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REMOVAL OF RUPTURED SLUGS FROM TWO TUBES, NOS. 2584-B AND 1861-B

SUMMARY

There were two ruptured slugs in succession at B Reactor during August. The first rupture occurred at 9:05 AM on August 28, 1951 and involved a ruptured uranium slug in tube No. 2584-B. The second failure took place just prior to the shutdown to discharge poison on August 29, 1951 and involved a uranium slug in tube No. 1861-B.

- The rupture in tube 2584-B was detected by the effluent water activity monitor, confirmed by VGM survey of water samples, and the tube was located by a survey of the rear face pig-tails. Removal was effected with the pneumatic charging machine. An attempt to reactivate the Reactor after an outage of only fifty minutes was unsuccessful because of Reactor transient conditions and an outage of 27.5 hours ensued.

Following the outage, which was the minimum time before reactor recovery was possible, it was discovered that No. 10 vertical safety rod had separated and that approximately 10 ft. of rod remained in the thimble. Poison columns were charged into the Reactor and, after a delay of 9.5 hours, the section of vertical safety rod was removed from the thimble and operation was resumed.

At 9:00 AM on August 30, approximately one hour before the shutdown to discharge the poison columns, an indication was received on the effluent water activity monitoring equipment indicating a ruptured slug on header 17 $\frac{1}{2}$. After the Reactor was shut down, a survey of the rear face pigtails indicated reading of 500 mr/hr at tube 1861-B. The ruptured slug was discharged from the tube with difficulty using the pneumatic charging machine. The Reactor resumed operation at 5:25 PM, August 30, after an outage of 5 hours to discharge the ruptured slug from tube 1861-B.

DETECTION OF RUPTURED SLUG FROM TUBE 2584-B

- The differential activity chamber in "Y" sample room gave the first indication of increasing activity on header 17 $\frac{1}{2}$ at 10:35 PM on August 27. A rise in activity of 1 $\frac{1}{2}$ major divisions on the sample room recorder occurred and the recorder reading gradually returned to normal. At 12:30 AM a rise was indicated on the "Y" sample room chamber and again returned to normal. On both occasions, a corresponding rise in activity on the 107 retention basin

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DETECTION OF RUPTURED SLUG FROM TUBE 2584-B (Cont.)

activity recorder was observed and in each instance after approximately 10 minutes the recorder reading returned to normal. At 5:00 AM the water activity increased and did not return to normal on the sample room recorder. VGM surveys of the header water samples were inconsistent during this period of time; however, the maximum readings obtained were greater than five times that of adjacent headers. Based on these indications, the Reactor was scrammed at 9:05 AM after shutdown operations had proceeded for a period of ten minutes. A survey of the rear pigtails revealed a reading of 5 R/hr at tube 2584-B.

DETECTION OF RUPTURED SLUG FROM TUBE 1861-B

The second ruptured slug occurred approximately one hour before the Reactor was to be shut down to discharge the poison columns. A rise of two minor divisions on the recorder of the differential water activity chamber in "A" sample room was experienced on header 17½. The water activity indication was the only evidence of slug failure observed and because of the approaching shutdown, no header water samples were taken for VGM determination.

After the Reactor was shut down a rear face survey indicated a reading of 500 mr/hr on the pigtail of tube 1861-B. The interior of the rear nozzle was swabbed and readings of 450 mr/hr were obtained which verified the presence of a ruptured slug in the tube. (These readings were appreciably higher than those at adjacent tubes.)

REMOVAL OF RUPTURED SLUG FROM TUBE NO. 2584-B

The Reactor was shut down and water flow at 400 psi pressure was continued for fifteen minutes. The pressure was then reduced to 75 psi and the suspect tube #2584-B was valved so as to maintain a 40" water head on the tube. The loading was discharged with the pneumatic charging machine at normal air pressure.

The process tube was swabbed and charged with regular metal.

REMOVAL OF RUPTURED SLUG FROM TUBE NO. 1861-B

The initial attempt to discharge tube 1861-B with the pneumatic charging machine failed after the metal loading was moved approximately 40 inches. When the backseating operation proved unsuccessful, the tube was oiled for fifteen minutes and discharged with the pneumatic charging machine at increased air pressure.

The process tube 1861-B was loaded with dummies and will be recharged during a subsequent outage.

H. I. ASPECTS

The effluent flow was switched to the empty 107 retention basin each time the Reactor was shut down because of a ruptured slug and the used basin was pumped to the 107-B crib. Samples of the retention basin and the storage basin revealed normal water activity and these basins were returned to regular service.

Contamination during the removal of both slugs was confined to established danger zones and there were no cases of personnel receiving undue exposure to radiation.

DATA ON THE CHARGES

Tube 2584-B contained regular metal charged January 23, 1951. The tube was operating at 331 K. W. power level and had reached 76.0% of current goal concentration.

The ruptured slug appeared to be the 40th piece from the downstream end of the loading and was determined by monitoring the slugs in the charge. The slug was MR type, canned January 5, 1951, processed on truck 7 on line G and had been autoclaved.

Tube 1861-B contained regular metal charged February 7, 1951. The tube was operating at 300 K. W. power level and had reached 66.0% of current goal concentration. The ruptured slug was monitored and its position was determined as the 29th piece from the downstream end of the loading. The slug was MR type, canned December 26, 1950, processed on truck 10 on line G and had been autoclaved.

EXAMINATION AND DISPOSAL

The ruptured slug in tube 2584-B appeared to have occurred as a result of a leaking and cap since investigation of the slug revealed that the end cap had completely separated from the metal slug.

The ruptured slug from tube 1861-B was cracked across the end opposite the cap and had split on either side approximately two-thirds the length of the slug. The end cap appeared to be in good condition.

Both slugs were canned and are being held in the 105-B storage basin awaiting removal to 111-B for further examination.

PRODUCTION UNIT
REACTOR SECTION

RJB:ram

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