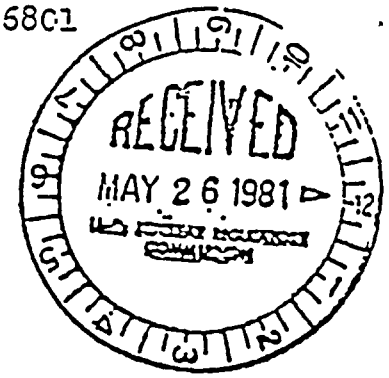
Box 1378
State College, Pa. 16801

May 22, 1981



Office of Nuclear Reactor Regulation
USNRC
Washington, DC 20555

ATTN: Director, Division of Licensing

Hello:

Attached is a copy of my comments on the Supplement #2 to the DES for Susquehanna 1 and 2. Dockets 50-387, 388.

The comments are divided into two parts. First come specific responses to specific claims I noted as I read the draft. Next is a longer treatment of the section dealing with estimated economic risk.

It is in this second section that I think the draft is at its worst. My analyses indicate that the draft's estimates are low by a factor of 100 to 150. These are the figures that affect the cost estimates for the plant.

If I didn't know better I would say that the draft's authors were consultants hired by the Applicant to shed the best possible light on the situation.

I firmly believe that this draft is so inadequate that it cannot serve as a final draft. As unpopular as it may be with the new wave coming from the Administration and the Hill, I urge the NRC to prepare a real draft, one that treats the problem and the economics properly. Then ask again for public comment and then proceed to the FES. I realize this is not a pleasant prospect; neither was reading this draft a pleasant experience.

The role of the NRC is to resist pressures from the Applicants, the opponents and the government officials in order to ensure the most thorough review of the problems associated with this plant. Do not let yourself be bullied into accepting a half-hearted job.

Sincerely,

Jim Perkins

Jim Perkins

Copies: Allen Ertel
David Mann
Morris Udall
Richard Ottinger

8105270219
H

C002
S1/1

Comments on Supplement to Draft Environmental Statement related to the Operation of Susquehanna Steam Electric Station, Units 1 and 2 Dockets 50-387, 388

Selected comments below result from a general reading of the text. Comments on the economic assessment rely, in addition, on information obtained by asking from PP&L. This information should surely have been available to the preparer of this document.

p. 6-4, section 6.1.1.3

The numbers cited from the BEIR III report were criticized by the committee head as being unduly generous, i.e. non-conservative. A recent article in Science indicates that the information relied upon by the BEIR committee overestimated the influence of neutrons in Hiroshima; hence, the conservative figure should probably be revised upward by the factor of 2 or 3 indicated by Dr. Radford. Furthermore, Karl Morgan and Alice Stewart, among others, are beginning to question the conservativeness of the linear hypothesis. As a responsible agency, not an adjudicative board of scientific studies, the NRC should assume the work of these reputable scientists defines the conservative "line". That's what being conservative means, not that one accepts the average. JP(1)

p. 6-5, section 6.1.2

Where the draft says, "None is known to have caused any radiation injury or fatality to any member of the public," could equally have been written, None is known not to have caused any radiation injury or fatality to any member of the public. It is clearly the case that no study has been done which would indicate that the draft's claim is true. I would suggest that such comments, which are unnecessary to the NRC's case, although perhaps not to the Applicant's, be eliminated. JP(2)

Regarding the estimates of releases from TMI-2, has there been any published estimates of the releases had TMI-2 not had the extra-thick containment? JP(3)

"It has been estimated that the maximum cumulative offsite radiation dose to an individual was less than 100 millirem." The Staff has failed to note that there have been far higher estimates presented to it, to which it has failed to respond. In particular, in Docket #50-272 with regard to the intervention by Lower Alloways Creek Township, Intervenor submitted a report in response to a Board Question on the accident at Three Mile Island. Utilizing the methodology provided in the TMI-2 Final Safety Analysis Report the report's author calculated that the release of Xenon-133 from the accident at TMI would have provided a 280 rem dose for a 2 hour exposure at the exclusion boundary and a 45 rem dose for a thirty day exposure at the low population zone boundary. These figures have been in the hands of the NRC since August, 1979. JP(4)

