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July 18, 1973

Mr. Lawrence Sager  
 Sager and Sager Associates  
 45 High Street  
 Pottstown, Pennsylvania 19464

RE: METROPOLITAN EDISON COMPANY, ET AL.  
 THREE MILE ISLAND UNIT 1  
 DOCKET NO. 50-289

Dear Mr. Sager:

As per your request of June 28, 1973, I am enclosing the following materials:

1. Safety Evaluation for Three Mile Island, dated July 11, 1973.
2. Supplement No. 3 to the Safety Evaluation for Oconee Nuclear Station Unit 1, dated July 10, 1973. (Appendix A contains an analysis of fuel densification of Babcock and Wilcox Reactor Fuels)
3. Technical Report on Densification of Light Water Reactor Fuels, dated November 14, 1972.
4. Additional testimony on Point Beach 2 Nuclear Plant In Regard to Fuel Densification and Its Effects, dated February 2, 1973.
5. Operating History, U. S. Nuclear Power Reactors, WASH-1203-72, (through December 31, 1972).
6. Affidavit of Donald E. Sells, dated January, 1973.
7. Final Environmental Statement, PHILADELPHIA ELECTRIC COMPANY, Peach Bottom Atomic Power Station Units 2 and 3, Docket Nos. 50-277, 50-278, dated April, 1973.

The material contained in items 2, 3, and 4 consist of all the material the Staff presently has available on fuel densification generically and for Babcock and Wilcox reactor fuels generally.

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DATE ▶	7/18/73		<i>RAB</i> 7/19/73		

The Staff is presently reviewing the analyses of the actual fuel for Three Mile Island Unit 1 and will report this last evaluation in the supplement to the Safety Evaluation Report for Three Mile Island Unit 1. This material is in response to your question number 2.

Section 3.10 of the Safety Evaluation Report (item 1) notes that the AEC Regulatory Staff has followed the construction and repair procedures for the containment building and we are satisfied that proper quality control and assurance were provided (question 3). Thus, the Staff has concluded that the containment has been constructed in accordance with the design.

The most recent inspection of the containment building was conducted late in June of this year. The report of this inspection has not yet been completed but it will be sent to you when it becomes available. In general, the results of this inspection of the containment repair records confirm our satisfaction with the implementation of the repair procedures. The only item of note is the surveillance of tendon bearing plate recession measured during tendon prestressing which is going on now. The maximum recession measured so far is less than 60% of the allowable value. The remaining prestressing operations will be watched closely to ensure acceptability.

A portion of the material related to the use of 80% capacity (question 6) is contained in items 5 and 6. The remainder of the Staff material on this subject is being reproduced and will be sent to you shortly.

Item 7 relates to your question 7 dealing with the cumulative effect of the Three Mile Island and the Peach Bottom plants. Additional material on this subject is being reproduced and will be sent to you shortly.

The Staff has not evaluated the cumulative effect of the two stations in detail. However, the Staff notes that the chemical discharges from each station represents only a small incremental increase over the ambient dissolved solid concentration in the Susquehanna River. Hence, in the Staff's opinion, the cumulative effects will be negligible. With respect to radioactive effluents, it is also noted that the incremental increased dose over natural background is inconsequential for each station separately and concludes that the cumulative effects will not represent an adverse impact.

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Your question number 8 regarding analysis of abnormal transients does not require submission of materials. The Staff wishes to advise you that the dynamic loads which could be developed on fluid system components, including pumps and valves, due to transient conditions such as water hammer and the consequent deleterious effects are an item of principal concern during the Staff's safety evaluation. Mere postulation of specific pump or valve failure due to water hammer is not considered by the Staff a sufficient response to this problem. It is the opinion of the Staff that a more meaningful response to the concern of water hammer effects is achieved by the elimination of all known causes of water hammer (e.g., systems which are left empty or allowed to drain out when not in use) and by actual test of all safety related fluid systems during the plant preoperational test program or by detailed dynamic analyses using conservative characterizations of the hydraulic forcing functions. Both of these actions are a standard part of the Staff safety evaluation for each facility.

During the course of the required system tests all safety related systems are operated in both the normal and emergency modes including all actions known to cause water hammer, e.g., pump starts, rapid valve closure, and rapid valve opening. Where vibrations are noted that are above the levels shown to be acceptable by design the applicant must demonstrate that system modifications have successfully restored the design conditions. Where analyses are employed, system response to all normal and transient conditions must be calculated and the associated stress levels must be shown to be within acceptable code limits.

Your question number 9 regarding the possible increase in the inventory of radioactive nuclides due to abnormal transients also does not require submission of materials.

It is the Staff's position that a component or system is not considered acceptable if operation in its normal and emergency modes and ranges produces abnormal transients sufficient to cause cladding or piping failures. As noted previously, the operating modes and ranges are thoroughly tested before full power reactor operations.

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In addition, a pressurized water reactor (PWR) such as Three Mile Island Unit 1 has a secondary level of protection against the unexpected release of the reactor fission product inventory to the environment. In a PWR, if some of the reactor fuel cladding fails abruptly, the fission products are released to the reactor coolant system. The reactor coolant system is circulated in such total confinement that the only path by which these fission products escape to the environment is via the limited amount of leakage to the steam cycle fluid system. Moreover, the releases calculated by the staff are based on expected operational occurrences including occasional large leaks or spills.

As previously noted, material related to the use of 80% capacity material related to releases into the Susquehanna River, as well as material relative to quality assurance is being reproduced and will be sent to you shortly.

Sincerely,

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Douglas K. Olson  
Counsel for AEC Regulatory Staff

Enclosures:

cc: George F. Trowbridge, Esq. (w/encl)  
Herbert C. Goldstein, Esq. (w/o encl)  
Theodore Adler, Esq. (w/o encl)  
Mr. Frank Karas (w/o encl)

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