How Volcker and the investment banks have strangled nuclear-power financing

by Lydia Dittler Schulman

Over the last several months, the U.S. nuclear industry has been under siege—not by outright environmentalists but by gentlemen from Wall Street who are pulling in the credit lines to nuclear utilities.

It is now the policy among the underwriters of utility bonds *not* to lend for the construction of new nuclear plants. Beyond this, major underwriters like Merrill Lynch and Salomon Brothers are intervening to cancel bond sales, thus cancelling plant construction, with the rationale of revised lower projections for electricity demand, and escalating construction costs.

This policy is reinforced through the downgrading of utilities' bond ratings (especially those with nuclear projects in progress); by a general sell-off of utility bonds, which pushed yields on Aa-rated utilities above 17.5 percent in late August; and in some cases, by an outright refusal of underwriters to arrange new bond sales needed to complete projects. The results of this financial warfare have been devastating for an industry historically about two-thirds dependent on external sources of funds for its enormous capital projects.

Merrill Lynch signaled the recent financial onslaught against nuclear power with a March report that singled out 18 plants as "good candidates" for cancellation. The report serenely concluded that the financial position of the parent utilities, investor-owned companies, would benefit greatly from the early termination of their nuclear projects.

Boston Edison's Pilgrim-2, one of the plants on the Merill Lynch "hit list," was canceled Sept. 24, for financial reasons; the utility cited the escalation of the plant's projected cost from the initial estimate of $400 million to close to $4 billion.

The completion of a second plant on the list, Niagara Mohawk Power's Nine Mile Point-2, is being challenged by the New York State Consumer Protection Board and State Attorney General Robert Abrams, who claim that the upstate New York plant is no longer cost-effective and that the power it was intended to supply can be imported more cheaply from Canada.

In July, Merrill Lynch helped along the demise of two other nuclear plants, units 4 and 5 of Washington Public Power Supply System (WPPSS), the nation's largest municipal utility and an issuer of tax-exempt bonds. Merrill Lynch issued a second report that questioned whether WPPSS would be able to continue to finance the units, projected to cost $6 billion apiece.

Moody's then dropped the rating on units 4 and 5 two full grades to "Baa1," and in August, Salomon Brothers, the lead underwriter of the bonds, stepped in with an ultimatum to WPPSS: the utility group either had to agree to pay back the interest and principal on the bonds early, or cancel the two units. The first option—repayment long before the plants were to start generating electricity and revenues—was clearly impossible. And on Sept. 25, the directors of WPPSS ordered the two units "mothballed" until the spring of 1983, at which time their financial viability would be reviewed.

In mid-October, the Michigan State Appeals Court finally allowed issuance of bonds for Detroit Edison's Enrico Fermi-2 unit and Consumers Power's Midland Nuclear plant. Both utilities had been temporarily enjoined from issuing new securities needed to complete the units, as a result of the intervention of Michigan State Attorney Frank Kelley, and the Michigan Citizens Lobby, an anti-nuclear consumer activist group. The opponents of the plants argued that the units were not cost-effective and that there would not be sufficient future demand to warrant their completion. In this case, fortunately, the court disagreed.

Potentially dozens more plants could be the casualties of the Federal Reserve's high interest rate regime and related forms of financial warfare. The record high interest rates are responsible for the latest escalation in plant construction costs, presenting the appearance that nuclear power can no longer be cost-justified.

High interest rates, capital formation, and the utilities

The vulnerability of the electric utilities to the Fed-

eral Reserve's usury is primarily due to their highly capital-intensive nature. This capital intensity and the utilities' high rate of capital investment was previously the source of their strength as an industry. Through the early 1970s, when industries like steel and machine tools had already slipped into technological obsolescence because of cumulative disinvestment, the electric utilities were still investing heavily and were bringing on a new generation of highly efficient, low-cost nuclear installations. Even today electric utilities account for about 30 percent of U.S. capital investment.

The electric utilities played and will always play a special, strategic role in the economy because electricity costs affect every other sector. Conversely, the current threat to the electric utilities is not a matter of concern to that sector alone; it means rising electricity rates (for the first time in this century), power blackouts, and the exacerbation of the basic problem of the U.S. economy—technological obsolescence.

