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TITLE 100-D AREA
CLASSIFIED FILES
RELATION BETWEEN HAND AND FLOW SEATING OF SLUG CHARGES AS THEY AFFECT SLUG RUPTURE RATES

AUTHOR

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FINAL DETERMINATION

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BY JW Gordon DATE 7-10-81
BY JP Derrin DATE 7-10-81

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February 13, 1956

DEVELOPMENT TEST 105-623A

RELATION BETWEEN HAND AND FLOW SEATING OF SLUG
• CHARGES AS THEY AFFECT SLUG RUPTURE RATES

OBJECTIVE

The objective of this test is to determine the effect upon slug rupture rate due to slug cocking as affected by hand seating or flow seating of slug columns.

BACKGROUND AND JUSTIFICATION

A large portion of the slug failures which occurred during 1955 were of the "hot-spot" type. Observation of these failures has shown them to be the result of intergranular corrosion attack of the aluminum jacket. Intergranular corrosion is presently considered to occur in water temperature above 150° C; (1) a flow disturbance which causes non-uniform coolant temperatures is suspected as the cause of failure.

(1)HW-40252, "Low Exposure Failures and Intergranular Corrosion, C. Groot and J. L. Ryan, 11-29-55.

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The presence of a cocked slug, or a bowed slug column, might provide this flow disturbance.

189-D laboratory tests have shown that flow seating the slug charge allows slugs to cock in the tube. It has also been found that these cocked slugs may be lifted to close proximity of the tube wall by the axial load on the slug column due to process water flow. It is believed that in cases such as this, slug and coolant temperatures may become critical.

Present charging procedures allow for flow seating of the slug column. The distance the column is flow seated varies from very little to 3 or 4 inches depending on the particular charge. It is believed that this practice can lead to the situation observed in the laboratory tests.

During the past two months, there has been an increase of failures of the "hot-spot" type at the DR pile. Therefore, this test proposes to evaluate the effectiveness of hand seating slug columns at the DR pile as outlined below.

PROCEDURE

During alternate outages at the DR pile each charge-discharge operation will include hand seating of the charge using a push pole from the front face. This will be done before the upstream dummy pattern is removed and after personnel on the rear face have replaced the nozzle cap. After nozzle caps have been replaced on the particular header being discharged personnel on the rear elevator will prepare the next header to be charged while personnel on the front elevator will hand seat those tubes just charged. Front elevator time requirements for this additional operation will be approximately one hour for every 200 tubes charged.⁽²⁾ During all other outages, charging will be continued as it is done now.

Operations will keep a record available for inspection by Pile Engineering personnel of those charges that have been hand seated. Ruptures can then be related to hand or flow seating procedures.

SCHEDULING

Start of Test: Immediately upon acceptance of this test.

Duration of Test: Two years or until sufficient data have been collected.

REACTIVITY LOSS

None

MAINTENANCE

None

ELEVATOR TIME

Approximately one hour will be required for each 200 tubes charged.

(2) Private Communication - J. T. Baker

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RESPONSIBILITY

Reactor Section: The Reactor Section will be responsible for all scheduling and data collection as well as the operational safety and production continuity of the pile.

Pile Engineering Sub-Section: Pile Engineering personnel will correlate the data and issue all reports.

A. C. Arneson

Mechanical Equipment
Development Unit
Pile Technology Section
ENGINEERING DEPARTMENT

F. W. Van Wormer

Process Technology Unit
Pile Technology Section
ENGINEERING DEPARTMENT

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