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March 30, 1953

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CORING PATTERN FOR K PILE (Revised)

Design Section

Process Engineering Unit

By L. E. Foster

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CG-PR-2 5-13-92

BY DA Bunk 8-15-92

VERIFIED BY J.H. Wells 8-15-92

This document has been reviewed and approved by the appropriate members of the Process Engineering Sub-Section. It is approved as a basis for design of the 105-K reactor moderator.

G.M. Roy
Design Analysis

J. R. Walcott
Head, Reactor Design and Development

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MASTER

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CORING PATTERN FOR K PILE (Revised)

This document supercedes HW-26837 ("Coring Pattern for K Pile" - L. E. Foster).

BACKGROUND

Since the issue of HW-26837, pile operation data from 100-H and 100-C has demonstrated that symmetrical heat generation (flux distribution) can be attained with enrichment or enrichment and shortened control rods. The previous coring pattern was based on 100-H operation prior to enrichment and therefore was designed to accomodate an asymmetrical flux distribution. Because the present K reactor design includes shortened control rods and operation will probably include enrichment, the coring design has been revised to a symmetrical pattern.

PURPOSE

The purpose of this document is to present the coring pattern recommended for the 105-K moderator design.

RECOMMENDATIONS

It is recommended that the overbore size used in the tube blocks of the 105-K moderator be as shown in Figures 2 - 8. The dimensions noted on these figures are the annuli thicknesses in inches between process tube and graphite.

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The other graphite blocks of interest, from coring considerations, are the trunnion blocks. These blocks are $4 \frac{3}{16}$ " in length and act as a centering block for the process tube. Five-eighths inch of the length is necked down on the tube and the remaining $3 \frac{9}{16}$ " is overbored.

The recommended overbore sizes of these blocks are as follows:

<u>Connecting Tube Blocks Overbored By</u>	<u>Trunnion Overbore</u>
0.030" - 0.030"	0.060"
0.030" - 0.060"	0.060"
0.060" - 0.060"	0.060"
0.060" - 0.130"	0.060"
0.060" - 0.220"	0.220"
0.130" - 0.130"	0.220"
0.130" - 0.220"	0.220"
0.220" - 0.220"	0.220"

JUSTIFICATION

The bases of this coring pattern are given in HW-26703 ("Request for Approval of the Bases of the Coring Pattern for K Pile" - L. E. Foster and G. M. Roy). Approval of these bases was made by the Project Committee and Design Committee. (See "Project Committee Meeting No. 28, Project CA-512-R", dated January 12, 1953.)

A summary of the bases and assumptions are as follows:

1. Pile atmosphere will be composed of a mixture of CO₂ and He prior to reaching 1,700 MW in power level.
2. Pile atmosphere will be 100% He above 1,700 MW.
3. 1,700 MW pile power level will be reached in approximately one year after start up.
4. The first year of operation will be at an average power level of 1,300 MW.
5. Prior to operating with 100% He, the maximum graphite temperature will not exceed 380°C and the minimum graphite temperature will be greater than 240°C (except extreme parts of reflector).
6. Probable reactivity available for flattening will be 400 inhours.

This coring pattern is designed for consistency with the above bases.

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Key to Figures 2, 3, 4, 5, 6, 7, and 8

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FIGURE 2
CORING PROFILE OF TUBE BLOCKS
(1st and 8th Rows From Inlet)

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FIGURE 3
CORING PROFILE OF TUBE SHEETS
(2nd Row from Inlet)

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FIGURE 1

CORRIDOR PROFILE OF FIVE FLOORS
(3rd Row from Table)

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FIGURE 5

CORING PROFILE OF TUBE BLOCKS
(4th Row From Inlet)

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FIGURE 6

CORING PROFILE OF TUBE BLOCKS
(5th Row From Inlet)

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FIGURE 7

CORING PROFILE OF TUBE BLOCKS
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FIGURE 8

CORING PROFILE OF TUBE BLOCKS
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