The current plight of the electric utilities, it must be stressed, encapsulates the predicament of all capital-intensive industry. High-priced credit draws funds out of long-term capital investment into quick-profit speculative areas; the condition of the utilities is merely an extreme case of this problem because of their high degree of dependence on external sources of capital, and the long lead-times now the rule for nuclear construction.

According to estimates from the Edison Electric Institute, $18 billion, or 65 percent of the capital requirements of the electric utilities in 1981, will be provided by external sources of funds: approximately $10 billion from long-term debt issues, $5.5 billion from sales of common stock, and $2.5 billion from preferred stock.

Consider also the fact that a utility building a nuclear plant is now required to finance and spend $2 to $6 billion (in current dollars) over a 14-year period, before realizing the first dollar of revenue from the project.

Financial entities have been sensitive to the problem insofar as it has affected the so-called fixed-charge coverage ratios—the bondholder's guarantee that there will be sufficient revenues to pay him back. The sharp rise in interest costs, on top of other cost increases, has gnawed down these interest coverage ratios. After-tax earnings of the investor-owned utilities declined to an estimated 2.11 times interest charges in 1981, from 2.43 in 1972.

This deterioration in turn has largely been responsible for the downgrading of utility securities (once considered "as good as gold"). In 1980, Standard & Poor's downgraded the bond ratings of 28 utilities, compared to 15 in 1979 and only 6 in 1973. The bond rating houses insist that they are not discriminating against nuclear power; heavily nuclear-oriented utilities are suffering more than others simply because they have large amounts of capital tied up in long-term projects generating no immediate revenue.

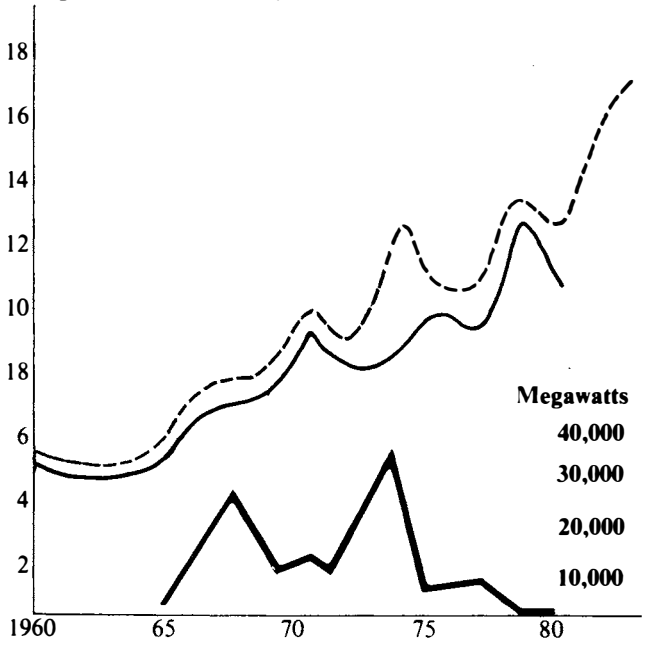
Other means of raising capital have been successively taken away from the utilities. Since the mid-1970s, the market price of utility common stocks has traded at a substantial discount to book value, currently at around 75 percent. During the 1974 credit crunch, many utilities were forced to sell large amounts of stock at substantial discounts from book value; and the new wave of credit austerity that began in October 1979 again forced utilities to plan record sales of equity in 1981. Such sales, however, lead to a dilution of the utility's overall book value, its earnings per share, and other indicators of its financial position, which are the basis for future borrowing.

Capital requirements

Wall Street's alarums about the steep financing requirements of the utilities might lead one to believe

Figure 3

Rate of U.S. nuclear power plant orders compared with utility bond rates



Source: Moody's; Atomic Industrial Forum

that the electric utilities have ambitious capital projects in the works. Capital expenditure plans have in truth fallen significantly below the level of replacing depreciated plant and equipment at today's inflated costs. The $18 billion in external capital requirements currently projected for 1981 compares with a total of about $14.8 billion in new money raised by the electric utilities from external sources in 1980. But this increase was more than accounted for by new requirements for pollution-control facilities (running about $1 billion a year) and the replacement of depreciated plants and equipment at inflated costs. (The inflation rate for the nuclear industry's producer goods is significantly above the general rate of inflation.)

