

BOOK30R

Notes:

"HFIR#5" on spine

Blank pages: inside front cover and opposite page 1, 1, 152, inside back cover

- pink sheet in front of cover sheets
- index card clipped to inside cover sheet
- pages 57/58 has paper clip on top of page

Scanned by:

Sheila Finch

RSICC /Oak Ridge National Lab.

August 5, 1999

J.N. SWANKS
 BLDG. 7910



UNION CARBIDE CORPORATION
 NUCLEAR DIVISION

FROM Record Center
 BLDG. 9711-5

IN-PLANT LOAN RECEIPT

| DOCUMENT NO. | COPY AND SERIES | CLASS. | TITLE OR DESCRIPTION |
|--------------|-----------------|--------|----------------------|
| ACCOUNT BOOK | No-5149 | U | 14-2-3 |

- White - Sender forwards with document. Borrower signs and returns. Sender returns to borrower when document is returned.
- Yellow - Sender holds for return of signed white; then destroys.
- Pink - Sender forwards with document. Borrower returns to sender with document. Sender destroys.
- Green - Sender forwards with document. Borrower holds for return of signed white; then destroys.

DATE SENT
 8-26-76
 DATE DUE
 9-26-76

I have received the material identified above and assume full responsibility for its safe handling, storage, transmittal elsewhere and/or return in accordance with existing security regulations.

J. N. Swanks
 SIGNATURE

DATE

Strip Wootly

| <u>N27. B</u> | <u>18</u> |
|-------------------|------------------|
| 2 - 13.3 | 1 - 27.2 |
| 3 - 13.0 | 2 - 25.6 |
| 4 - 13.3 | 3 - 27.4 |
| 5 - 13.0 | 4 - 26.1 |
| <u>Avg. 13.15</u> | 5 - 23.8 |
| Σ 52.6 | 6 - 23.8 |
| | 7 - 23.8 |
| | 8 - 26.3 |
| | 9 - 26.3 |
| | 10 - 26.5 |
| | <u>Avg. 25.7</u> |

Core + fuel + primary key
Core = Portals + Key - full

UNION CARBIDE CORPORATION
NUCLEAR DIVISION

IN-PLANT LOAN RECEIPT

FROM: *Record Center*
BLDG. *9711-5*

TO: *J.N. SWANKS*
DOCUMENT NO. *7910*

COPY AND SERIES: *No-5149 U*
CLASS: *14-2-3*

TITLE OR DESCRIPTION: *ACCOUNT BOOK*

DATE SENT: *8-26-76*
DATE DUE: *9-26-76*

SIGNATURE: *J.N. Swanks*

UCN-490A
(2-11-68)

I have received the material identified above and assume full responsibility for its safe handling, storage, transmittal elsewhere and/or return in accordance with existing security regulations.

Strip Worth

| N27.0 | 'B |
|------------|---------|
| 2-13.3 | 1-27.2 |
| 3-13.0 | 2-25.6 |
| 4-13.3 | 3-27.4 |
| 5-13.0 | 4-26.1 |
| Avg. 13.15 | 5-23.8 |
| Σ 50.1 | 6-23.8 |
| | 7-23.8 |
| | 8-26.3 |
| | 9-26.3 |
| | 10-26.5 |

Avg. 25.7



Record Ruled (27 Lines)

Made in 150, and 300 Pages

MADE IN U.S.A.

TO REORDER, SPECIFY NUMBER, RULING AND THICKNESS INDICATED ON BACKBONE OF THIS BOOK.

14-2-3

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE REFERENCE | SET | START-UP RANGE |
|------------|-----------------------|---------|------------------|-----|-----------------------|
| K-1 | 3 X 10 ⁻¹² | Water ✓ | 4" | ✓ | 3 X 10 ⁻¹² |
| " | " | Fast ✓ | " | ✓ | " |
| K-2 | " | Alarm ✓ | 3" | ✓ | " |
| " | " | Fast ✓ | " | ✓ | " |
| P-1 | 700V | Alarm ✓ | cont | ✓ | 500V |
| P-2 | 1200V | Low ✓ | 8" | ✓ | 900V |
| " | " | Alarm ✓ | 1" | ✓ | " |

LOG N CALIBRATION OPERATE SOURCE No. B-80

DUMP WELL TROBE LIGHT

START-UP CHECK LIST

Equipment checked by F.O.C. Personnel check by F.O.C.
 Instruments and safeties checked and reset by A.K.K.
 Source is checked by A.K.K. M-43
 Emergency equipment is checked by F.O.C.
 Ins. wires in place by A.K.K. 2-1-2 PM-KL
 Rod id. on by A.K.K. 0820
 Start-up OK'd by F.O.C., A.K.K. Date 2-3-72

H.F.I.R. Core
 117-0-117-E

Have H.F.I.R. core 117-0 & 117-E assemble in small reflector tank, inner core spaced 1.375" with plastic spacers.

0902 Water ht = 59.10 cm.
 System sub critical
 Drain.

Now have spent fuel element with 2 fuel plates # D-3224 & D-5495.

0938 Water ht = 59.0 cm
 System sub critical
 Drain.

Now have spent fuel element with 4 fuel plates # D-3224 & D-5495, D-3242, D-2870, plus 4 enriched strips # 5, 6, 9, 10 and 1 natural strip # 5.

Water ht = 59.10 cm $\pm 6 = 7.8$ Temp °C
 #15 = 23.5 °C
 #16 = 23.7 °C
 + Peri
 $E = 69.5 \text{ cm} = 13.0 \text{ ft} = 1.74 \text{ /cm}$

1034 Water ht = 51.30 cm $\text{core} = 291.0 - 113.4 - 13.0$
 System just critical $= -264.6 \text{ ft}$
 Drain

Repeat + Per: to check Log n.

Water ht = 59.10 cm ^{± 0.8 cm}

+ Per

t = 67.4 mm = 13.3 φ = 1.74 cm

1052 Water ht = 51.30 cm

System just critical
Drain

Temp °C

15 = 24.2 °C

16 = 23.7 °C

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE DELAYANCE | SET | START-UP RANGE |
|-----------------------------|---------|---------|------------------|-----|------------------------|
| K-1 | 3110-12 | Meter ✓ | 9" | ✓ | 3X10-12 |
| " | " | Ext ✓ | " | ✓ | " |
| K- | " | Meter ✓ | 3" | ✓ | " |
| " | " | Ext ✓ | " | ✓ | " |
| P- | | | | | |
| P- | 700V | Alarm ✓ | cont | ✓ | 500V |
| P- | 1200V | Ext ✓ | 8" | ✓ | 900V |
| " | " | Alarm ✓ | 1" | ✓ | " |
| LOG IN CALIBRATE ✓ | | | OPERATE ✓ | | SOURCE No. <u>D-80</u> |
| DUMP WELL PROBE LIGHT _____ | | | | | |

START-UP CHECK LIST

Equipment checked by ^{Z.P.C.} ARKK Personnel check by Z.P.C.
 Instruments and meters checked and reset by ARKK
 Source is checked by ARKK Source No. 19-43
 Emergency equipment for accident ready checked by F.I.C.
 Instruments for trip checked by K-1-2 AM-1-2
 Red light on by ARKK Time 0910
 Start-up OK'd by F.I.C., ARKK Date 2-7-72

H.F.I.R. cones
115-0 & 115-1

Have H.F.I.R. cones 115-0 - 115-1 assemble in
small reflector tank, inner core spaced
.375" with plastic spacers.

0845 Water ht = 59.10 cm.
System sub critical
Drain.

Now have spent fuel element with 2 fuel
plates # D-3224 & D-5495.

0914 Water ht = 59.20 cm Temp °C
System sub critical #15 = 22.0 °C
Drain. 16 = 22.2 °C

Now have spent fuel element with 4 fuel
plates # D-3224, D-5495, D-3242, D-5495. Plus
4 enriched strips # 1, 2, 3, 5. and natural strips
2.

~~15~~
1257 Water ht = 59.00 cm Temp °C
System sub critical #15 = 22.2 °C
Drain. 16 = 22.2 °C

H.F.I.R. cones
115-0 & 115-E

Removed natural strip # 2.

