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February 13, 1952

SLUG JACKET FAILURES
JANUARY 1952

There were twenty slug jacket failures during the month of January, 1952. Of these, fourteen were end cap failures, five were split slugs and one has not been recovered. A total of 311.4 hours of outage time was required for removal of these ruptured slugs from the reactors.

The detection, removal and radiation aspects, along with the slug data, are shown on the attached sheets.

C. G. Lewis
Operations Unit
REACTOR SECTION

CG Lewis:bob

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RUPTURED SLUG DATA FOR TUBE #1471-DR
100-DR AREA - 1-3-52

I. LOST PRODUCTION TIME

Reactor down at 10:10 P. M. on 1-3-52. Operation resumed at 10:40 P. M. on 1-3-52.

Total outage time 0.5 hours. Time chargeable to rupture 0.5 hours.

II. SYMPTOMS OF RUPTURE

Beta Monitor, Increase on 107 inlet activity recorder.

III. CONFIRMATION OF RUPTURE

Pigtail reading > 5 r/hour.

IV. REMOVAL METHOD

Charging machine without oiling.

V. DATA ON CHARGE

Type MR. Canning date 4-12-51. Line G. Truck 12.

Autoclaved. Metal Group 7. Charged 5-9-51.

Concentration (tube) 584.

* Position of slug in tube unknown.

VI. RADIATION ASPECTS

No contamination spread. No over-exposure of personnel.

VII. GENERAL REMARKS

* Metal pushed into chute gates along with metal from previous ruptures.

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February 13, 1952

RUPTURED SLUG DATA FOR TUBE NO. 2582-B
100-B AREA - 1-6-52

I. LOST PRODUCTION TIME

Reactor down at 4:05 A. M. on 1-6-52. Operation resumed at 8:47 A. M. on 1-8-52.

Reactor down for removal of temporary poison at 12:50 A. M. on 1-9-52. Operation resumed at 5:32 A. M. on 1-9-52.

Total outage time 57.4 hours. Time chargeable to rupture 26.0 hours. Time chargeable to other work 31.4 hours.

Nature of other work: No. 6 HSR thimble was replaced and the rod was returned to service. Charging and other items originally scheduled for a shutdown on 1-9-52 were completed.

II. SYMPTOMS OF RUPTURE

Beta Monitor and filtered crossheader samples.

III. CONFIRMATION OF RUPTURE

Pigtail reading 25 r/hour.

IV. REMOVAL METHOD

Charging machine with oiling; however, charge stuck after 17 pieces had been pushed out. Frontseated at 3000 pounds with hydraulic ram. Final removal by charging machine.

V. DATA ON CHARGE

Type ZR. Canning date 2-23-51. Line G. Truck 1.

Autoclaved. Metal group 7.

Concentration (tube) 592.

Position of slug in tube - 24th from front (estimated from weaseling).

Tube replaced; slug and tube held in 105-B storage basin.

VI. RADIATION ASPECTS

No contamination spread. No over-exposure of personnel.

GENERAL REMARKS

The charge moved with the charging machine until about 17 slugs had been discharged. At that point it was necessary to use an hydraulic jack at 3000 pounds to free the charge. Final removal was then made with the charging machine. The rupture was an end cap failure. The cap was missing, and there was a small hole in the end of the slug. The outside of the can was in good condition.

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RUPTURED SLUG DATA FOR TUBE #3763-DR
100-DR AREA - 1-7-52

I. LOST PRODUCTION TIME

Reactor down at 3:08 P. M. on 1-7-52. Operation resumed at 1:28 P. M. on 1-9-52.

Charge "P" at 2:39 P. M. on 1-9-52. Start-up at 4:48 P. M. on 1-9-52. Reactor down for removal of temporary poison at 2:57 P. M. on 1-10-52. Operations resumed at 4:27 P. M. on 1-10-52.

Total outage time 49.9 hours. Time chargeable to rupture 49.9 hours.

II. SYMPTOMS OF RUPTURE

Special VGM.

III. CONFIRMATION OF RUPTURE

Pigtail reading 100 r/hour. Charge stuck.

IV. REMOVAL METHOD

Removed tube with entire charge in tube. Removed tube with 64 slugs inside at 2000 pounds. Remove barrel.

