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PHILADELPHIA ELECTRIC COMPANY - AMENDMENT NO. 11 TO APPLICATION FOR PEACH BOTTOM PLANT

50-171

Amendment No. 11 to Philadelphia Electric Company's application for a construction permit and operating license for the Peach Bottom Atomic Power Station requested that such license also authorize the receipt, possession and use of:

1. 15 curies of tritium in accelerator neutron sources
2. 20 milligrams of U-235 in fission counters
3. 150 grams of antimony in seven antimony-beryllium photoneutron sources of saturation activity  $10^9$  n/sec per source.

By telephone call on August 31, 1965 to Mr. Vincent Boyer of the Philadelphia Electric Company, I obtained the following additional information on these items.

1. Accelerator Neutron Sources:

Two accelerator neutron sources will be used, one a steady-state linear accelerator source and the other a pulse neutron source. Both will be used only during the initial startup and nuclear physics testing by GA. Both are commercially available units which are sealed in metal canisters with cable connections.

The linear accelerator source operates by electronically ionizing and accelerating deuterium atoms to strike a tritium target, thereby releasing neutrons. The 5 to 10 curies of B-active tritium in this source is in the form of a solid zirconium compound. The 3" diam X 15" long unit is manufactured by Atomic Assoc's. and will be suspended at about the core midplane in a reflector element position during use.

The pulse neutron source is very similar to the linear source except that it can be electronically pulsed to emit single bursts of  $10^8$  neutrons or up to 10 bursts per second. The pulse source was manufactured by Kaman Co. and contains about 1 curie of tritium, also in the form of a

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solid zirconium compound. The 4 1/2" diam X 20" long unit will not fit into an element position in the reactor core, so it will be used either lying on top of the core or 3 elements will have to be removed to permit insertion. The applicant plans to have two of these pulse sources on site, one as a spare.

Mr. Boyer informed me that GA, which will be supervising the use of these neutron sources during the startup test program, already has an AEC license to use these sources, but not with fuel present, hence this application.

Considering the small quantity of radioactivity involved in these sources, the fact that the radioactive element is in solid form during normal operating temperatures, that it is contained in sealed metal cannisters, and that these sources will be used only during the initial startup test program under expert supervision, we believe that the use of these sources will not represent a significant safety hazard.

2. U-235 Fission Counters:

The 20 milligrams of U-235 will be contained in miniature (1/4" diam) fission counters to be used to measure core flux distribution during initial core physics testing. Up to five units may be used. The counters are commercially available units manufactured by GE and/or Westinghouse which incorporate seal welded stainless steel cannisters. We can see no significant safety hazard due to the use of these fission counters.

3. Antimony-Beryllium Sources:

The request to possess and use radioactivity antimony was included in this amendment because, due to an oversight, it was not specifically included in the original application. The antimony-beryllium sources which contain this antimony are discussed on pg. II-233 of the FSAR and were therefore considered in our review of this facility. These antimony-beryllium photoneutron sources will be the permanent operational sources in the Peach Bottom reactor, superseding the polonium-beryllium startup sources after the reactor has had sufficient power level operation to activate the antimony. Although not specifically stated in the FSAR, Mr. Boyer informed me that the antimony-beryllium sources are doubly encapsulated just like the polonium beryllium sources.

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Amendment No. 11 refers to seven antimony-beryllium sources while the FSAR (pg. II-233) refers to five. Mr. Boyer explained that five sources are still expected to be enough to satisfy the 10 cps criteria to permit rod withdrawal, but that the calculations used to evaluate this are known to be imprecise. For this reason the request provides for two additional sources which will be inserted only if needed to satisfy the minimum count-rate criteria.

In conclusion, we believe that the additions to the application requested by amendment no. 11 do not represent significant hazards considerations not described or implicit in the hazards summary report and that there is reasonable assurance that the health and safety of the public will not be endangered.

cc: E. G. Case, DRL  
K. R. Goller, DRL

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