-In the continuing aftermath of the accident at TMI radioisotopes of several different types than iodine and xenon have been found outside the plant, in water samples. JP(4)

p. 6-8, section 6.1.3.2

I wonder how the residents of the Borough of Berwick, 6 miles to the south of the plant site, will feel to learn they are not a population center. JP(5)

p. 6-14, section 6.1.4.4

The draft neglects the costs associated with the physical and psychological health effects of an accident. With substantial awards being made by courts to individuals or families of individuals for the loss of one life, the costs associated with the loss of tens or hundreds or thousands should not be shrugged off. JP(6)

p. 6-19, section 6.1.4.6

This section regarding the chance of an accident whose decontamination cost is $1 billion is ludicrous. This I believe makes a mockery of the whole effort. "if the probability of an accident serious enough to require extensive cleanup and decontamination is taken as . . . 2.4 chances in 100,000 per year, and if the average decontamination cost . . . is assumed to be one billion dollars, then the estimated risk would be about $24,000 per year." I won't quibble with this because it is merely a mathematical statement. If, however, the draft's authors mean to suggest that the hypothesis of the statement is reasonable, then I will argue. On the very next page, as the authors try to explain their reliance on the Reactor Safety Study, they write, "The accident at Three Mile Island occurred in March 1979 at a time when the accumulated experience record was about 400 reactor years. It is of interest to note that this was within the range of frequencies estimated by the RSS for an accident of this severity."

The authors cannot have the best of each world. The TMI accident will cost at least $1 billion to decontaminate. Hence it fits in with the average accident cited by the authors. It occurred within the range of frequencies suggested by the RSS. Hence 2.4 in 100,000 per year is not a reasonable estimate. Rather clearly 1 in 400 per year is the reaonable assumption if we are not allowing for the impact of "lessons learned", as the draft's authors have claimed. So, let's use the methodology of the sentence quoted above: JP(7)

$$\frac{1}{400} \times \$1,000,000,000 = \$2,500,000 \text{ per year as the estimated economic risk.}$$

The draft errs by a factor of 100.

Further, I would suggest that $1 billion may not be a reasonable estimate. Where did it come from?

Continuing on section 6.1.4.6

The cost of the TMI accident decontamination is now estimated at $1.3 billion. The cost of replacement power for ratepayers is estimated at $1.2 billion through 1985 alone. The proposed industry insurance scheme for replacement power, sponsored by the Nuclear Electric Insurance Limited of Bermuda, would have provided a maximum of $156 million for the GPU ratepayers had it been in place. So we can reduce costs to GPU ratepayers to $1.05 billion through 1985, and add on for the following years some figure. Since TMI-2 couldn't possibly be put back into service until 1990, it seems conservative to add another $1 billion for the years 1985 to 1990. Making the generous assumption that decontamination doesn't cost more than $1.3 billion, we are thus faced with a cost of at least $3.35 billion. Hence, the annual estimated economic risk is now $8,375,000.

Furthermore, if the RSS was reasonably accurate we can expect another TMI-type accident before 1985.

JP(8)

Missing from the draft was any mention of control rod failures of the sort that occurred at Brown's Ferry 3 in June of 1980. Also missing, though understandably, was any comment on the new concern about boiling water reactors' scram systems reported on by the NRC's Office for Analysis and Evaluation of Operational Data. These gaps should be filled.

- Page 6-19, Section6.1.4.6

Comments on the worst case suggested by the draft's authors and on the proposed case to be studied.

Worst case: One unit lost in first year. The draft doesn't suggest the result on the other in this scenario, so I will take their three year estimate for a delay in restart.

Carrying charges for the lost plant are estimated by the company at 18% per year of final cost. Assuming a $3.5 billion final cost and an even distribution of the costs between the two units, the carrying charges on the undamaged facility would total $945 million. The lost carrying charges on the damaged facility would total $9.128 billion dollars. (Levelized 16.3% per year for 32 years) JP(9)
Net replacement power at 40 mills per kwh at the company's expected 68.9% capacity would total $456 million per year. In addition, the company would lose out on its sales to the PJM by some predicted 5 to 6 billion kwh per year. At a split savings profit of 16 mills per kwh, the loss of each unit would cost ratepayers at least $40 million per year.
We will assume a $1 billion cost to decontaminate and five years. Then we will assume that the company still has sufficient wherewithall to build a replacement for the damaged unit. That will take ten years and will be paid for in inflated dollars, not in 1980 dollars.

