What about other alternatives, like co-generation or energy conservation? And wouldn't it be cheaper just to abandon Zimmer altogether and revive closed plants or build a new, perhaps smaller coal-fired plant from scratch?

Of these issues, perhaps the strongest arguments are made against the exclusive purchase of power. Its biggest drawback is uncertain supply. "If someone has a plant that's not fully utilized, they may make you a short-term deal at an attractive price," says Waymire. "But to provide reliable energy to customers, you'd need a long-term contract." The suppliers would then build a facility and charge a profit on the power it sold...certainly not a low-cost option. Since power is offered for sale only when the generating plants' local service area doesn't need it, availability cold—and probably will—change.

Because very little power plant construction is going on at this time, the utilities express doubt that much excess power will be available in the 1990s, as growth continues and old plants are phased out. Relying on purchased power for the long haul could retard economic growth of the area, as business owners prefer to locate and expand where sufficient power is produced.

Co-generating is an option practiced largely on the East and West coasts, where fuel oil is used extensively, and expensively, by utilities. There, it makes sense for an industrial customer that needs steam for its process to also produce steam for electricity. In Ohio, there's not much interest in co-generation, since electric power costs are comparatively low, and our primary fuel is inexpensive coal. Lacking a strong economic incentive, Ohio companies prefer to leave power generating up to the utilities, according to Waymire.

Energy conservation, another alternative suggested by consumer groups to reduce the need for power, is likely to continue. But the utilities believe the biggest impact of conservation has already been made, and is in fact partly responsible for the drop in demand for electricity shown across the state in the last few years. Industrial consumers have practiced intense conservation

for at least the last five, or even ten, years. Residential consumers, who represent about a third of the demand requirement for electric power, are unreliable conservationists. According to Alan Haskell, director of generation planning at CG&E, "People will conserve all year long until about the third or fourth day of a real hot spell. Then they will all decide in unison that they have paid their dues, and they will all switch on. We still have to serve that peak day."

Wattage Needed

A smaller coal-fired plant would be impractical, say the partners, because they need the full benefit of the 1,300 megawatt unit to satisfy power requirements. Current agreements among the partners make it unrealistic for the individual utilities to go off on their own and build separate units, even if financing would be obtainable. And that is doubtful, since the investment community would take a dim view of the companies' finances, particularly at CG&E, if Zimmer were scuttled altogether.

Permitting for a new plant would take at minimum an additional two years more than the conversion, they say. Besides, the switch to coal recycles many existing parts of the nuclear Zimmer. Those components, such as the low-pressure turbines and generator, would have to be added to the cost of a comparable 1,300-megawatt unit built from scratch. And Zimmer is also set up with transmission lines. Says Waymire," It's turning out these days to be as difficult to obtain siting for transmission lines as it is power plants."

Q:But what about the technical feasibility? Can a nuke plant be transformed into coal? Will it work? Will it be efficient? How do you know for sure?

Robert Buerger, vice president of DP&L, recognizes the importance of this frequent question. Because of his background in engineering, many people ask him what's the toughest part of converting the plant. "I say, 'it's changing everyone's perception that it can't be done'. It's not an engineering problem as much as it is a people problem."

Buerger has made a habit of calling all sources mentioned in the media who express doubts about the conversion's feasibility. "At times people have economic questions, but I've never found anyone who said it was not technically feasible."

David Kettler is project manager for Ebasco Services of New York, which performed studies of various coal-fired alternatives for the Zimmer partnership. He counters the suggestion that the conversion is a new, untried experiment by saying, "It is the application of existing technology to a new circumstance, but there is no new technology applied to the situation."

The new Zimmer configuration will be essentially the same as AEP's highly efficient coal-fired 1,300 Mountaineer Plant in West Virginia, the only exception being Zimmer's addition of scrubbers to the generating complex. AEP has completed four such units at various sites, and two more are under construction. This proven design features heat-conversion efficiencies that are better than the average for each of the three Zimmer partners. Its availability and heat rates are said to be among the best in the world.

Some critics have questioned the vulnerability of the topping turbine, an essential part of the coal-conversion that permits the use of high-temperature, high-pressure steam in what was originally designed to be a low-temperature, low-pressure system. Kettler says the topping turbine serves the same function as the high-pressure and reheat turbine in a standard fossil-fueled system. It should be no more vulnerable to mechanical failure than any other turbine of its

type, and states, "In any coal-fired unit, a failure of any of the turbine components would take it off-line," so a scratch-built plant would be equally vulnerable.

"We are extremely fortunate that the original Zimmer design was not larger than 800 megawatts," says AEP's Brennan. "The size just happens to match our low-pressure unit." If Zimmer had been larger, it would have required two boilers and two topping turbines, making the project far more costly than the single boiler and topping turbine now required.