V. DETAILS ON CHARGE

Type 2B. Canning date 4-23-51. Line G. Truck 5.
Autoclaved. Metal Group 7. Charged 5-9-51.

Concentration (tube) 537.

Position of slug in tube - 15th from downstream end of metal charge.

VI. RADIATION ASPECTS

No contamination spread. No over-exposure of personnel.

VII. GENERAL REMARKS

When the downstream slugs could not be flushed out, the tube was removed with the entire metal charge in it. Inspection of the tube revealed a two inch crescent-shaped split in the tube about one-quarter inch wide at approximately the center of the ruptured slug. The end cap was separated from the balance of the ruptured slug.

Special transfer cask was inoperable at this time.

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RUPTURED SLUG DATA FOR TUBE #3688-B
100-B AREA - 1-10-52

I. LOST PRODUCTION TIME

Reactor down at 5:32 P. M. on 1-10-52. Operation resumed at 5:58 P. M. on 1-10-52.
Total outage time 0.4 hours. Time chargeable to rupture 0.4 hours.

II. SYMPTOMS OF RUPTURE

Beta Monitor and filtered crossheader samples.

III. CONFIRMATION OF RUPTURE

Pigtail reading 1 r/hour.

IV. REMOVAL METHOD

Charging machine with oiling.

V. DATA ON CHARGE

Type MR. Canning date 2-5-51. Line G. Truck 4.

Autoclaved. Metal Group 7.

Concentration (tube) 325.

Position of slug in tube unknown.

Tube recharged solid aluminum. Slug held in 105-B storage basin.

VI. RADIATION ASPECTS

No contamination spread. No over-exposure of personnel.

VII. GENERAL REMARKS

The slug had a small slit about a quarter of an inch long between the cap and the can.

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RUPTURED SLUG DATA FOR TUBE #2585-F
100-F AREA - 1-11-52

I. LOST PRODUCTION TIME

Reactor down at 12:10 P. M. on 1-11-52. Operation resumed at 12:45 P. M. on 1-11-52.

Total outage time 0.6 hours. Time chargeable to rupture 0.6 hours.

II. SYMPTOMS OF RUPTURE

Beta Monitor and filtered crossheader samples.

III. CONFIRMATION OF RUPTURE

Pigtail reading 25 r/hour.

IV. REMOVAL METHOD

Charging machine without oiling.

V. DATA ON CHARGE

Type MR. Canning date 3-8-51. Line G. Truck 6.

Autoclaved.

Concentration (tube) 497 MWD.

Position of slug in tube - 42nd from front.

Slug canned; tube replaced.

VI. RADIATION ASPECTS

No contamination spread. No over-exposure of personnel.

VII. GENERAL REMARKS

Cap loose except for one-half inch of weld.

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RUPTURED SLUG DATA FOR TUBE #0978-DR
100-DR AREA - 1-11-52

I. LOST PRODUCTION TIME

Reactor down at 8:52 P. M. on 1-11-52. Operation resumed at 1:15 P. M. on 1-12-52.

Reactor down for charge of temporary poison at 12:30 A. M. on 1-13-52. Operation resumed at 2:05 A. M. on 1-13-52.

Total outage time 17.9 hours. Time chargeable to rupture 17.9 hours.

II. SYMPTOMS OF RUPTURE

Beta Monitor.

III. CONFIRMATION OF RUPTURE

Pigtail reading 150 r/hour. Charge stuck.

IV. REMOVAL METHOD

Backseated at 1500 pounds with hydraulic ram. Removed tube ribs. Flushed out chips. Final removal by ram at 2200 pounds and by charging machine.

V. DATA ON CHARGE

Type Z. Canning date 6-23-51. Line G. Truck 5. Autoclaved. Metal Group 3.

Charged 7-16-51. Concentration (tube) 426.

Position of slug in tube - 21st from rear downstream end of metal charge.

Slug to be shipped to 100-B for inspection.

VI. RADIATION ASPECTS

No contamination spread. No over-exposure of personnel.

VII. GENERAL REMARKS

The ruptured slug was split near the center of the base end, extending almost the full length of the slug.