Water ht = 59.10 cm $\Delta h = 1.7$ cm Temp °C
+ Per #15 = 22.2 °C
C = 1912.2 sec = .66 ϕ = .394/cm 16 = 22.5 °C

1326 Water ht = 57.90 cm
System just critical core = 391.0 - 109.0 = .66
Drain. = -286.3 ϕ

H.F.I.R. cones
114-0 & 114-E

Have H.F.I.R. cones 114-0 & 114-E assemble in
small reflector tank, inner core spaced
.375" with plastic spacers.

1500 Water ht = 59.10 cm
System sub critical
Drain.

Now have spent fuel element with 2 fuel
plates # D-3224 & D-5495

1540 Water ht = 59.10 cm Temp °C
System sub critical #15 = 22.5 °C
Drain. 16 = 23.0 °C

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE | SET | START-UP RANGE |
|------------|---------|---------|--------|-----|----------------|
| K-1 | 3A10-12 | Meter ✓ | 4" | ✓ | 3A10-12 |
| " | " | Fast ✓ | " | ✓ | " |
| K-2 | " | Meter ✓ | 3" | ✓ | " |
| " | " | Fast ✓ | " | ✓ | " |
| R-1 | | | | | |
| R-2 | | | | | |
| PM-1 | 700 ✓ | Alarm ✓ | cont | ✓ | 500 ✓ |
| PM-2 | 1200 ✓ | Low ✓ | 89 | ✓ | 900 ✓ |
| " | " | Alarm ✓ | 1" | ✓ | " |

LOG N CALIBRATE OPERATE SOURCE No. 10-80
 DUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by E.I.C. Personnel check by E.I.C.
 Instruments and safeties checked and reset by R.M.V.
 Source in checked by R.M.V. Source No. M-43
 Emergency equipment in control room checked by E.I.C.
 Instruments in trip circuit: K-1-2 PM-1-2
 Red light on by R.M.V. 0815
 Start-up OK'd by E.I.C. R.M.V. Date 7-8-72

H.P.I.R. Cont
 114.0 + 112-E

Now have spent fuel element with 9 fuel plates # 0-3729, 11-5425, 11-8242, 11-2870, plus 9 enriched strips # 2, 3, 7, 8.

Water ht = 59.20 cm Temp °C
 + Per - Void # 15 = 22.2 °C
 16 = 22.7 °C

0856 System screamed by K-1.

Water ht = 59.30 cm ^{ΔL = 8.3 cm} Temp °C
 + Per # 15 = 22.7 °C
 T = 52.15 cm = 15.9 f = 1.94/cm 16 = 23.0 °C

0916 Water ht = 51.0 cm.
 System just critical core = 391.0 - 103.1 - 15.9
 Drain. = -272.0 f ✓

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE | SET | START-UP RANGE |
|------------|---------------------|---------|--------|-----|---------------------|
| K-1 | 3x10 ⁻¹² | Meter ✓ | 4" | ✓ | 3x10 ⁻¹² |
| " | " | Fast ✓ | " | ✓ | " |
| K-2 | " | Meter ✓ | 3" | ✓ | " |
| " | " | Fast ✓ | " | ✓ | " |
| R-1 | | | | | |
| R-2 | | | | | |
| PM-1 | 700V | Alarm ✓ | cut | ✓ | 500V |
| PM-2 | 1200V | Low ✓ | 8" | ✓ | 900V |
| " | " | Alarm ✓ | 1" | ✓ | " |

LOG N CALIBRATE OPERATE SOURCE No. 0-90
 DUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by ^{Z, N, C} AKH Personnel check by AKL
 Instruments and safeties checked and reset by AKH
 Source in checked by AKH Source No. 19-93
 Emergency equipment in control room checked by F.O.C.
 Instruments in trip circuit: K-1-2 PM-1-2
 Red light on by AKH Time 1020
 Start-up OK'd by F.O.C., AKH Date 2-10-72

H.F.L.R. core
 113-0 & 113-2

Same H.F.L.R. core 113-0 & 113-2 assembled in small reflector tanks, same core speed, 375" with plastic spacers.

1057 Water ht = 59.10 cm
 System sub critical
 Drain.

Now have spent fuel element with 2 fuel plates # 0-3224 & 0-5495.

1126 Water ht = 59.10 cm Temp °C
 System sub critical #15 = 22.7 °C
 Drain. 16 = 27.0 °C

Now have spent fuel element with 4 fuel plates # 0-3224, 0-5495, 0-3247, 0-2870. Plus 4 enriched strips # 5, 6, 7, 8. And natural strip # 2,

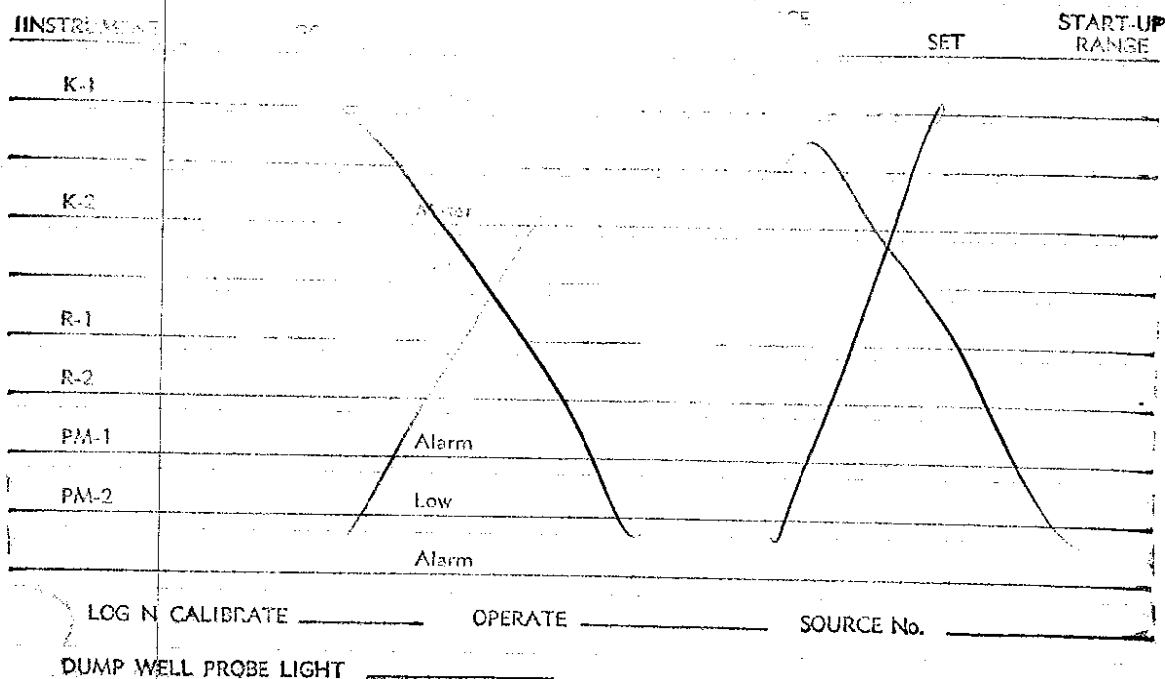
Water ht = 59.10 cm Temp °C
 + Per #15 = 23.0 °C
 5 = 499.8 sec = 2.94 16 = 23.5 °C

1507 Water ht = 55.30 cm
 System just critical
 Drain. core = 391.0 - 111.0 - 2.9
 = 277.64

H.F.I.R. Core
112-0 & 112-F

Now have H.F.I.R. Core 112-0 & 112-1 assembly
in small reflector tanks. Inner core spaced
.375" with plastic spacers.

Water ht = 59.20cm
System sub-critical
Drain.



INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE DISTANCE | SET | START-UP RANGE |
|------------|---------------------|---------|-----------------|-----|---------------------|
| K-1 | 3x10 ⁻¹² | Meter ✓ | 4" | - | 3x10 ⁻¹² |
| " | " | Fast - | " | - | " |
| K-2 | " | Meter - | 3" | - | " |
| " | " | Fast - | " | - | " |
| R-1 | | | | | |
| R-2 | | | | | |
| PM-1 | 700v | Alarm ✓ | cont | - | 500v |
| PM-2 | 1200v | Low ✓ | 8" | - | 900v |
| " | " | Alarm - | 1" | - | " |

LOG N CALIBRATE _____ OPERATE _____ SOURCE No. B-80

DUMP WELL PROBE LIGHT _____

START-UP CHECK LIST

Equipment checked by ^{I.D.C.} AKL Personnel check by AKL

Instruments and safeties checked and reset by AKL

Source in checked by AKL Source No. M-83

Emergency equipment in control room checked by I.D.C.