Adds Kettler, "The concept of a topping turbine is not unusual. The heat generator is of proven design. The engine clean-up system and coal-handling system is not unusual. There is not an unusual component or newly designed component in the Zimmer plant. There's no logical reason to say that these components configured somewhat differently than before, will not operate."

Q: OK. Say the power is needed; that coal-conversion is the least-costly alternative and the plant will operate efficiently, once it's built. What about costs? Tack the $1.7 billion cited for conversion onto the $1.7 already spent for the nuclear portion of Zimmer. That's $3.4 billion—a lot of money. Who's going to pay for it? Who will decide who should pay for it, and when?

Money has been an issue at Zimmer since the first delays and redesign and replacement of equipment began years ago. There is no way to sweep the cost of Zimmer in its nuclear phase under the rug, and no one is trying to do so. The nuclear components that cannot be utilized in the conversion, and that portion of the project that has been called "mismanagement" by some, have yet to be determined or quantified. The Public Utilities Commission of Ohio (PUCO) is currently engaged in an attempt to quantify such items so they aren't charged to the customer at some future time.

PUCO Probe

One report has been filed by O'Brien-Kreitzberg & Associates, a consulting firm hired by PUCO. Its opinion—that $1.3 billion of the $1.7 billion in Zimmer construction costs was attributable to mismanagement—has been sharply challenged by the utilities who call the report, "simplistic," and say the consultants did not satisfy the requirements for the study set out by the PUCO. And in fact, PUCO spokesman Todd Ambs says that the figures cited in the report are being "considered" by PUCO, but that they are not binding, and PUCO's ultimate decision could differ substantially.

PUCO will hold special hearings this fall and winter to target mismanagement costs.

Another agency, the Ohio Power Siting Board, will not be a factor in Zimmer's conversion. Despite arguments it should take jurisdiction to ensure customers are not paying for an unneeded plant, the board decided in September not to oversee conversion. The board said it did not have jurisdiction because construction was started in 1972, before the board was created.

No construction costs of Zimmer are currently being included in the rates of any of the participating utilities. (Customers have paid about $189 million for Zimmer via construction work in progress (CWIP) assessments, but the PUCO removed that element from the rate base when Zimmer's construction was halted in '83, and some of that money has been refunded.)

Also the Zimmer partners have brought a lawsuit against General Electric Co. and Sargent & Lundy Engineers, claiming defects in the nuclear steam-supply system and the Mark II containment (a steel-lined concrete structure that includes the reactor and steam piping) as

designed and constructed for Zimmer. Damages of $400 million or more may be awarded if the suit is successful, and would revert back to the companies and their shareholders.

So the nuclear cost of Zimmer is currently in the hands of the regulators and the courts...and will probably be there for years to come.

As for the coal-conversion costs, during the two-to three-year term while construction permits are obtained, the companies expect to restrict financing to internal sources and possibly short-term borrowing. The mood of Wall Street analysts appears to be improving, since technical details of the conversion were revealed. Standard & Poor's recently raised the bond ratings of all the Zimmer participants, and Moody's investment Service announced it was reviewing their financial status, pending a future change. Kendrick T. Kelly, electric utility analyst for Moody's, says "AEP is highly regarded nationwide and worldwide for engineering expertise. The fact that it will run the Zimmer conversion operation lends considerable credibility to the project."

Stock prices for the companies, which eroded during the nuclear phase, are also moving up. "We see a turnaround and a positive improvement in our image," says Waymire.

Obviously, customer rates will go up eventually. AEP says Zimmer represents only 1 percent of its total system in generating capacity. Even though its financial exposure is greater than that, it doesn't anticipate a radical rate change. CG&E can't give exact figures because so many factors will affect a rate decision, but its current projections show an average annual increase of about 1 or 2 percent over the consumer price index.

Perhaps the entire discussion of Zimmer centers on trust: can the Ohio public trust the decisions and skills of the utility management? The question has been raised repeatedly in the public forum. Buerger of DP&L answers it this way: "One of the repsonsibilities we have, like it or not, is to plan on energy needs for our customers. It's real easy when someone takes the time and effort to make a good plan, for someone else to find out what's wrong and criticize it. I always encourage people who tend to be that way by saying 'Fine. Make a better plan and bring it forward.' But that never seems to happen."

Not long ago there was a flurry of attention in the media concerning a possible name change for the Wm.H. Zimmer Power Station. Waymire confirms the internal discussion at CG&E, but says no conclusions were reached. "I think the general feeling is that we're going to take this liability and turn it into an asset. And that the name 'Zimmer' at some point in time will be very favorably looked upon."

If it works they could call the power station "Phoenix Rising."

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