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HW-47043



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November 29, 1956 COPY 1 OF 1

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FILE POWER RAISES AFTER PROJECT CG-558

Re: HW-46757, "A Study of Expected Reactor Powers after Project CG-558 as Determined by Slug Rupture Considerations", J. K. Anderson.

We are transmitting the reference document to you for your consideration in planning your post CG-558 operation.



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The document presents powers to which the piles are predicted to be limited by slug ruptures and outlines two plans for raising power after 558. These plans are coordinated in the sense that results from one area are used to make operating plans for other areas. You may wish to choose one or the other of these alternatives or some modification of either. It should also be recognized that as Post CG-558 operational experience is acquired new information will probably dictate some variation of the accepted plan.

Two factual points should be noted:

- (1) Changes in start-up dates from those we used may modify the justification for certain of the plans outlined in the document. The results of certain startup schedule changes in the project after the B Pile startup have been expressed in the document. However, should other changes be foreseen, these plans should be re-evaluated.
- (2) When we use a tube power, for example, of 850 KW, the uncertainties are such that this figure could as well be 830 KW or 870 KW. The powers expressed as expected slug rupture limits are not meant to be exact, but only to show the neighborhood in which such limits are expected to exist.

Two additional points should be made in considering the "fast-rise" plan as compared to the more conservative plan. These are:

- (1) The "fast-rise" plan depends heavily upon B Pile experience at 950 KW to pilot other piles to 950 KW. Prior to CG-558 shutdown B Pile had a lower rupture rate than we could explain when compared to other piles. If such performance should be maintained after CG-558, B Pile experience would not be strictly applicable to other piles and would present the basis for a more optimistic decision at other piles than justified. Should experience indicate that B Pile is near a rupture limit at some power it might be well to hold the D, DR, and F reactors at a somewhat lower level for a time.
- (2) Semi-immediate operation at 950 KW would be less safe by some indeterminable degree than operation at 850 KW. When major modifications such as CG-558 have been made, a preliminary low power shake down may or may not have removed all of the "bugs" critical to pile safety. A quantitative determination of degree of risk cannot be made because it is not possible:
 - a) To determine the length of low level operation required for absolute shake-down.
 - b) To predict the unsafe event that could occur and the probability of occurrence.
 - c) To predict how the consequences of the event would be altered by the additional 100 KW.

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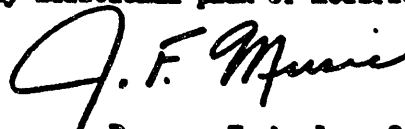
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However it is true that results of certain types of failures, e.g. loss of water to one or more tubes, would be more severe at higher powers. Although the degree of the additional reactor safety risk attached to the "fast-rise" plan cannot be determined, this risk is real and should be considered in making a choice of the plan to be used.

We will be happy to assist you in evaluating any additional plan or modification of these plans which you might wish to consider.



Manager - Process Technology Operation
Research and Engineering Operation
IRRADIATION PROCESSING DEPARTMENT

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5 / 20 / 93