Instruments in trip circuit: K-1-2 PM-1-2

Red light on by AKL Time 0800

Start-up OK'd by I.D.C. AKL Date 8-11-72

H.F.I.R. cones
112-D + 112-E

Now have spent fuel element with 2
fuel plates # 0-3224 + 0-5495.

0900

Water ht = 59.20 cm.

Temp °C

System sub critical

#15 = 23.0 °C

Drain.

16 = 23.5 °C

Now have spent fuel element with 4
fuel plates # 0-3243224, 0-5495, 0-3242, 0-
0-5495. Plus 4 enriched strips # 7, 8, 9, 10.

Water ht = 59.30 cm

Δh = 6.5 cm

Temp °C

+ Per

#15 = 23.2 °C

C = 126.02 cm = 5.84 = .89 f/cm.

16 = 23.5 °C

1054

Water ht = 52.80 cm

System just critical

Drain.

Core = 3910 - 102.9 - 5.8

= -282.3 f

C.E-2 cone

Now have CE-2 assembly in small reflection
tanks. Have spent fuel element with 4 fuel
plates # 0-3224, 0-5495, 0-3242, 0-2870. Plus
3 enriched strips # 1, 2, 10. plus 1 natural strip
2.

Water ht = 59.10 cm

Δh = 9.5 cm

Temp °C

+ Per

#15 = 23.2 °C

C = 56.50 cm = 15.0 f = 1.6 f/cm

16 = 23.5 °C

Water ht = 49.60 cm

System just critical

Drain

Core = 3910 - 92.60 - 15.0

= -283.9 f

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE | SET | START-UP RANGE |
|------------|---------|---------|--------|-----|----------------|
| K-1 | 3110-12 | Meter ✓ | 9" | ✓ | 3110-12 |
| " | " | " ✓ | 1" | ✓ | " |
| K-2 | " | " ✓ | 3" | ✓ | " |
| " | " | " ✓ | 1" | ✓ | " |
| R-1 | | | | | |
| R-2 | | | | | |
| PM-1 | 700V | " ✓ | cont | ✓ | 500V |
| PM-2 | 1200V | " ✓ | 8" | ✓ | 900V |
| " | " | Alarm ✓ | 1" | ✓ | " |

LOG IN CALIBRATE OPERATE SOURCE No. B-80
 DUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by Z.D.C. Personnel check by R.K.H.
 Instruments and safeties checked and reset by A.K.H.
 Source in checked by A.K.H. Source No. M-93
 Emergency equipment in control room checked by Z.D.C.
 Instruments in trip circuit: K-1-2 PM-1-2
 Red light on by A.K.H. Time 1325
 Start-up OK'd by Z.D.C. A.K.H. Date 7-12-72

H.F.L.R. Cons
 110-0 & 110-I

Have H.F.L.R. Cons 110-0 & 110-I assemble in small
 repulston tanks. Downer core spaced 1375" with
 plastic spacers.

1357 Water ht = 59.10 cm
 System sub critical
 Drain.

Now have spent fuel element with 2 fuel
 plates, # D-3224 & D-5995.

1524 Water ht = 59.20 cm
 System sub critical.
 Drain.

Temp °C
 #15 = 23.2°C
 16 = 23.5°C

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE DISTANCE | SET | START-UP RANGE |
|------------|---------------------|-------------------------------------|-----------------|-------------------------------------|---------------------|
| K-1 | 3×10^{-12} | <input checked="" type="checkbox"/> | 4" | <input checked="" type="checkbox"/> | 3×10^{-12} |
| " | " | <input checked="" type="checkbox"/> | 1" | <input checked="" type="checkbox"/> | " |
| K-2 | " | <input checked="" type="checkbox"/> | 3" | <input checked="" type="checkbox"/> | " |
| " | " | <input checked="" type="checkbox"/> | 1" | <input checked="" type="checkbox"/> | " |
| R-1 | | | | | |
| R-2 | | | | | |
| PM-1 | 700V | <input checked="" type="checkbox"/> | cont | <input checked="" type="checkbox"/> | 500V |
| PM-2 | 1200V | <input checked="" type="checkbox"/> | 8" | <input checked="" type="checkbox"/> | 900V |
| | | <input checked="" type="checkbox"/> | 1" | <input checked="" type="checkbox"/> | " |

LOG N CALIBRATE OPERATE SOURCE No. N-80

DUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by ARKK Personnel check by F.I.C.

Instruments and safeties checked and reset by ARKK

Source in checked by ARKK Source No. M-43

Emergency equipment in control room checked by F.I.C.

Instruments in trip circuit: K-1-2 PM-1-2

Red light on by ARKK Time 0955

Start-up OK'd by F.I.C. ARKK Date 2-15-72

H.F. 1. R. Core

110-0 & 110-F

Now have spent fuel element with 9 fuel plates, #0-3228, 0-5895, 0-3292, 0-2870. Plus 3 enriched strips # 4, 5, 6, and natural strip # 2.

0935 Water ht = 49.20 cm Temp °C
 System just critical #15 = 23.2°C
 Drain 16 = 23.5°C

added enriched strip # 7. ht = 5.65 cm Temp °C
 Water ht = 59.20 cm #15 = 23.7°C
 + Per 16 = 23.7°C
 E = 256.9 sec = 4.5 pf = 1.79 H/cm.

1036 Water ht = 53.55 cm
 System just critical
 Drain core = 396.0 - 110.8 - 4.5 = -275.7 f

H.F. 1. B Core

111-0 & 111-F

Now have H.F. 1. B Core 111-0 & 111-F assembly in small reflector tank. Inner core spaced 375" with plastic spacers.

1125 Water ht = 59.10 cm
 System sub critical
 Drain.

H.F.I.R Cores
111-0 + 111-E

Now have spent fuel element with 2 fuel plates # D-3224 & D-5495.

1347 Water ht = 59.10 cm
System sub-critical
Drain.

Temp °C
#15 = 28.5 °C
16 = 29.5 °C

Now have spent fuel element with 4 fuel plates # D-3224, D-5495, D-3242, & D-2870. Plus 4 enriched strips # 1, 2, 3, 4, and natural strip # 3.

Water ht = 59.10 cm $\sigma_h = 4.6$ cm
#4 Res

Temp °C
#15 = 29.2 °C
16 = 29.5 °C

$E = 302.05 \text{ cm} = 3.9 \text{ f} = .95 \text{ g/cm}.$

1453 Water ht = 54.50 cm
System just critical
Drain.

Core = $391.0 - 119.3 - 3.9$
 $= -267.8 \text{ f}$

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE DISTANCE | SET | START-UP RANGE |
|-----------------------------|---------------------|----------|-----------------|-----|------------------------|
| K-1 | 3110 ⁻¹² | Master ✓ | 4" | ✓ | 3 X 10 ⁻¹² |
| " | " | Ext ✓ | 1" | ✓ | " |
| K-2 | " | Master ✓ | 4" | ✓ | " |
| " | " | Ext ✓ | 1" | ✓ | " |
| R-1 | | | | | |
| R-2 | | | | | |
| PA | 7000 | Alarm ✓ | 5" | ✓ | 5000 |
| SA | 12000 | alarm ✓ | act'd service | ✓ | |
| | | Time | 7-18-72 | ✓ | |
| LOG N CALIBRATE | | ✓ | OPERATE | ✓ | SOURCE No. <u>D-80</u> |
| DUMP WELL PROBE LIGHT _____ | | | | | |

START-UP CHECK LIST

Equipment checked by ^{F.D.C.} AKR Personnel check by F.D.C.
Instruments and safeties checked and reset by AKR
Source in checked by AKR Source No. M-43
Emergency equipment in control room checked by F.D.C.
Instruments in trip circuit: K-1-2 PM-1
Red light on by A.K. Reedy Time 1320
Start-up OK'd by F.D.C., AKR Date 7-18-72

Have C.E.-2 core assembly in small reflector tank. Have spent fuel element with 9 fuel plates. # 0-3224, 0-5495, 0-3242, 0-2870. Have 3 enriched strips # 4, 8, 10. and 1 natural strip # 2.

