DOCKET NUMBER 50-537(E)

DOCKET NO. 50-537
STATEMENT OF CHARLES KOMANOFF*
PRESENTED TO THE NUCLEAR REGULATORY COMMISSION
ON JANUARY 18, 1982
IN OPPOSITION TO APPLICANTS' EXEMPTION REQUEST
UNDER 10 CFR §50.12

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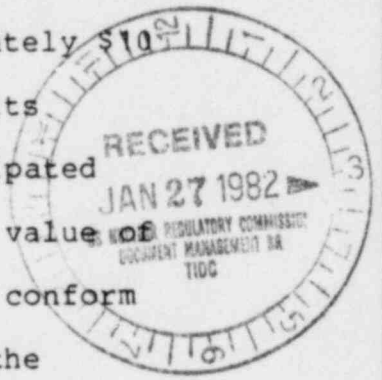
The Applicants contend that further delays in the construction of the Clinch River Breeder Reactor Plant (CRBRP) will result in additional costs of approximately $10 million per month. [1/] This estimate apparently results from a simplistic calculation based solely on anticipated inflation. It fails to take into account "the time value of money" -- the cost of raising and spending funds to conform with the expedited construction schedule sought by the Applicants. When the time value of money is properly taken into account, the purported costs of delay essentially disappear. Indeed, where (as here) the time value of money is greater than the anticipated inflation rate, delay may actually produce monetary benefits rather than costs.



Applicants' Estimate of The Cost of Delay

The SPAR contains no explanation or derivation of the Applicants' estimate that further project delays will cost $10 million per month. A companion document, entitled

*My qualifications are attached as Tab 1 to this Statement.

1/ See, for example, SPAR, pp. 0-1, 1-6.

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"Documentation Supporting the SPAR" (Attachment A to DOE letter to NRC Commissioners dated December 31, 1981), seeks to support the estimate by reference to the Atomic Safety and Licensing Board's acceptance of an analogous estimate of the costs of delay for a different facility -- the Shearon-Harris Nuclear Plant (see p. 15n). Through analogy to the Shearon-Harris plant, the Applicants apply an anticipated inflation factor of 8% per year to the current CRBRP cost estimate of approximately $3 billion, resulting in a cost of $240 million per year, or $20 million per month. For reasons not stated, the Applicants assume -- conservatively in this context -- only half of this cost, or $10 million per month.

The Fallacy in the Applicants' Estimate

In effect, the Applicants derive their estimate of the cost of delay by assuming that half of the ultimate expenditures for the project -- about $1.5 billion -- would be pushed back into the future by any delays and would increase in cost in proportion to the prevailing inflation rate. This is certainly true -- to the extent that delays cause any expenditures to be made later, inflation adds to their costs in actual, as-spent ("current") dollars.

However, this fact expresses only one side of the impacts of delay. The other offsetting side concerns the savings that would accrue to the Applicants from delay,

through postponement of the need to raise the funds to pay for construction.

Funds for construction of CRBRP will be raised primarily by the federal government. The cost of these funds to the federal government is measured by the interest rate on federal funds such as U.S. Treasury bonds and notes. This interest rate effectively determines the cost of financing federal expenditures. This is true not only when the federal budget is in a deficit situation, as it is today and is anticipated to remain for at least several more years, but also in surplus periods, during which the government routinely borrows to finance capital expenditures such as CRBRP.

The interest rate on long-term federal funds is currently approximately 14% (as indicated by the average yields of long-term U.S. Treasury bonds and notes as of January 6, 1982). At the same time, the Applicants anticipate that inflation will average 8% in the future. The current interest rate is, then, greater than the anticipated inflation rate. If the interest rate does exceed the actual inflation rate, the Applicants -- on the basis of their own assumptions -- would actually save money by deferring expenditures on the project. In effect, the Applicants could buy Treasury notes at 14% and, through income on these notes, earn more than enough to pay for the anticipated increase in costs contributed by inflation. Indeed, since the difference

between the current interest rate and the anticipated inflation rate is unusually high -- 6 percent -- the likely benefits of deferring construction activities are unusually large.

The foregoing may be rendered in more concrete terms by constructing a simplified numerical example. Assume, to comport with the Applicants' apparent methodology (in "Documentation Supporting the SPAR," op. cit., p. 15n), that $1.5 billion remains to be spent on the project. Assume further, for simplicity's sake, that the entire project could be built in one year, once the permitting process has been completed. Assume also that the inflation rate is constant at 8% per year beginning at the start of 1982, and, to be conservative, that the interest rate on Treasury borrowing is not 14% but 11%. (Interest rates on long term notes generally exceed the anticipated long term inflation rate by 3%.)