Apparently the electric utilities are fast adjusting their spending plans to bring them in line with the shrunken prospect for raising new funds. A June 1981 survey of 85 electric utilities by *Public Utilities Fortnightly* found that the utilities' capital expenditures were budgeted to rise 7.7 percent in 1981, 3.8 percent in 1982, and a mere 0.8 percent in 1983 (in current dollars). By contrast, the industry's capital spending grew at an average rate of 13.5 percent a year during 1976-79, before slowing to 7.4 percent in 1980.

The cost of nuclear energy

Cancellations of U.S. nuclear plants are now being recommended on two grounds: that nuclear energy is no longer cost-effective, and that the outlook for reduced growth in electricity demand has rendered the plants unnecessary. Both points are as bogus as the safety arguments against nuclear power have always been.

The cost of constructing a nuclear plant in the United States has risen astronomically, especially in the last one to two years. However, the $4 to $6 billion per unit costs cited by the new "economy-conscious" opponents of nuclear power have nothing to do with the true *economic* cost of nuclear. They are the result of the conjunction of two *political* developments.

Those utilities with nuclear plants under construction at the time of the Three Mile Island incident in March 1979 found their projects caught in the ensuing regulatory morass, and found themselves in the situation of having to finance drawn-out construction and modifications at higher and higher financing costs. It is in this context that various utilities have been recently pressured by Wall Street and local consumer activists to cancel their long-stalled plants because they are no longer "economical."

Nuclear plants have traditionally required 20 to 30 percent more financing than coal-fired plants to build—a higher capital cost more than offset by the sharply lower fuel costs and higher density of nuclear power. But there exist no economic reasons why nuclear plants should be 70 percent more expensive than coal-fired units, as solar advocate Charles Komanoff and other anti-nuclear spokesmen insist. In fact, nuclear power has proven over and over again its cost-effectiveness, particularly in an inflationary environment in which fuel prices are subject to sudden escalation. *To argue from the current, politically inflated cost of constructing a nuclear plant in the United States that nuclear power is not cost-effective is tantamount to sabotaging the development of the cheapest and most efficient energy option the nation has.*

The effect of high interest rates

The extent to which interest rates are responsible for inflating the cost of nuclear power can be seen in the case of nuclear units 4 and 5 of Washington Public Power Supply System (WPPSS): These two units are now projected to cost about $12.1 billion, making them the most expensive nuclear power units in the country. However, interest charges on the long-term bonds issued to finance them will account for a full $8 billion of the project costs, or more than two-thirds.

Rates on the bonds have risen steadily from about 6 percent when the project began, to 11 to 12 percent currently. The five-unit WPPSS project of which units 4 and 5 are a part is now projected to cost $23.9 billion. It was only $4 billion when the project was started in the early 1970s. Last summer, Moody's Investor Service dropped the rating of units 4 and 5 two grades to Baa1, which will force yields on these bonds even higher and make financing increasingly difficult.

The WPPSS case is indicative of a larger trend. Fixed-interest charges, or what the industry calls embedded capital costs, have been taking an ever larger bite of utilities' earnings over the past decade. In long-term debt financing, interest expense is tax-deductible, reducing the effective cost of interest to the utility. However, over recent years the sharp rise in interest rates has raised the average effective interest rate from 5.1 percent in 1970 to an estimated 9.1 percent a decade later. Given the large sums involved in a nuclear project, *this increase has meant the difference between building or not building a new nuclear plant.*

A number of economists have pointed out that the cost of nuclear is overstated by an order of two to three by the standard methods of depreciating capital and financing costs used by the electric utilities. Commonly used straight-line depreciation methods, which spread the capital (including financing) cost equally over the lifetime of a given plant, tend to "front-load" the capital costs and revenue requirements in the early years of the plant's operation. But it should be noted that a change in accounting procedures would be helpful only to the extent that it encourages the rapid replacement of outmoded generating capacity with more efficient coal-

fired, conventional-nuclear, advanced-nuclear, and fusion-energy plants. Even though inflation may be appreciating the value of plant and equipment from a financial (replacement cost) standpoint, that plant and equipment is *depreciating* in physical terms no less rapidly.