1/2" fuel rate = 3.9 cm/min.
 3/4" drain rate = 5.6 cm/30 sec.
 3.0" dump rate = 29.5 cm/10 sec.

Water ht = 57.70 cm
 + Per

Temp °C
 # 15 = 25.5°
 # 16 = 25.5°

1453 Water ht = 49.55 cm
 System just critical
 Drain

$$C_{en} = 391.0 - 92.2 - 16.9 = -281.9 f$$

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE DISTANCE | SET | START-UP RANGE |
|-----------------------|---------------------|---------|-----------------|------------|---------------------|
| K-1 | 3×10^{-12} | Met | 9" | ✓ | 3×10^{-12} |
| " | " | Met | 1" | ✓ | " |
| K-2 | " | Met | 9" | ✓ | " |
| " | " | Met | 1" | ✓ | " |
| 144 | 700V | Alarm ✓ | 15" | ✓ | 500V |
| 145 | — | Low | — | — | — |
| — | — | Alarm | — | — | — |
| LOG-N CALIBRATE | ✓ | OPERATE | ✓ | SOURCE No. | B-80 |
| DUMP WELL PROBE LIGHT | | | | | |

START-UP CHECK LIST

Equipment checked by ^{T.D.C.} AKK1. Instruments checked by T.D.C.
 Instruments and sensors checked and ready by A.K.M.
 Source in checked by AKK and ready by M-43
 Emergency equipment in checked and ready by T.D.C.
 Instrument in trip checked K-1-2 PM-1
 Red Light on by A.K.P. Time 0800
 Start-up OK'd by T.D.C. A.K.M. Date 7-19-72

CF#2

Replaced natural strip #2 with enriched strip #2.

Water ht = 57.20 cm

+ Res

t = 782.28 sec = 1.6 f

Temp °C

#15 = 25.5°C

#16 = 25.5°C

1000

Water ht = 53.40 cm

System just critical

Drain.

Cor = 391.0 - 104.5 - 1.6

= -284.9 f

4/3/74

APR CE 2 - see pg 24 for loading

| INSTRUMENT | RANGE | TRIP | SOURCE | SET | START UP RANGE |
|---------------|---------------------|---------|--------|-----|---------------------|
| K1 | 3710 ^{-1V} | Alarm ✓ | 3u | ✓ | 3710 ^{-1V} |
| | | High ✓ | 1u | ✓ | |
| K2 | 3710 ^{-1V} | Alarm ✓ | 3u | ✓ | 3710 ^{-1V} |
| | | High ✓ | 1u | ✓ | |
| P1 | - | | | | |
| P2 | - | | | | |
| PM1 | 700V | Alarm ✓ | 1u | ✓ | 500V |
| PM2 | 1200V | Alarm ✓ | 8u | ✓ | 900V |
| | | Alarm ✓ | 2u | ✓ | |
| LOSS OF PHASE | DC | | DC | | SOURCE No. B-80 |

START-UP CHECK LIST

Equipment checked by RLR , Inspected check by DC

Last month and safety checked and signed by RLR

Source is checked by RLR , Source No. M 43

Emergency equipment in control room checked by DC

Knobs on in trip circuit DC , KI, KV, PM1, PM2

and lights on by DC , Time 10:18

START-UP DATE BY DC , Date 4/3/74

Feed rate (10.6 - 11.4) cm/min = 4.4 cm/min

Draw rate (12.6 - 13.1) cm/min = 10 cm/min

Top of plate at 48.3 cm

8/4/72

H₂O = 58.6 cm
 T = 60.8 sec
 ϕ = 1.0 φ
 He = —

[Operations interrupted ~ 11 AM to ~ 1:15 P by
 examination inspection of 101-201 with examinee;
 restart 1:15 P - again interrupted, same
 reason, at ~ 4 PM. Critical height not
 precisely determined]

8/4/72 Remove enriched strip #2, replaced with
 natural strip #2.

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE DISTANCE | SET | START-UP RANGE |
|-------------------|---------------------|-------------------|-----------------|-----------------|---------------------|
| K-1 | 3x10 ⁻¹² | Meter ✓ Fast ✓ | 3" | ✓ | 3x10 ⁻¹² |
| K-2 | 3x10 ⁻¹² | Meter ✓ Fast ✓ | 3" | ✓ | 3x10 ⁻¹² |
| R-1 | — | — | — | — | — |
| R-2 | — | — | — | — | — |
| PM-1 | 700V | Alarm ✓ | Control | ✓ | 500V |
| PM-2 | 1200V | Low ✓ Alarm ✓ | 4" 1" | ✓ | 900V |
| LOG N CALIBRATE ✓ | | OPERATE ✓ | | SOURCE No. B-80 | |

START-UP CHECK LIST

Equipment checked by EJ Personnel check by DC
 Instruments and safeties checked and reset by EJ
 Source in checked by EJ Source No. M-43
 Emergency equipment in control room checked by DC
 Instruments in trip circuit: K-1, K-2, PM-1, PM-2
 Red light on by EJ Time 12:10
 Start-up OK'd by EJ Date 8/4/72

1317 H₂O @ 75.2 cm. + Period #1 E = 126.03 sec
 1326 H₂O @ 49.7 cm. Shift key. = 8.2 φ
 1330 H₂O @ 49.7 cm Critical

8/4/72

13:33

Drain $d \approx 30$ cm

DE 8/4

13:43

Refill affected tank -

14:09

H_W = 50.1 cm slightly super. $Z = 80.40$ cm

14:10

H_W = 52.2 + period measure = 11.7 f

14:23

= 49.7 slightly super

14:26

= 49.7 sub.

14:28

Scram! \checkmark

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE DISTANCE | SET | START-UP RANGE |
|------------|---------------------|---|-----------------|-------------------------------------|---------------------|
| K-1 | 3×10^{-12} | Meter <input checked="" type="checkbox"/> | 3" | <input checked="" type="checkbox"/> | 3×10^{-12} |
| " | " | Fast <input checked="" type="checkbox"/> | 1" | <input checked="" type="checkbox"/> | " |
| K-2 | " | Meter <input checked="" type="checkbox"/> | 2" | <input checked="" type="checkbox"/> | " |
| " | " | Fast <input checked="" type="checkbox"/> | 1" | <input checked="" type="checkbox"/> | 00 |
| R-1 | | | | | |
| R-2 | | | | | |
| PA-1 | 700V | Alarm <input checked="" type="checkbox"/> | " | <input checked="" type="checkbox"/> | 500V |
| PA-2 | 1200V | Low <input checked="" type="checkbox"/> | 8" | <input checked="" type="checkbox"/> | 900V |
| " | " | Alarm <input checked="" type="checkbox"/> | 1" | <input checked="" type="checkbox"/> | 00 |

LOG N CALIBRATE OPERATE SOURCE No. D-80

DUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by FID.C Personnel check by FID.C

Instruments and safeties checked and reset by AKAV

Source in checked by AKAV Source No. N-43

Emergency equipment in control room checked by AKAV

Instruments in trip circuit: K-1-2 PA-1-2

Red light on by AKAV Time 0835

Start-up OK'd by FID.C, AKAV Date 8-8-72

Water ht = 50.75 cm
+ Pwr

0917

Water ht = 49.50 cm
System just critical
Drain

Temp^a
#15 = 24.7 °C
16 = 25.0 °C

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE DISTANCE | SET | START-UP RANGE |
|------------|-----------------------|---------|-----------------|-----|-----------------------|
| K-1 | 3 x 10 ⁻¹² | Alarm ✓ | 4" | ✓ | 3 x 10 ⁻¹² |
| " | " | F 4 ✓ | 1" | ✓ | " |
| K-2 | " | Alarm ✓ | 4" | ✓ | " |
| " | " | F 4 ✓ | 1" | ✓ | " |
| R-1 | | | | | |
| P-1 | | | | | |
| P-2 | 700 V ✓ | Alarm ✓ | 15" | ✓ | 5000 |
| P-3 | 1200 V ✓ | low ✓ | 10" | ✓ | 900 V |
| " | " | Alarm ✓ | 1" | ✓ | " |