I will consider the costs of two alternatives: start of construction on 1-1-82 and completion on 12-31-82 (the expedited case), and start on 1-1-83 and completion on 12-31-83 (the one-year delay case). In the first case, the Treasury must borrow $1.5 billion during 1982 -- say on July 1, 1982 -- at 11% and pay annual interest costs of $165 million from 7-1-82 through 7-1-11 in the next century. In the second, the Treasury must borrow 8% more than $1.5 billion, or $1.62 billion -- to pay inflated wages and

prices. Again at 11% per year, the interest cost is $178.2 million per year, paid annually from 7-1-83 through 7-1-12.

The expedited alternative, requiring payments of $165 million per year, might appear at first glance to be less costly than the delay alternative, requiring $178.2 million per year. But there is one critical consideration cutting the other way: in the delay case, the Treasury need spend no money on interest until mid-1983, whereas in the expedited case the payments begin in mid-1982. Taking a discount rate of 11% (equal to the interest rate), it is actually cheaper to pay $178.2 million for 30 years starting next year than it is to pay $165 million for 30 years starting today. (The first interest payment for the expedited case has a cost of $165 million on 7-1-82; the present value to the same date (7-1-82) of the first interest payment for the delay case is $165 million x 1.08/1.11 (inflating at 8% and discounting at 11%), or $160.5 million -- $4.5 million less than the expedited case. Similarly for the succeeding payments.)

Although the foregoing example is a simplified case, especially in its assumption of a 1-year construction period, the same result obtains for a multi-year construction period. So long as the effective interest rate during the delay period exceeds the effective inflation rate on unexpended funds, the present value of the project cost will be less for the delay case than the expedited case.

Indeed, for expedited construction to confer a $10 million per month benefit, claimed by the Applicants, the inflation rate would need to exceed the interest rate by 8% -- a highly unlikely turn of events, considering, as noted above, that the inflation rate is generally less, by about 3%, than interest rates on long-term notes.

Possible Costs From Delay Appear Less Than the Benefits

For the assumptions used here -- 8% inflation, 11% interest, and both applied to $1.5 billion of CRBRP costs -- it can be shown that a 1-year deferral in construction actually creates a savings, in present value terms, on the order of $30 million. Against this benefit of a 1-year delay, three types of costs might be posited: forfeited (i.e., postponed) fuel cost savings from CRBRP; excess administrative and managerial costs during delay; and forfeited (postponed) accumulation of experience with the CRBRP. However, all of these costs appear to be either small relative to the saving from delay, or speculative.

A one-year delay in completion of CRBRP implies a one-year postponement in the substitution of inexpensive generation by the CRBRP for fossil generation on the TVA system. 1980 TVA fossil generation had incremental costs of approximately 1.5¢/kWh for fuel and 0.1¢/kWh for O&M. For CRBRP I ignore fuel processing and fabrication costs and

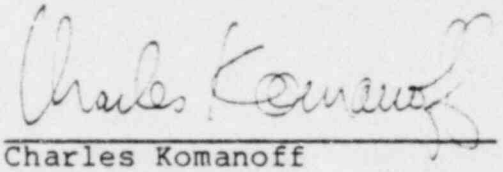
assume zero fuel costs. I also conservatively estimate O&M costs (in 1980 dollars) of 0.5¢/kWh -- the 1980 U.S. nuclear plant average. Assuming that coal costs escalate at 11% per year -- 3% faster than the inflation rate -- the inflation and discount rates are equal, allowing the 1980 value of replacement energy of 1.1¢/kWh (1.6¢ - 0.5¢) to serve as the replacement cost during the year of delay. Assuming a 60% capacity factor for the 350-MW CRBRP (the U.S. nuclear average to date, and probably high for a demonstration facility), the foregoing value of replacement energy is $20 million per year. This is not a small sum, but it is less than the $30 million present worth benefit from a year's delay noted above.

The second cost of delay is the cost to employ those managers, administrators and engineers who must be retained over the project's duration, including during any delays. This is concededly a non-zero cost, but its magnitude is totally speculative at this point, absent any estimate by the Applicants. Note also that this cost would plausibly be offset by improvements in design, engineering and construction afforded by findings emerging from ongoing breeder-related research and demonstration activities here and in other countries.

The same speculative quality adheres to the third possible cost of delay -- the postponement in the acquisition

of U.S. operating experience with breeder technologies. There is no valid way of estimating such cost with any precision. Further, there is no indication in Applicants' analysis that it outweighs the benefits of delay.

Finally, the speculative costs of delay may be more than offset by additional important benefits of adhering to the full licensing procedure -- ensuring protection of the environment, the public health and safety, and the common defense and security and enhancing public confidence in the integrity of the licensing process for nuclear power.



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