OPTIONAL FORM NO. 10
5010-104
UNITED STATES GOVERNMENT

Memorandum

TO : Harold L. Price, Director
Division of Licensing and Regulation

DATE: NOV 23 1960

FROM : Frank K. Pittman, Director aqw for
Division of Reactor Development

SUBJECT: APPLICATION FOR CONSTRUCTION PERMIT AND FACILITY LICENSE, PHILADELPHIA ELECTRIC COMPANY, DOCKET NO. 50-171
(YOUR MEMO, 11-16-60, DLR:NDM)

RD:CR:HTR:DHG

Your memorandum, referenced above, requested our comments as to the reasonableness of the fuel requirement for the Philadelphia Electric Company Peach Bottom Atomic Power Station as stated in the Application for Construction Permit.

An estimated schedule of transfer of special nuclear materials and supporting data is set forth in Exhibit F, Part A, of the Application. The transfer requirements are based primarily on a core inventory of 150 kg U-235 and a normal core life of three years.

The following table gives a comparison of the Peach Bottom, Dragon, and Indian Point reactor cores. Because of the variation in reactor ratings, the comparison is on the basis of specific power. The specific power for each of these cores is of the same order of magnitude, the differences being in the direction that would be expected from a consideration of the other materials present in the core. Based on this comparison, we believe the stated fuel requirement is adequate. This requirement will probably be subject to small adjustments when further computer analysis and operation of the HTGR critical facility have been completed.

(continued)

A-136

	Indian Point	Peach Bottom	Dragon
Reactor Power, Thermal Kw	585,000	115,000	20,000
Fertile Loading U235 kg	1,048	150	20
Fertile Loading Th kg	15,800	1,290	134
Moderator	H_2O	Graphite	Graphite
Σ a Moderator, Cm^{-1}	.022	.00037	.00037
Thorium-Uranium weight ratio	15.1	8.6	6.7
Specific Power Kw/kg U-235	558	767	1,000

A primary advantage of the unclad graphite fuel element design employed in this core is that fuel burnup is expected to be limited by reactivity considerations only. This results in the projected three-year life time. General Atomic has irradiated specimen fuel compacts and samples of impermeable graphite to about 75% of core life. The tests indicate that the anticipated burnup will be attainable. Additional information on this point will be obtained from a large number of irradiation tests now under way or scheduled. At this point the projected core life appears to be reasonable.