LOG IN OPERATE OPERATE SOURCE No. B-80

DUMP WILL BARGE LIGHT

START-UP CHECK LIST

Equipment checked by F.D.C. Personnel check by F.D.C.
 Instruments and cassettes checked and reset by AKM
 Source in checked by AKM Source No. M-43
 Emergency equipment in control room checked by F.D.C.
 Instruments in trip circuit: K-1-2 P-1-2
 Red light on by AKM Time 0900
 Start-up OK'd by F.D.C., AKM Date 11-13-72

H.F.I.R Core
128-0 & 128-1

Have H.F.I.R core 128-0 & 128-1 assembled in
small reflector tank. Inner core spaced
.375"

1/2" feed rate = 3.2 cm/min. Top of fuel:
3/4" drain rate = 10.1 cm/min outlet = 47.3 cm
3" dump rate = 32.7 cm 10 sec. Inner = 47.9 cm

1018 Water ht = 58.9 cm
System sub critical
Drain.

Now have spent fuel element with 2 fuel
plates #0-3224 & 0-5495.

Water ht = 58.30 cm Temp °C
System sub critical #15 = 23.5 °C
Drain #16 = 23.7 °C

Now have spent fuel element with 4 fuel
plates #0-3224 & 0-5495. #0-3242 & 0-2870.
plus 4 enriched strips #1, 2, 3, 4. and 1 natural
strip #3. 106.0

Water ht = 58.05 cm Temp °C
#15 = 24.7 °C
#16 = 24.7 °C
C = 269.45 sec = 4.34

Water ht = 53.90 cm
System just critical
Drain. C = 391 - 106.3 - 13.0 - 4.3
= -267.40 sec ✓

H.F.I.R Core 122-0 & 122-1

Have H.F.I.R. Core 122-0 & 122-1 assembled in
small reflector tank. Inner core spaced
.375"

1503 Water ht = 57.95 cm Temp °C
System sub critical #15 = 24.8 °C
Drain #16 = 25.0 °C

Now have spent fuel element with 2 fuel
plates #0-3224 & 0-5495.

1528 Water ht = 58.10 cm Temp °C
System sub critical #15 = 25.0 °C
Drain #16 = 25.0 °C

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE DISTANCE | SET | START-UP RANGE |
|------------|---------------------|---------|-----------------|-----|---------------------|
| K-1 | 3x10 ⁻¹² | Meter ✓ | 9" | - | 3x10 ⁻¹² |
| " | " | Foot ✓ | 1" | - | " |
| K-2 | " | Alarm ✓ | 9" | - | " |
| " | " | Foot ✓ | 1" | - | " |
| R-1 | | | | | |
| R-2 | | | | | |
| PM-1 | 700V | Alarm ✓ | 5" | - | 500V |
| PM-2 | 200V | Low ✓ | 10" | - | 900V |
| " | " | Alarm ✓ | 1" | - | " |

LOG N CALIBRATE OPERATE SOURCE No. B-80

DUMP WELL PROBE LIGHT

START-UP CHECK LIST
F.P.C.

Equipment checked by ARKL Personnel check by R.K.R.L.

Instruments and safeties checked and reset by R.K.R.L.

Source in checked by ARKL Source No. M-43

Emergency equipment in control room checked by F.P.C.

Instruments in trip circuits: K-1-2 PM-1-2

Red light on by ARKL Time 0800

Start-up OK'd by F.P.C. ARKL Date 11-14-72

H.F.I.R. Core 122-0 & 122-1

Now have spent fuel element with 4 fuel plates # D-3224, D-5495, D-3222, & D-2870. Plus 4 enriched strips # 4, 5, 8, 10, and 2 natural strips # 4, 5.

Water ht = 58.10 cm Temp °C
+ Per #15 = 25.0 °C
#16 = 25.0 °C
C = 956.12 cm = 1.3 f
0932 Water ht = 55.40 cm
System just critical
Drain. cm = 391.0 - 102.7 - 263 - 1.3 = 26.0 f

H.F.I.R. Core 123-0 & 123-1

Have H.F.I.R. Core 123-0 & 123-1 assemble in small reflector tank. New core spaced, 375"

1030 Water ht = 58.10 cm Temp °C
System sub critical #15 = 25.0 °C
#16 = 25.0 °C
Drain.

Now have spent fuel element with 2 fuel plates # D-3224 & D-5495.

Water ht = 58.20 cm Temp °C
System sub critical #15 = 25.2 °C
#16 = 25.2 °C
Drain.

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE | SET | START-UP RANGE |
|------------|---------------------|---------|--------|-----|---------------------|
| K-1 | 3x10 ⁻¹² | Meter ✓ | 4" | ✓ | 3x10 ⁻¹² |
| " | " | Fast ✓ | 1" | ✓ | " |
| K-2 | " | Meter ✓ | 4" | - | " |
| " | " | Fast ✓ | 1" | - | " |
| R-1 | | | | | |
| R-2 | | | | | |
| PA-1 | 700V | Alarm ✓ | 5" | - | 500V |
| PA-2 | 1200V | Low ✓ | 10" | - | 900V |
| " | " | Alarm ✓ | 1" | - | " |

LOG IN CALIBRATE OPERATE SOURCE No. B-80
 DUMP WELL-PROBE LIGHT

BOARD-UP CHECK TICK

I.P.C.
 Equipment checked by A.K.K. Personnel check by A.K.K.
 Instruments and safeties checked and reset by A.K.K.
 Source in checked by A.K.K. Source No. M-43
 Emergency equipment in control room checked by I.P.C.
 Instruments in trip circuit: K-1-2 PM-1-2
 Red light on by A.K.K. Time 0825
 Start-up OK'd by A.K.K. I.P.C. Date 11-16-72

Now have front fuel element with 8 fuel plates #0-3224, 0-5495, 0-3282, 0-2870, plus enriched stages #1, 2, 3, 4, and natural stage #4.

Water h₅ = 58.10 cm
 + Per
 E = 43.96 sec = 18.0 f
 0920 Water h₅ = 50.70 cm
 System just critical
 Drain
 Core = 3910 - 1196 - 18.0
 = -253.4 f
 Temp °C
 #15 = 24.8 °C
 #16 = 24.5 °C

Have H.F.I.R. Core 120-0 + 120-1 assembly in small reflector tank. Lower core spaced .375"

1252 Water h₅ = 58.50 cm
 System sub critical
 Drain
 Temp °C
 #15 = 25.0 °C
 #16 = 25.0 °C

Now have front fuel element with 7 fuel plate #0-3224 + 0-5495
 Water h₅ = 58.80 cm
 System just critical
 Drain
 Temp °C
 #15 = 25.0 °C
 #16 = 25.0 °C

Now have fresh fuel element with 4 fuel plates, #D-3229, D-5995, D-3292, D-2970 plus 5 enriched strips # 4, 7, 8, 9, 10.

Water ht = 58.70 cm Temp °C
 + Per #15 = 25.5°C
 #16 = 25.5°C

1452 Water ht = 51.30 cm
 System just critical
 Drain core = 391.0 - 129.0 - 13.6
 = -248.4 f

Repeat of last run on p-37. 2 fuel plates.