The nuclear advantage

A sound estimate of the cost of generating electricity with coal-fired units, the only serious competitor to nuclear energy, is provided in a paper issued in December 1980 by Gordon R. Corey, financial consultant and retired vice-chairman of Commonwealth Edison Company of Chicago. The study, based on the company's experience in operating both types of power plants, showed unambiguously that nuclear-generated electricity is the cheaper form because of lower fuel costs and improvements in nuclear technology that have more than doubled the energy content derived from a metric ton of uranium over the last decade. The study also showed that, assuming continued double-digit inflation through the 1980s, the relative cheapness of nuclear over coal-generated electricity would increase because of the resistance of operating nuclear plants to inflation.

In 1979, actual "bus-bar" costs (the average cost of electricity delivered to the station bus before transformation, transmission, and distribution to customers) were 17.3 mills per kilowatt-hour (KwH) for the utility's nuclear units and 32.6 mills per KwH for its coal-fired units.

On average, coal-fired plants cost only two-thirds as much to construct as nuclear plants, but in the annual operating bill, the large fuel bill for the coal units outweighed amortized depreciation, interest, plus other carrying charges.

The nuclear units' uranium fuel costs, on the other hand, represented only a small portion of the cost of electricity production, giving nuclear its twofold edge despite higher construction costs. Moreover, the fivefold increase in yellow-cake prices and fourfold increase in enrichment costs over the previous decade and a half have been offset by technological advances which have made it possible to produce 36,000 megawatt-days of electricity per metric ton of uranium, compared with 12,000 to 15,000 (MWd/MT) 15 years ago.

But what about the relative costs of nuclear and coal plants in the future? Corey also made projections for plants coming on line in 1991-92. Assuming a 10 percent rate of cost escalation (for fuel, construction costs, etc.), he found that during the first 10 years of operation, nuclear-generated electricity would be 19 percent cheaper, and over the full service lifetime of the plants, it would be 36 percent cheaper. Because of their resistance to inflation, the cost advantage of the nuclear-generating units actually increased with higher inflation rates.

The second line of argument against nuclear power revolves around demand projections. The growth of electricity demand is now falling, the argument goes. Therefore, plans for adding new generating capacity should be cut back accordingly.

Such a course would in fact create the conditions for a permanent depression in the U.S. economy, robbing the economy of its motor for growth and technological change. Historically, the availability of cheap electricity, supplied increasingly by low-entropy nuclear power, laid the basis for economic growth in the United States—for rising standards of living and labor productivity, for declining costs of industrial processes, and for the introduction of increasingly energy-dense and capital-intensive forms of technology. This positive process is represented graphically in the correlation of the growth curves of electrical generating capacity and electricity consumption and the falling curve of per killowatt-hour electricity prices.

Interestingly, it was the availability of increasingly cheap electricity that created demand, not the other way around. It created demand in a non-linear way, and this in turn produced increasing revenues for the electric utility companies, enabling them to add new, more efficient generating capacity, and to bring down prices once again.

The historic trend came to an abrupt halt following the economic dislocations of 1973 caused by the quadrupling of world oil prices. The long-term growth rate of electricity demand dropped from a historic average of 7 percent per annum to 2.5 to 3.5 percent. The United States did not have sufficient inflation-resistant nuclear capacity on line to cushion the blow of the oil prices. The result was a reversal in the long-term secular decline in electricity prices and a slowdown in the growth of demand. In 1974 and 1975, total energy consumption dropped absolutely, and in 1980 it again dropped by an unprecedented 3.4 percent.

The Electric Power Research Institute (EPRI) expects total energy use in the United States to rise only 1.3 to 2.7 percent annually, assuming an annual economic growth rate (real GNP) of 2.5 to 3.5 percent. Edison Electric Institute data on electric power sales already show a striking downward trend in the growth rates of industrial, commercial, and residential purchases of electricity in the last two years.

By scaling plans for adding nuclear and overall electrical capacity back to current reduced growth projections (which are in fact a reflection of a *policy commitment* to sharply reduce economic and population growth rates), the country will soon be in the situation of not having the generating capacity on line to permit economic growth. Demand projections can fluctuate year to year; however, even under the best conditions, it will take 7 to 10 years to introduce new nuclear plants.