Thus the final cost of the accident, neglecting the costs of offsite damages and settlements, can be calculated.

	damaged unit	undamaged unit	(millions $)
carrying charges	9,128	$945	
ruined fuel	50	-	
replacement power	3,420*	684	
lost sales to grid	600*	120	
cost of cleanup	+ 1,000	+ -	
	$14,198	$1,749	

Plus a plant constructed and paid for in year 1998 dollars will have a substantially higher cost to ratepayers. For the moment we'll neglect that.

The bill, neglecting rather a lot, is $15,947,000,000 for a $1 billion accident.

draft's
Now utilizing the techniques of the preceeding paragraph and the Rasmussean probability of 1 in 400 per year we get an annual estimated economic risk of $39,867,500.

* assuming fifteen years until capacity replaced.

the proposed case: one unit fails after 8 years of operation and the second is down for 3 years until restart

Carrying charges for the lost plant would equal a levelized 12.2% per year. Assuming a $3.5 billion final cost and an even distribution of the costs between the facilities, the carrying charges for the lost plant would total $5.119 billion. Lost carrying charges of the undamaged facility would total $885 million. (These figures are in mixed dollars.) Net replacement power at 40 mills (1980 mills) per kwh at the company's expected capacity of 70% would total $696 million for the undamaged facility and $3.48 billion for the fifteen years until the capacity is replaced. Again the company would lose out on its sales to the PJM grid of $40 million (1980 dollars) per year.

Assuming a $1 billion cleanup (in 1980 dollars, for consistency) and the construction of replacement capacity in mixed dollars which will be capitalized in 2006, we can compile the following chart.

	damaged unit	undamaged unit ($million)
carrying charges	$5,119	$885
ruined fuel	50	-
replacement power	3,480	696
lost sales to grid	600	120
cost of cleanup	+ 1,000	+ -
	$10,249	$1,701

JP(9)

carrying charges are in mixed dollars, 1991 to 2014 for the damaged unit and 1991 to 1993 for the undamaged. All others are in 1980 dollars. To get the 1991 figure we can assume a conservative 10% annual inflation rate for fuel, replacement power, lost sales, and cost. From 1983 to 1991 a compounded 10% amounts to a 114% increase.

	damaged unit	undamaged unit ($ m)
carrying charges	$5,119	$885
fuel	107	-
replacement power	7,447	1,489
lost sales to grid	1,284	257
cost of cleanup	+ 2,140	+ --
	$16,097	$2,631

JP(9)

So, in comparison with the figure on the preceeding page representing the "worst" case, we have an annual economic risk of $46,820,000. mostly in 1991 dollars.

Because the analysis above included some mixed dollars for carrying charges, I decided to take the worst case once more, this time calculating the effects in 1983 dollars. For every year of the company's proposed carrying charge schedule, I have used a factor based on a 10% inflation rate to adjust the figure back to a 1983 dollar cost. The draft's staff used 40 mills as a net replacement cost, a figure probably conservative* for 1983. I have used a 16 mill per kwh rate of earnings from the grid for 1983, based upon some analysis of the past record of the company. $1 billion is the draft's estimate of cost. Assume a $3.5 billion final cost and an even distribution between the two units. The company assumes an average capacity of 68.9% for each unit.

Reduced as described, the carrying charges foregone for the damaged facility would total $2,959,000,000 in 1983 dollars. The three years of carrying charges for the undamaged plnt would total $861,000,000.

JP(9)

	damaged unit	undamaged unit
carrying charges	$2,959	$861
damaged fuel	50	-
replacement power	3,420	684
lost sales to grid	600	120
cost of cleanup	+ 1,000	+ -
	$ 8,029	$1,665

So, in constant 1983 dollars the cost of a hypothetical $1 billion accident which destroyed one unit and rendered the other out of service for three years would be $9,694,000,000. This neglects entirely offsite damages and injuries and that a utility trying to handle a $9 billion loss and major cleanup would have a hard time entering the capital market for construction funds.

JP(7)

At the RSS figure quoted by the draft's authors of 1 in 400 per year for a billion dollar accident, this figure translates to an estimated $24.2 million economic risk for the first year of Susquehanna's operation. This figure is more that 100 times as high as the draft's.

* conservative, used here, means low