1550 Water ht = 58.50 cm Temp °C
 System just critical #15 = 25.6°C
 Drain core = -240.0 f #16 = 25.6°C

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE DISTANCE | SET | START-UP RANGE |
|------------|---------------------|---------|-----------------|-----|---------------------|
| K1 | 3×10^{-12} | High ✓ | 9" | ✓ | 3×10^{-12} |
| " | " | Low ✓ | 1" | ✓ | " |
| K2 | " | High ✓ | 9" | ✓ | " |
| " | " | Low ✓ | 1" | ✓ | " |
| PM1 | 700 V | Alarm ✓ | 1.5" | ✓ | 500 V |
| PM2 | 1200 V | Low ✓ | 10" | ✓ | 900 V |
| " | " | Alarm ✓ | 1" | ✓ | " |

LOW H CALIBRATE _____ OPERATE _____ SOURCE No. B-80

BUMP WILL PRODUCE LIGHT _____

START-UP CHECK SHEET

Equipment checked by FID.C Personnel check by FID.C
 Instruments and safeties checked and reset by AMM
 Source is checked by AMM Source No. M-93
 Emergency equipment checked and reset by FID.C
 Instruments in use: H-1-2 PM-1-2
 End Start-up by AMM Time 0830
 Start-up OK'd by FID.C AMM Date 11-16-72

Now have H.F.I.R. cones 121-0 & 121-1 assemble in small reflector tank. Inner core spaced .375"

0957 Water ht = 58.20 cm Temp °C
System sub critical #15 = 25.0 °C
Drain #16 = 25.0 °C

Now have spent fuel element with 2 fuel plates # D-3224, D-5495.

1010 Water ht = 58.70 cm Temp °C
-Per #15 = 25.0 °C
C = -1375.53 rem = -1.0 f
Drain: core = 240.0 + 1.0 = -241.0 f
#16 = 25.0 °C

Now have spent fuel element with 4 fuel plates # D-3224, D-5495, D-3242, D-2870, plus 5 enriched strips # 6, 7, 8, 9, 10

1112 Water ht = 58.60 cm Temp °C
+Per #15 = 25.2 °C
C = 67.36 rem = 13.3 f
#16 = 25.2 °C

Water ht = 51.30 cm
System just critical
Drain: core = 391.0 - 126.7 - 13.3 = -251.0 f

Now H.F.I.R. Cones 118-0 & 118-1 assemble in small reflector tank. Inner core spaced .375"

1319 Water ht = 59.60 cm Temp °C
System sub critical #15 = 25.2 °C
Drain #16 = 25.2 °C

Now have spent fuel element with 2 fuel plates # D-3224, D-5495.

1346 Water ht = 58.90 cm Temp °C
System ~~just~~ sub critical #15 = 25.5 °C
Drain #16 = 25.5 °C

Now have spent fuel element with 4 fuel plates # D-3224, D-5495, D-3242, D-2870, plus 4 enriched strips # 6, 7, 8, 9, and natural strips # 4.

1430 Water ht = 58.60 cm Temp °C
3+Per #15 = 25.5 °C
C = 30.42 rem = 22.5 f
#16 = 25.5 °C

Water ht = 50.10 cm
System just critical
Drain: core = 391.0 - 100.2 - 13.3 - 22.5 = -255.0 f
alt!

added natural trip #2.

Water ht = 58.60 cm
 + Per

Temp °C
 #15 = 25.6 °C
 16 = 25.6 °C

$L = 141.24 \text{ cm} = 7.5 \text{ f.}$

Water ht = 52.90 cm

System just critical
 Drain.

Core = 391.0 - 100.2 - 26.6 - 7.5
 = -256.7 f

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE DISTANCE | SET | START-UP RANGE | |
|-----------------------|------------|-------------------------------------|-----------------|-----|-------------------------------------|-----------------|
| K-1 | 10^{-12} | Meter | 4" | - | 3810 ⁰⁰² | |
| " | " | " | 1" | - | " | |
| K-2 | " | Meter | 4" | - | " | |
| " | " | Ext | 1" | - | " | |
| R-1 | | | | | | |
| R-2 | | | | | | |
| PM-1 | 700V | Alarm | 5" | - | 600V | |
| PM-2 | 1200V | Low | 10" | - | 900V | |
| " | " | Alarm | 1" | - | " | |
| LOG IN CALIBRATE | | <input checked="" type="checkbox"/> | OPERATE | | <input checked="" type="checkbox"/> | SOURCE No. B-80 |
| DUMP WELL PROBE LIGHT | | | | | | |

START-UP CHECK LIST

Equipment checked by ^{I.D.C.} AKH Personnel check by RAC
 Instruments and safeties checked and reset by AKH
 Source in checked by AKH Source No. M-43
 Emergency equipment in control room checked by F.P.C.
 Instruments in trip circuit: K-1-2 PM-1-2
 Red light on by AKH Time 0820
 Start-up OK'd by I.D.C. AKH Date 11-17-72

H.F.L.R. Cons 124-0 & 124-1
 Have H.F.L.R. Cons 124-0 & 124-1 assemble
 in small reflector tanks. Lower core
 spaced .375"

0800 Water ht = 58.80 cm Temp °C
 System sub critical #15 = 25.2 °C
 Drain. 16 = 25.2 °C

Have been spent fuel element with 2 fuel
 plates. # D-3224, D-5495.

0935 Water ht = 59.10 cm Temp °C
 System sub critical
 Drain.

over

Now have spent fuel element with 4 fuel plates D-3224, D-5495, D-3242, D-2870, plus 4 enriched strips # 3, 4, 5, 6, and natural strip # 5.

Water ht = 58.50 cm

Temp °C

+ Per

#15 = 25.5°

C = 82.57 m = 11.4

#16 = 25.7°

1030

Water ht = 51.60 cm

System just critical

Drain:

Core = 391.0 - 101.1 - 13.0 - 11.4

= -265.5 f

H.F.I.R. Cores 119-0 + 119-1

Have H.F.I.R. cores 119-0 + 119-1 assemble in small reflector tanks, down core spaced .375".

1253

Water ht = 58.40 cm

Temp °C

System sub critical

Drain:

#15 = 25.5°

#16 = 25.7°

Now have spent fuel element with 2 fuel plates, D-3224, D-5495.

Water ht = 58.90 cm

Temp °C

+ Per

#15 = 25.5°

C = 608.44 m = 2.0 f

#16 = 25.7°

1519

Water ht = 56.30 cm
System just critical

Drain:

Core = 240.0 - 2.0

= -238.0 f

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE DISTANCE | SET | START-UP RANGE |
|------------|---------------------|--------|-----------------|-----|---------------------|
| 3 | 3x10 ⁻¹² | Auto ✓ | 4" | - | 3x10 ⁻¹² |
| " | " | Ext ✓ | 1" | - | " |
| 4 | " | Auto ✓ | 4" | - | " |
| " | " | Ext ✓ | 1" | - | " |
| 5 | 700 V | Auto ✓ | 25" | - | 500 V |
| 6 | 1200 V | Ext ✓ | 10" | - | 900 V |
| " | " | Auto ✓ | 1" | - | " |

LOG H CALIBRATE ✓

OPERATE ✓

SOURCE No. B-80

DRAIN WELL PROOF LIGHT

START-UP CHECK LIST

Equipment checked by F.O.C. Personnel check by AKK
 Instruments and safeties checked and reset by AKK
 Sources in checked by BKM Source No. M-43
 Emergency equipment in control room checked by F.O.C.
 Instruments in trip circuit: K-1-2 PM1-2
 Red light on by AKK Time 0800
 Start-up OK'd by F.O.C. BKM Date 11-20-72

H.F.I.R. Conds 119-0 & 119-1

Repeat of last run p-44-25.

0854 Water ht = 58.90 cm Temp °C
 System sub critical #15 = 24.0°C
 Drain. 16 = 24.2°C

Now have spent fuel elements with 4
 fuel plates #0-3224, 0-5495, 0-3242 &
 0-2876. Plus 5 enriched strips #6, 7, 8, 9, 10:
 and 1 natural strip #4.

Water ht = 58.90 cm Temp °C
 #Per #15 = 24.2°C
 C = 445.46 sec = 2.7f 16 = 24.2°C

1025 Water ht = 55.10 cm
 System just critical
 Drain. Cond = 391.0 - 126.7 - 13.3 - 2.7
 = -248.30f ✓

Repeat of last experiment.

58.85 cm
 Water ht = 58.85 cm Temp °C
 #Per #15 = 24.5°C
 C = 515.00 sec = 2.4f 16 = 24.5°C

1130 Water ht = 55.20 cm
 System just critical
 Drain. Cond = 391.0 - 126.7 - 13.3 - 2.4
 = -248.60f ✓

Repeat of experiment described on p-44, 45, 46, (7 fuel plates)

Water ht = 58.90 cm Temp °C
 #Per #15 = 24.7°C
 C = 1716.67 sec = 7f 16 = 24.7°C

1335 Water ht = 57.80 cm
 System just critical
 Drain. Cond = 290.0 - 170
 = -239.3f ✓

Have H.F.I.R. Core 129-0 + 129-1 assembled in small reflection tank. Inner core spaced, 375".

