NOTICE

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HW--18605

DE92 010915

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DOC: #5 - GR Prout - FK McGuire

#6 - J. L. Greening

#7 - CN Gross (LB)

#8 - JE Milder

#9 - JE Johnson

#10 - JS McLaughlin

#11 - WK Woods

#12 - EP Lee

#13 - 700

#14 - Pink
August 15, 1950 - Yellow

Atomic Energy Commission
Hanford Operations Office
Richland, Washington

Attention: Mr. D. F. Shaw, Manager

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References:

INCREASED PLUTONIUM PRODUCTION

300 AREA

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- (a) Document ODC:DGS, dated July 28, 1950, D. F. Shaw to G. R. Prout (GER-17,051)
(b) Document HW-18549, dated August 11, 1950, W. K. Woods to E. P. Lee

only 1913

By pm Eck 3-5-92

Verified by Doc Bank

5/16/92

It is pointed out in the reference document (a) that completion of the development and design work necessary for replacement of the liquid IX system in the piles by the proposed ball system would eliminate the present bottle-neck to substantial increases in power levels in the B, D, and F piles. You have requested that we advise you of the best schedule under which this objective can be accomplished.

It is our opinion that the ball IX system can be placed in service at B, D, and F piles within a period of approximately 17 to 20 months from the present time. This represents, as well as can be determined at present, the time necessary to complete the development and design engineering phases of the program (which might require 8 to 11 months), procurement of materials, fabrication, and installation during pile outages planned for the purpose. A slight extension of these periods would be necessary to place the ball IX system in service at five piles. In the normal course of events, such a program might be expected to require in excess of two years for completion. The indicated time schedule assumes that the program will be expedited as much as possible commensurate with the programming of other urgent objectives which must be accomplished by the same forces. We estimate that the lost production time incident to installation will amount to at least one month per pile.

In consideration of the use of a ball IX system, we would like to point out that this facility in itself does not guarantee that significant increases in power level can be made. Reference document (b) states that,

SPECIAL RE-REVIEW

FINAL DETERMINATION

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Atomic Energy Commission

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August 15, 1950

with provision of a satisfactory ball XI, further increases in graphite temperature and in associated power levels could be attempted with much greater safety. However, it is not now known how much the graphite temperature can be increased before an adverse chemical reaction between the moderator and the pile atmosphere will be encountered. It is possible, although not likely, that such adverse effects may result after an increase of no more than 10% in the central graphite temperatures (as measured above inlet water temperatures). An additional barrier to higher operating levels stems from a lack of knowledge regarding reactivity effects which would be encountered due to the heat generation by fission products if there were a complete failure of the pile cooling water. Since this effect would be proportional to the operating level, the time available for taking possible corrective action is governed by the operating level and becomes shorter as the level is increased. Safe operating policy may therefore require operation at less than maximum possible levels. It is anticipated that further information on this point may be developed during start-up of the DR pile.

The use of the liquid XI system in the piles imposes certain limitations on any further appreciable increases in power level and is not completely satisfactory at present levels for reasons which are described in detail in reference document (b). In general, these involve the loss of XI fluid because of boiling and the flow of liquid into the pile if there is a thinble failure. These considerations have led to development work on an alternate XI system during the past several months. Even without the interest in increased production, we consider this an essential part of our program of operating under the safest possible conditions.

Our work to date on replacement of the XI system has indicated that a ball type system is feasible in theory and can be applied to the Hanford piles if a number of design and installation problems can be solved. Several mechanical experiments, including drop tests of various types of balls, have already been conducted or are planned during the next three or four months. Insofar as it is feasible, preliminary design engineering will run concurrently with these tests following which a more comprehensive design program will be scheduled. It is our intention to expedite this program and to carry it to completion at the earliest possible date for all five piles unless a preferable alternate plan can be developed or unless the ball system proves to be unsatisfactory.

Very truly yours,

W. H. S. Brown

Manager, Manufacturing Divisions

A. B. [Signature]

Manager, Technical Divisions

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END

**DATE
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