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RUPTURED SLUG DATA FOR TUBE #1166-F
100-F AREA - 1-12-52

I. LOST PRODUCTION TIME

Reactor down at 6:00 A. M. on 1-12-52. Operation resumed at 9:25 A. M. on 1-13-52.

Reactor down from 12:47 P. M. to 4:53 P. M. on 1-13-52 for charging of temporary poison. Reactor down for removal of temporary poison at 7:55 A. M. on 1-14-52. Operation resumed at 10:34 A. M. on 1-14-52.

Total outage time 34.2 hours. Time chargeable to rupture 34.2 hours.

II. SYMPTOMS OF RUPTURE

Beta Monitor and filtered sample.

III. CONFIRMATION OF RUPTURE

Pigtail reading 20 r/hour.

IV. REMOVAL METHOD

Final removal by charging machine.

V. DATA ON CHARGE

Type ZR. Canning date 4-17-51. Line G. Truck 5. Autoclaved. Metal Group 7.

Concentration (tube) 454 MWD.

Position of slug in tube - 47th from front.

Slug canned and awaiting shipment to 111-B.

VI. RADIATION ASPECTS

Extremely high rear face contamination requiring chemox masks. No over-exposure of personnel.

VII. GENERAL REMARKS

Charged 5-8-51.

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RUPTURED SLUG DATA FOR TUBE #0864-D
100-D AREA - 1-13-52

I. LOST PRODUCTION TIME

Reactor down at 7:00 P. M. on 1-13-52. Operation resumed at 7:27 P. M. on 1-13-52.

Total outage time 0.5 hours. Time chargeable to rupture 0.5 hours.

II. SYMPTOMS OF RUPTURE

Beta Monitor, routine VGM.

III. CONFIRMATION OF RUPTURE

Pigtail reading 6 r/hour.

IV. REMOVAL METHOD

Charging machine without oiling.

V. DATA ON CHARGE

Type ZR. Canning date 1-9-51. Line H. Truck 3. Autoclaved. Metal Group 7.

Concentration (tube) 470. Charged 4-18-51.

VI. RADIATION ASPECTS

No contamination spread. No over-exposure of personnel.

VII. GENERAL REMARKS

Cap failure.

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RUPTURED SLUG DATA FOR TUBE #2462-D
100-D AREA - 1-15-52

I. LOST PRODUCTION TIME

● Reactor down at 11:22 P. M. on 1-15-52. Operation resumed at 11:48 P. M. on 1-15-52.

Total outage time 0.4 hours. Time chargeable to rupture 0.4 hours.

II. SYMPTOMS OF RUPTURE

Beta Monitor.

III. CONFIRMATION OF RUPTURE

Pigtail reading 32 r/hour.

IV. REMOVAL METHOD

Charging machine without oiling.

● V. DATA ON CHARGE

Type MR. Canning date 4-3-51. Line G. Truck 2. Autoclaved. Metal Group 7.

Concentration (tube) 550. Charged 4-18-51.

VI. RADIATION ASPECTS

No contamination spread. No over-exposure of personnel.

VII. GENERAL REMARKS

Cap failure.

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RUPTURED SLUG DATA FOR TUBE #1560-DR
100-DR AREA - 1-18-52

I. LOST PRODUCTION TIME

Reactor down at 12:17 P. M. on 1-16-52. Operation resumed at 3:52 A. M. on 1-18-52.

Reactor down for removal of temporary poison at 2:43 P. M. on 1-18-52. Operations resumed at 4:47 P. M. on 1-18-52.

Total outage time 39.1 hours. Time chargeable to rupture 23.1 hours. Time chargeable to other work 16.0 hours. Other work consisted of charge and discharge of process tubes.

II. SYMPTOMS OF RUPTURE

Beta Monitor and 107 inlet activity.

III. CONFIRMATION OF RUPTURE

Pigtail reading 5 r/hour. Charge stuck.

IV. REMOVAL METHOD

Backseated at 200. Flushed out chips. Final removal by ram at 1460 pounds.

V. DATA ON CHARGE

Type MR. Canning date 4-11-51. Line G. Truck 9. Autoclaved. Metal Group 7.