1421 Water ht = 58.90 cm Temp °C
 System sub critical
 Drain. #15 = 25.0 °C
 #16 = 24.8 °C

Now have spent fuel element with 2 fuel plates #0-3224, + 0-5495.

1442 Water ht = 58.90 cm Temp °C
 System sub critical
 Drain. #15 = 25.0 °C
 #16 = 25.0 °C

Now have spent fuel element with 4 fuel plates #0-3224, 0-5495, 0-3247, + 0-2870. Plus 4 enriched steps #1, 2, 3, 4, and 2 natural steps #4, + 5.

Water ht = 58.90 cm Temp °C
 4 + Per #15 = 25.0 °C
 #16 = 25.0 °C

1537 Water ht = 52.85 cm
 System just critical
 Drain. $\beta_{eff} = 391.0 - 106.3 - 26.3 - 7.5$
 $= -250.9 \%$

| INSTRUMENT | RANGE | TRIP | SOURCE DISTANCE | SET | STARTUP RANGE |
|------------|---------------------|---------|-----------------|-----|---------------------|
| K-1 | 3x10 ⁻¹² | Meter ✓ | 4" | ✓ | 3x10 ⁻¹² |
| " | " | Fast ✓ | 1" | ✓ | " |
| K-2 | " | ✓ | 4" | ✓ | " |
| " | " | ✓ | 1" | ✓ | " |
| PM-1 | 700 ✓ | Alarm ✓ | 1.5" | ✓ | 500 ✓ |
| PM-2 | 1200 ✓ | Low ✓ | 10" | ✓ | 900 ✓ |
| " | " | Alarm ✓ | 1" | ✓ | " |

LOG IN CALIBRATE OPERATE SOURCE No. D-80
 DUMP WELL PROBE LIGHT

STARTUP CHECK SHEET
 2.1 °C
 Equipment checked by ATM Personnel checked by ATM
 Instruments and facilities checked and reset by ATM
 Source in checked by ATM Source No. M-93
 Emergency equipment in control room checked by F.P.C.
 Instruments in trip circuit: K-1-2 PM-1-2
 Red light on by ATM Flag 0805
 Start-up OK'd by F.P.C. ATM Date 11-21-72

Repeat of last run. p-48.

Water ht = 58.90 cm.

+Per

$\tau = 189.05 \text{ sec} = 5.8 \text{ f}$

0903

Water ht = 53.60 cm

System just critical

Drain.

Cone = 391.0 - 106.3 - 26.3 - 5.8

= -252.6 f ✓

Repeat of above:

Water ht = 59.00 cm.

+Per

$\tau = 186.88 \text{ sec} = 5.9 \text{ f}$

1005

Water ht = 53.40 cm

System just critical

Drain.

Cone = 391.0 - 106.3 - 26.3 - 5.9

= -252.5

H.F.I.R. Cone 127-0 & 127-1

Now have H.F.I.R. cone 127-0 & 127-1 assembly in small reflector tank. Inner core spaced 375".

1053

Water ht = 58.90 cm

System sub critical

Drain.

Temp °C

#15 = 24.8 °C

16 = 25.0 °C

Now have front fuel element with 2 fuel plates # 0-3224 & 0-5495.

Water ht = 58.90 cm

System sub critical

Drain.

Temp °C

#15 = 25.0 °C

16 = 25.0 °C

Now have front fuel element with 4 fuel plates # 0-3224, 0-5495, 0-3242, 0-2870. plus 4 enriched strips # 6, 7, 8, 9. and 1 natural strip # 3.

Water ht = 58.90 cm

+Per

$\tau = 54.32 \text{ sec} = 1.5 \text{ f}$

1313

Water ht = 51.05 cm

System just critical

Drain.

Temp °C

#15 = 25.0 °C

16 = 25.2 °C

Cone = 391.0 - 100.3 - 13.0 - 15.9

= -261.9 f

Added natural strip #5.

Water ht = 58.90 cm.

+Per

$\tau = 677.98 \text{ sec} = 1.8 \text{ f}$

1428

Water ht = 56.00 cm

System just critical

Drain.

Temp °C

#15 = 25.2 °C

16 = 25.7 °C

Cone = 391.0 - 100.3 - 26.0 - 1.8

= -262.9 f

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE DISTANCE | SET | START-UP RANGE |
|------------|---------------------|---------|-----------------|-----|---------------------|
| K-1 | 3K10 ⁻¹² | Meter ✓ | 9" | ✓ | 3K10 ⁻¹² |
| " | " | Fast ✓ | 1" | ✓ | " |
| K-2 | " | Meter ✓ | 9" | ✓ | " |
| " | " | Fast ✓ | 1" | ✓ | " |
| R-1 | | | | | |
| R-2 | | | | | |
| PM1 | 700V | Alarm ✓ | 5" | ✓ | 500V |
| PM2 | 1200V | 10V ✓ | 10" | ✓ | 900V |
| " | " | Alarm ✓ | 1" | ✓ | " |

EDS IN CALIBRATE OPERATE SOURCE No. B-80

DUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by AKA Personnel check by AKA
 Instruments and safeties checked and reset by AKA
 Source in checked by AKA Source No. M-93
 Emergency equipment in control room checked by F.V.C.
 Instruments in trip circuits: K-1-2 PM1-2
 Red light on by AKA Time 0805
 Start-up OK'd by F.V.C., AKA Date 11-22-72

Have H.F.I.R. core 125-0 & 125-1 assembly in small reflector tank. Drive coil spaced .375"

0914 Water ht = 59.00 cm Temp °C
 System sub-critical
 Drain #15 = 24.5 °C
 16 = 24.7 °C

Now have spent fuel element with 2 fuel plates #D-3224 & D-5495.

Water ht = 59.00 cm Temp °C
 +Per #15 = 24.7 °C
 C = 1542.8 new = .82 f 16 = 25.0 °C

1014 Water ht = 57.60 cm
 System just critical
 Drain Core = 290.0 - .82
 = -239.2 f

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE CALIBRATION | SET | STANDARD RANGE |
|------------|---------------------|------|--------------------|-----|---------------------|
| K-1 | 3x10 ⁻¹² | ✓ | 4" | ✓ | 3x10 ⁻¹² |
| " | " | ✓ | 1.0 | ✓ | " |
| K-2 | " | ✓ | 4" | ✓ | " |
| " | " | ✓ | 1" | ✓ | " |
| E-1 | | | | | |
| E-2 | | | | | |
| SW1 | 700V | ✓ | 15" | ✓ | 500V |
| SW2 | 1200V | ✓ | 16" | ✓ | 900V |
| " | " | ✓ | 1" | ✓ | " |

LOC IN CALIBRATION DATE SOURCE No. B-80
 SHOWN WELL FROM INSTRUMENT

INSTRUMENT CHECKED BY I.V.C.
AKAL
 RECALIBRATED AND RECALIBRATION CHECKED BY AKAL
 RECALIBRATION DATE 11-23
 INSTRUMENT CHECKED BY I.V.C.
 RECALIBRATION DATE 11-22 PM 1-2
 RECALIBRATED BY AKAL DATE 0828
 RECALIBRATED BY I.V.C. AKAL DATE 11-27-72

Have spent fuel element with 4 fuel plates
 #0-3224, 10-5995, 10-3242 & 10-2870. Plus 5
 enriched strips #6, 7, 8, 9, 10, and 1 natural
 strip #4.

0915 Water ht = 59.0 cm Temp °C
 System just critical
 Drain. #15 = 23.7 °C
 #16 = 24.0 °C

Core = 391.0 = 126.7 - 13.3
 = -251.0 f ✓

10:00 Repeat of above:
 Water ht = 58.90 cm Temp °C
 System just critical
 Drain. #15 = 23.7 °C
 #16 = 24.0 °C

Repeat of experiment described on bottom of p-53.
 (2 fuel plates).

