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October 8, 1959

U. S. Atomic Energy Commission
Hanford Operations Office
Richland, Washington

Attention: J. E. Travis, Manager

Gentlemen:

OPERATIONAL INTERRUPTION - B-REACTOR
Reference: HW-62052, dated September 22, 1959

Copies of the reference B-C Reactors Operation report covering this incident are being forwarded to you through Classified Files. Although this operational interruption might be attributed to normal wear and tear, and then would not require reporting under AEC Manual Chapter 0502, it was unusual in nature and time consuming in correction.

Very truly yours,

W. E. Johnson

GENERAL MANAGER

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WE Johnson:RLD:bs

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September 22, 1959

R. L. Dickeman
Manager
Manufacturing Section
IRRADIATION PROCESSING DEPARTMENT

OPERATIONAL INTERRUPTION
B REACTOR - SEPTEMBER 12, 1959

SUMMARY

B Reactor was scrammed on September 10 and again on September 12 by panellit trips. Subsequent investigations revealed the scrams were caused by small pieces of neoprene in an orifice screen. Extensive checks following the September 12 scram revealed pieces of neoprene in all seven near-side process water header basket screens, in all crossheader screens, and in three process tube orifice screens. The source of the neoprene was found to be a deteriorated curtain seal in the No. 4 process water storage tank, 190 Building. A portion of this seal had fallen into the storage tank and become dispersed throughout the downstream process water supply system. Total outage time required to clean and flush the process water supply system and resume reactor operation was 88.6 hours. Of the total outage time, approximately 40 hours were utilized in the performance of necessary project and maintenance work in the discharge area, which otherwise would have required outage time at later dates.

FINDINGS

1. Following a panellit trip on row 13 at 12:52 P.M. on September 10, 1959, small pieces of neoprene were found in the orifice screen of Tube No. 1353. At this time, the gauge pressure showed only a five- to seven-pound decrease, and there was no change in the gauge base range setting. All other gauge pressures on the row appeared normal. After a recurrence of this situation at 7:27 A.M. on September 12, approximately three hours after the initial startup, a full-scale investigation of the process water system was initiated. A rupture indication which showed on the gamma monitor at the time of the initial scram proved false. Investigation of a previous panellit scram, following startup, on row No. 46 showed nothing abnormal at that time.

2. Pieces of neoprene and fabric were found in all crossheader screens, the greater amounts being in the near-side header screens. Considerably more of the material was in the screens on the lower headers than the upper headers. The pieces ranged in size from very small bits to occasional pieces as large as one inch by three inches. All of the basket screens in the seven process water headers supplying the near riser were found to contain rather large

FINDINGS (Continued)

2. amounts of the neoprene pieces consisting of pieces as large as four inches by four inches. No neoprene was found in any of the far-side header basket screens. Approximately 200 process tube orifice screens and venturis were inspected. In addition to 1353-B, neoprene pieces were found only on the orifice screens of 1354-B and 4665-B. Also, one piece was found in the rod water supply screen.

3. Inspection of the curtain seal in Process Tank No. 4 showed the seal had deteriorated, and a piece approximately 36 square feet in size had dropped into the tank. These seals consist of laminations of neoprene sheets and canvas and were installed during the original tank construction. Power supervision had recognized the possible condition of the curtain seals and the damage they could cause, and the curtain seals had been removed from the No. 1, No. 2, and No. 3 Process Tanks during the fall of 1958 and the spring of 1959. No deterioration was evident upon inspection of these seals. It was intended to continue with the removal of the No. 4 seal, but during the spring of 1959, a windstorm removed part of the 190-B Tank Room roof, creating a safety hazard to operating personnel at this location. At this time it was decided to repair the Tank Room roof and to postpone removal of the No. 4 tank seal until roof repair was completed. It was necessary to cover the No. 2, No. 3, and No. 4 tanks with tarpaulins to prevent pieces of concrete, tar, and gravel from falling into the tanks during the roof repair work.

4. All crossheader screens were cleaned, the crossheaders were flushed, and the screens were replaced. A defective flexitallic gasket was found on the No. 12½ near-side crossheader screen, which could have permitted passage of the pieces causing the scrams, since these pieces appeared too large to pass through the crossheader screen. The defective gasket was probably caused by misalignment of the gasket and cover during tightening of the cover on the original CG-558 installation.

5. Some of the material in the crossheader screens was too large to pass through the valve pit basket screens. Since there were no ruptured basket screens, it must be assumed that a wrench found below the false bottom in one of the screen chests was not permitting the screen to seat properly. It was also found that neither the screen flanges or their mating surfaces were machined to fit closely, thereby creating a potential for material to bypass all screens. The process water system was thoroughly flushed, and during final installation, each screen was matched to its chest and the seating improved as much as possible by grinding the mating surfaces.

6. Prior to startup, the panellit pressure monitoring system was thoroughly checked to assure that no sensing lines were plugged and that all gauge base ranges were normal. Duplicate sets of data were taken by Process Technology personnel, calculations were double-checked and the results were analyzed by Process Technology personnel.

7. The reactor was started up at 2:57 P.M. on September 15. Additional temperature maps and flow and pressure readings, as recommended by the Process Technology Operation, were taken during the startup and subsequent operation. No unusual conditions have been observed since startup.

CONCLUSIONS

1. The primary cause of the incident was failure of the No. 4 tank curtain seal.

2. Improper screen fit on the pump discharge headers and improper installation of No. 12½ crossheader screen were contributing factors in the magnitude of the incident.

RECOMMENDATIONS AND ACTION

The following preventive measures have been taken or will be initiated. They are recommended for other facilities where applicable:

1. The No. 4 Process Tank was isolated and the curtain seal removed. The tank and adjacent lines were thoroughly flushed before returning the tank to service.

2. Each of the other tanks are to be drained and inspected for foreign materials.

3. Future inspections of process water screens are to include checking for proper fit.

A. R. Maguire

A. R. Maguire, Manager
B-C Reactor Operation
IRRADIATION PROCESSING DEPARTMENT

AR Maguire:JWB:asn

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