Charged 5-9-51. Concentration (tube) 520.

Position of slug in tube - 35th from downstream end of metal charge.

Slug to be shipped to 100-B Area for inspection.

VI. RADIATION ASPECTS

No contamination spread. No over-exposure of personnel.

VII. GENERAL REMARKS

Process tube removed—to be replaced at a later date. An examination of the ruptured slug revealed two longitudinal splits approximately one inch apart beginning one-quarter inch from the base end of the slug. The two splits joined a radial crack at a point approximately two-thirds of the length of the slug.

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RUPTURED SLUG DATA FOR TUBE #2961-B
100-B AREA - 1-16-52

I. LOST PRODUCTION TIME

Reactor down at 11:10 P. M. on 1-16-52. Operation resumed at 2:31 A. M. on 1-18-52.

Total outage time 27.3 hours. Time chargeable to rupture 27.3 hours.

II. SYMPTOMS OF RUPTURE

Beta Monitor and filtered crossheader samples.

III. CONFIRMATION OF RUPTURE

Pigtail reading 2 r/hour. Charge stuck.

IV. REMOVAL METHOD

Flushed out 49 slugs with 200 psi water pressure. Transfer operation; removed 14 slugs to adjacent tube 2962. Removed tube with one slug inside at 3000 pounds.

V. DATA ON CHARGE

Type 2R. Canning date 4-5-51. Line G. Truck 2. Antoclaved. Metal Group 7.

Concentration (tube) 487.

Position of slug in tube - 15th slug from front.

Slug being held in 105-B storage basin. A new tube will be installed during a subsequent shutdown.

VI. RADIATION ASPECTS

No contamination spread. Two men received over-exposures. These over-exposures are being formally investigated.

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RUPTURED SLUG DATA FOR TUBE #2562-F
100-F AREA - 1-17-52

I. LOST PRODUCTION TIME

Reactor down at 12:22 P. M. on 1-17-52. Operation resumed at 1:44 A. M. on 1-19-52.

Reactor down for removal of temporary poison at 5:28 P. M. on 1-19-52. Operation resumed at 8:58 P. M. on 1-19-52.

Total outage time 40.8 hours. Time chargeable to rupture 10.0 hours. Time chargeable to other work 30.8 hours. Other work consisted of charge-discharge, reactor maintenance, production tests.

II. SYMPTOMS OF RUPTURE

Beta Monitor and special VGM.

III. CONFIRMATION OF RUPTURE

Pigtail reading 15 r/hour. Charge stuck.

IV. REMOVAL METHOD

Flushed out 41 pieces at 350 psi water pressure. Backseated at 5000 pounds with hydraulic ram. Removed tube ribs. Flushed out chips. Final removal by ram at 4000 pounds and by push pole when forces required dropped to 250 pounds.

V. DATA ON CHARGE

Type MR. Canning date 2-27-51. Line H. Truck 1. Autoclaved. Metal group 7.

Concentration (tube) 508 MWD.

Position of slug in tube - 23rd from upstream end.

Slug canned and awaiting shipment to 100-B.

VI. RADIATION ASPECTS

No contamination spread. No over-exposure of personnel.

VII. GENERAL REMARKS

Rupture had a wedge-shaped split extending completely through the piece.

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RUPTURED SLUG DATA FOR TUBE #2669-B
100-B AREA - 1-25-52

I. LOST PRODUCTION TIME

Reactor down at 6:49 A. M. on 1-25-52. Operation resumed at 7:12 A. M. on 1-25-52.

Total outage time 0.4 hours. Time chargeable to rupture 0.4 hours.

II. SYMPTOMS OF RUPTURE

Beta Monitor and filtered crossheader samples.

III. CONFIRMATION OF RUPTURE

Pigtail reading 3 r/hour.

IV. REMOVAL METHOD

Charging machine without oiling.

V. DATA ON CHARGE

Type MR. Canning date 4-28-51. Yine G. Truck 9. Autoclaved. Metal Group 8.

Concentration (tube) 564.

Position of slug in tube unknown. Slug held in 105-B storage basin. The tube is now charged with solid aluminum, but will be charged with regular metal during the next shutdown.

VI. RADIATION ASPECTS

No contamination spread. No over-exposure of personnel.

