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PHYSICS ASPECTS OF
REMOVAL OF OVERBORE TEST FACILITY

August 10, 1964

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AW-33596

August 10, 1964

N. F. Fifer
Reactor Design
Design Engineering Subsection
Facilities Engineering Section
Irradiation Processing Department

PHYSICS ASPECTS OF
REMOVAL OF OVERBORE TEST FACILITY

Investigation of several alternative methods of modifying the C-Reactor overbore test facility in order to terminate the production tests has been completed. The results are as follows:

<u>Case</u>	<u>Exposure</u>	<u>Pu</u>	<u>%240</u>	<u>E. Req.</u>	<u>Rel. Power</u>
I	600	529	5.53	3	1.000
II	600	586	5.72	22*	1.500**
III	700	584	5.18	27	1.008
IV	600	528	5.38	7	1.000
V	600	527	5.55	3.5	1.015

* Enrichment wrapped around periphery of zone.

** Assuming no flux depression through zone.

Case I - normal lattice
Case II - overbore lattice
Case III - normal tube and fuel inside overbore tube - water annulus
Case IV - normal tube and fuel inside overbore tube - graphite annulus
Case V - normal tube and fuel in overbore channel - overbore tube removed.

Exposure - Goal Exposure in MWD/T for Natural U.

Pu - Grams Pu/Ton U at that exposure (in Nat. U.)

%240 - Percent of Pu that is Pu²⁴⁰ at that exposure (in Natural U)

E. Req. - Number of Enrichment columns required to support zone
(44 tubes) if uniformly dispersed through the zone

Rel. Power - Power of natural uranium in this configuration compared to
power of natural U in normal configuration.

In the case of the tube-in-tube concept, the use of a graphite annulus between the two tubes probably results in Zirconium temperatures which are too high to be practical. For the water annulus, the enrichment usage is almost independent of its position, for the additional material required when the enrichment surrounds the test zone is almost balanced by the loss in "worth" of the enrichment when it is inside the zone.

N. F. Fifer

August 10, 1964

It would appear, from these results, that the best method would involve simply removing the present tubes and replacing them with normal tubes. Of course, this destroys the facility--an action which may not be totally desirable.

Reactor Design Analysis

GF Bailey:bw

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