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August 3, 1951

To: FILE

**REMOVAL OF RUPTURED SLUG
FROM TUBE NO. 4086-B**

SUMMARY

The 105-B Pile was shut down at 9:54 P.M. on July 27, 1951 to effect removal of a ruptured uranium slug from tube no. 4086-B. The rupture was detected by the effluent water activity monitor, confirmed by rear crossheader evaporated water samples and the tube located by a survey of the rear face pigtails. Removal was effected by back-seating with the hydraulic ram, flushing out the downstream slugs, reaming out the tube ribs downstream of the ruptured piece, pushing the ruptured slug into the deribbed area with the hydraulic ram and then discharging the tube with the pneumatic charging machine.

Pile operation was resumed at 11:04 P.M. on July 28. The elapsed downtime was the minimum possible outage under prevailing Pile conditions. Some work tentatively scheduled for the outage of August 14, was carried out during the removal operation. The production loss has been estimated at 444 M.W.D.

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August 3, 1951

DETECTION

The differential activity recorder in C sample room gave the first indication of increasing activity on header 40 $\frac{1}{2}$ at 11:30 A.M. on July 27. Water samples, taken at that time and periodically for several hours, failed to supply conclusive evidence that a rupture existed. The decision to shut down the Pile was based on results of samples taken at 8:30 P.M., which showed the activity of cross-header 40 $\frac{1}{2}$ to be 2.6 times that of adjacent headers. There were no other indications on any of the other instruments. A survey of the rear pigtails, after the Pile was shut down, revealed a reading greater than 5R at tube no. 4086-B.

REPAIR

After the Pile had been shut down 1 $\frac{1}{2}$ hours, an attempt to discharge the tube with the pneumatic charging machine was unsuccessful. The charge was then backseated with the hydraulic ram using forces up to 2,000 lbs. and the pieces downstream of the ruptured slug were then flushed out. The tube ribs downstream of the ruptured slug were then removed using the rotary reamer. After the chips were flushed out, the charge was moved downstream with the hydraulic ram, using forces up to 1,500 lbs. When the ruptured slug entered the dented area, discharging was completed using the pneumatic charging machine. The tube was replaced and charged with regular metal.

RADIATION ASPECTS

The effluent flow was switched to the south basin twenty minutes after the tube was isolated and the north basin was pumped to the 10% level. Samples of both retention basins and the storage basin revealed only normal activity levels. These basins have been returned to regular service.

Contamination was confined to established danger zones and there were no cases of personnel exceeding the daily exposure limit.

DETAILS OF THE SLUG

- Tube no. 4086-B contained regular metal charged February 7, 1951. The tube was operating at 234 K.W. power level and had reached the 10% current goal concentration.

The ruptured slug, the 35th piece from the front, was an MR type, dated December 12, 1950, processed on truck 7, line G and had been anticharged.

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EXAMINATION AND DISPOSAL

The rupture was apparently caused by a can wall failure. A triangular shaped portion of the side of the can had become detached from the uranium and the exposed surface showed definite indication of hydrolysis. There were several blisters on the remainder of the can. The ruptured piece and the separated portion of the can wall have been placed in an aluminum can in the storage basin pending removal to III-E.

Other pieces in the charge were examined and the proportion and severity of the blisters were found to be greater than previously. Random selected pieces that had attained full goal concentration.

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