VII. GENERAL REMARKS

Examination of the slug revealed that the cap was missing.

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RUPTURE DUMPING DATA FOR TUBE #0860-B
100-B AREA - 1-25-52

I. LOST PRODUCTION TIME

Reactor down at 5:34 P. M. on 1-25-52. Operation resumed at 7:27 P. M. on 1-26-52.

Total outage time 25.9 hours. Time charges for rupture 25.9 hours.

II. SYMPTOMS OF RUPTURE

Meta Monitor, special VGM and filtered cross-section samples.

III. CHARACTERIZATION OF RUPTURE

Digital reading 50 r/hours. Charge stuck.

IV. REMOVAL METHOD

Flushed out 29 slugs at 200 psi water pressure. Back-sealed at 6500 pounds with hydraulic ram. Removed tube ribs. Flushed out chips. Final removal by ram at 1000 pounds.

V. DATA ON CHARGE

Type 18R. Canning date 12-26-50. Line G. Truck 10. Autoclaved. Meta Group 7.

Concentration (tube) 511.

Position of slug in tube - 35th from front. Tube replaced and recharged regular. Slug held in 105-B storage basin.

VI. RADIATION ASPECTS

No contamination spread. No over-exposure of personnel.

VII. GENERAL REMARKS

The side of the can was split the full length in two places.

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RUPTURED TUBE DATA FOR TUBE #2082-F
100-F AREA - 1-26-52

I. LOST PRODUCTION TIME

Reactor down at 7:44 P. M. on 1-26-52. Operation resumed at 12:03 A. M. on 1-28-52.

Total outage time 28.3 hours. Time chargeable to rupture 28.3 hours.

II. SYMPTOMS OF RUPTURE

Routine VGM and evaporated samples.

III. CONFIRMATION OF RUPTURE

- Pigtail reading 30 r/hour.

IV. REMOVAL METHOD

Backseated at 2000 pounds with hydraulic ram. Removed tube ribs. Flushed out chips. Final removal by ram at 2000 pounds and by charging machine.

V. DATA ON CHARGE

Type MR. Canning date 4-14-51. Line G. Truck 10. Autoclaved. Metal Group 7.

Date charged 5-8-51. Concentration (tube) 476 MWD.

Position of slug in tube - 48th from front. Slug canned; tube replaced.

VI. RADIATION ASPECTS

No contamination spread. No over-exposure of personnel.

VII. GENERAL REMARKS

Far side of 19½ header bucks near side. Therefore, no sample room indication was noted.

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RUPTURED SLUG DATA FOR TUBE #0787-D
100-D AREA - 1-27-52

I. LOST PRODUCTION TIME

Reactor down at 8:55 A. M. on 1-27-52. Operation resumed at 12:36 P. M. on 1-28-52.

Reactor down for removal of temporary poison at 11:50 P. M. on 1-28-52. Operation resumed at 1:50 A. M. on 1-29-52.

Total outage time 29.7 hours. Time chargeable to rupture 29.7 hours.

II. SYMPTOMS OF RUPTURE

Beta monitor and special VGM sample.

III. CONFIRMATION OF RUPTURE

Pigtail reading 2.2 r/hour.

IV. REMOVAL METHOD

Attempted to backseat at 6000, no movement. Flushed out material downstream of the failure and then discharged the entire tube containing the residual metal.

V. DATA ON CHARGE

End data not available as end of can was damaged so that data could not be read.

Position of slug in tube - 37th from downstream end of charge (by measurement).

Charged 3-7-51. Concentration (tube) 461.

Slug to be canned and sent to 100-B for inspection.

VI. RADIATION ASPECTS

No contamination spread. No over-exposure of personnel.

VII. GENERAL REMARKS

Slug was found to be in six pieces and was classed as a split.

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RUPTURED SLUG DATA FOR TUBE #2076-DR
100-DR AREA - 1-28-52

I. LOST PRODUCTION TIME

Reactor down at 3:03 P. M. on 1-28-52. Operation resumed at 3:35 A. M. on 1-28-52.

Total outage time 0.5 hours. Time chargeable to rupture 0.5 hours.

II. SYMPTOMS OF RUPTURE

Beta Monitor.

III. CONFIRMATION OF RUPTURE

Pigtail reading 1 r/hour.

IV. REMOVAL METHOD

Charging machine without oiling.

V. DATA ON CHARGE

Type MF. Canning date 4-30-51. Line G. Truck 6. Autoclaved. Metal Group 8.

Charged 6-6-51. Concentration (tube) 52%.

Position of slug in tube unknown. Slug to be sent to 100-B for inspection.

VI. RADIATION ASPECTS

No contamination spread. No over-exposure of personnel.

VII. GENERAL REMARKS

End cap is approximately four-fifths separated from slug.

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RUPTURED SLUG DATA FOR TUBE NO. 0770-F
100-F AREA - 1-30-52

I. LOST PRODUCTION TIME

Reactor down at 8:26 A. M. on 1-30-52. Operation resumed at 3:53 A. M. on 1-31-52.

Total outage time 19.5 hours. Time chargeable to rupture 19.0 hours; 0.5 hours was chargeable to removal of ruptured slug from 0666-F.

II. SYMPTOMS OF RUPTURE

Beta Monitor and special filtered samples.

III. CONFIRMATION OF RUPTURE

Pigtail reading 5 r/hour. Charge stuck.

IV. REMOVAL METHOD

Frontseated at 1700 pounds with hydraulic ram. Final removal by ram at 2000 pounds and then by charging machine.

V. DATA ON CHARGE

Lot 124T. Canning date 8-23-51. Truck 2. Autoclaved. Metal Group 8.

Concentration (tube) 218 MWD.

Position of slug in tube - 43rd from front. Slug canned for shipment to 111-B; tube replaced.

VI. RADIATION ASPECTS

No contamination spread. No over-exposure of personnel.

VII. GENERAL REMARKS

Tube charged on 9-18-51. Piece split lengthwise into two pieces.

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RUPTURED SLUG DATA FOR TUBE #0666-F
100-F AREA - 1-30-52

I. LOST PRODUCTION TIME

Reactor down at 8:26 A. M. on 1-30-52. Operation resumed at 3:53 A. M. on 1-31-52.

Total outage time 19.5 hours. Time chargeable to rupture 0.5 hours; 19.0 hours chargeable to removal of ruptured slug from 0770-F.

II. SYMPTOMS OF RUPTURE

Beta monitor and rear face survey.

III. CONFIRMATION OF RUPTURE

Pigtail reading 2.5 r/hour.

IV. REMOVAL METHOD

Charging machine without oiling.

V. DATA ON CHARGE

Type ZR. Canning date 1-23-51. Line H. Truck 10. Autoclaved. Metal Group 7.
Concentration (tube) 496 MWD.

Position of slug in tube not determined since pieces were mixed with others in the chute. Slug canned and awaiting shipment to 111-B.

VI. RADIATION ASPECTS

No contamination spread. No over-exposure of personnel.

VII. GENERAL REMARKS

Charged 2-21-51. End cap missing.

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RUPTURED SLUG DATA FOR TUBE #2777-D
100-D AREA - 1-30-52

I. LOST PRODUCTION TIME

Reactor down at 6:08 A. M. on 1-30-52. Operation resumed at 6:28 A. M. on 1-30-52.
Total outage time 0.3 hours. Time chargeable to rupture 0.3 hours.

II. SYMPTOMS OF RUPTURE

Beta Monitor, special VGM, filtered sample.

III. CONFIRMATION OF RUPTURE

Pigtail reading 500 mr/hour.

IV. REMOVAL METHOD

Charging machine without oiling.

V. DATA ON CHARGE

Type MR. Canning date 4-25-51. Line G. Truck 3. Autoclaved. Metal Group 7.
Charged 5-23-51. Concentration (tube) 524.

Position of slug in tube not known. Slug canned and stored in 105-D storage basin for shipment to 100-B for inspection.

VI. RADIATION ASPECTS

No contamination spread. No over-exposure of personnel.

VII. GENERAL REMARKS

Not detectable on the 107 inlet chart due to an increase in power level that was made at the time the failure occurred.

Classed as a cap failure. The break constituted about 90% of the cap circumference.

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