Water ht = 58.95 cm Temp °C
 -Per #15 = 24.0 °C
 #16 = 24.0 °C
 C = -1216.88 sec = -1.1 f

1042 Drain Core = 240.0 + 1.1
 = -241.1 f ✓

over

H.F.I.R. Cores 126-0 & 126-1

Have H.F.I.R. Cores 126-0 & 126-1 assembled in small reflector tank, tank core spaced 1.375"

1311 Water ht = 59.00 cm
System sub critical
Drain.

Temp °C
#15 = 24.0°C
16 = 24.2°C

Have spent fuel element with 2 fuel plates
0-3224 & 0-5495.

Water ht = 59.00 cm,
2 Per

Temp °C
#15 = 24.2°C
16 = 24.2°C

E = 221.65 nee = 5.14

1352 Water ht = 59.10 cm
System just critical
Drain.

Core = 290.0 + 5.1
= -234.90

Now have spent fuel element with 4 fuel plates # 0-3224, 0-5495, 0-3242, & 0-2870, plus 5 enriched strips # 2, 3, 7, 8, 9 and natural strips # 4.

Water ht = 58.90 cm
3 Per

Temp °C
#15 = 24.5°C
16 = 24.5°C

E = 126.03 nee = 8.24

1530 Water ht = 52.70 cm
System just critical
Drain.

Core = 391.0 + 129.4 + 13.3 + 8.2
= -290.14

START-UP CHECK LIST

Equipment checked by F.P.C. A.K.M. Personnel check by F.P.C.
 Instruments and safeties checked and reset by A.K.M.
 Source in checked by A.K.M. Source No. M-43
 Emergency equipment in control room checked by F.P.C.
 Instruments in trip circuit: K-1-2 PM-1-2
 Red light on by A.K.M. Time 0812
 Start-up OK'd by F.P.C. A.K.M. Date 1-29-74

| INSTRUMENT | RANGE | INSTRUMENT CHECK | | | |
|------------|---------------------|------------------|-----------------|-------|---------------------|
| | | TRIP | SOURCE DISTANCE | RESET | STARTUP RANGE |
| K-1 | 3x10 ⁻¹² | Meter ✓ | 3" | ✓ | 3x10 ⁻¹² |
| | | Fast ✓ | 2" | ✓ | " |
| K-2 | 3x10 ⁻¹² | Meter ✓ | 3" | ✓ | " |
| | | Fast ✓ | 2" | ✓ | " |
| PM-1 | 7000 | Alarm ✓ | 5" | ✓ | 5000 |
| PM-2 | 12000 | Low | 12" | ✓ | 9000 |
| | | Alarm | 1" | ✓ | " |

LOG N CALIBRATE OPERATE DUMP WELL PROBE LIGHT
 RADIATION ALARM: A B C SOURCE NUMBER D-601

Have H.F.I.R. Cores 143-0 & 143-1 assemble in small reflector tanks. Inner core spaced .375"

1/2" fuel rate = 4.3 cm/min
 3/4" Drain rate = 10.6 cm/min
 3.0" Dump rate = 32.4 cm/min
 Top of fuel center = 47.2 cm
 Inner = 47.9 cm

1001 Water ht = 59.0 cm
 System sub critical
 Drain
 Temp °C
 #15 = 24.0 °C
 16 = 24.2 °C

Have spent fuel plate element with 2 fuel plates # D-3224 & D-5495.

1054 Water ht = 58.5 cm
 System sub critical
 Drain
 Temp °C
 #15 = 24.2 °C
 16 = 24.2 °C

Have spent fuel element with 4 fuel plates # D-3224, D-5495, D-3242, & D-2870. plus 4 enriched strips # 6, 7, 8, 9. and 1 natural strips # 4.

over.

1314 Water ht = 58.60 cm
System sub-critical
Drain.

Temp °C
#15 = 24.5 °C
#16 = 24.5 °C

Removed enriched strip #9.

1344 Water ht = 58.80 cm
System sub-critical
Drain.

Temp °C
#15 = 25.0 °C
#16 = 25.0 °C

Removed natural strip #9.

Water ht = 58.9 cm
+ Per 1.6 f

Temp °C
#15 = 25.0 °C
#16 = 25.0 °C

1441 Water ht = 56.50 cm
System just critical
Drain.

Core = 391.0 + 73.9 + 1.6
Core = -315.5 ✓

1/30/74

| INSTRUMENT | RANGE | INSTRUMENT CHECK | | | |
|------------|-----------------------|------------------|-----------------|-------|-----------------------|
| | | TRIP | SOURCE DISTANCE | RESET | STARTUP RANGE |
| K-1 | 3 x 10 ⁻¹² | Meter | 3" | ✓ | 3 x 10 ⁻¹² |
| | | Fast | 2" | ✓ | |
| K-2 | 3 x 10 ⁻¹² | Meter | 3" | ✓ | 3 x 10 ⁻¹² |
| | | Fast | 2" | ✓ | |
| PM-1 | 5000 | Alarm | 12" | ✓ | 5000 |
| PM-2 | 12000 | Low | 12" | ✓ | 5000 |
| | | Alarm | 1" | ✓ | |

LOG N CALIBRATE OPERATE DUMP WELL PROBE LIGHT
RADIATION ALARM: A B C SOURCE NUMBER B-80

START-UP CHECK LIST

Equipment checked by EQ/IDC Personnel check by IDC
Instruments and safeties checked and reset by EQ
Source in checked by EQ Source No. M-43
Emergency equipment in control room checked by IDC
Instruments in trip circuit: PM-1, PM-2, K-1, K-2
Rel light on by EQ/IDC Time 0825
Start-up Card by EQ/IDC Date 1/30/74

4/30/74

CE-2 w. 4 fuel plates in SPERT element
~~Natural strips #1~~, Enriched strips 4, 8, 10, ✓

0950 H₂O @ 58.5 cm + Point #1 Temp 24.5°C
C = 220.0 = 5.0 d

0957 Water @ 51.8 cm Critical Cm 391-104.5 - 5.0
= 281.5 d

1004 Drain
391-124.5

Cores 143-0 + 143-1

Have H.F.I.R. cores 143-0 + 143-1 assemble
in small reflector tanks. Inver core
spaced .375". Have spent fuel element
with 4 fuel plates # 0-3229, 0-5495,
0-3242, 0-2870. Plus natural strips
2, 3, 4; and enriched strip # 3.

Water ht = 59.0 cm Temp °C
#15 = 24.7°C
#16 = 24.7°C

1327 Water ht = 51.6 cm
System just critical
Drain. Core = 391 + 67.0 + 11.7
= -312.3 ✓

Have H.F.I.R. Cores 132-0 + 132-1 assemble in
small reflector tanks. Inver core spaced
.375"

1519 Water ht = 59.7 cm Temp °C
System sub critical #15 = 25.0°C
Drain. #16 = 25.0°C

Have spent fuel element with 2 fuel
plates # 0-3229 + 0-5495.

1557 Water ht = 59.1 cm Temp °C
System sub critical #15 = 25.0°C
Drain. #16 = 25.0°C

| INSTRUMENT | RANGE | INSTRUMENT CHECK | | | |
|------------|---------------------|------------------|-----------------|-------|---------------------|
| | | TRIP | SOURCE DISTANCE | RESET | STARTUP RANGE |
| K-1 | 3x10 ⁻¹² | Meter ✓ | 3" | ✓ | 3x10 ⁻¹² |
| | | Fast ✓ | 2" | ✓ | " |
| K-2 | 3x10 ⁻¹² | Meter ✓ | 3" | ✓ | " |
| | | Fast ✓ | 1" | ✓ | " |
| PM-1 | 700 ✓ | Alarm ✓ | .5" | ✓ | 500 ✓ |
| PM-2 | 1200 ✓ | Low ✓ | 12" | ✓ | 900 ✓ |
| | | Alarm ✓ | 2" | ✓ | " |

LOG N CALIBRATE OPERATE DUMP WELL PROBE LIGHT
 RADIATION ALARM: A B C SOURCE NUMBER B-804

START-UP CHECK LIST

Equipment checked by I.D.C. Personnel check by I.D.C.
 Instruments and safeties checked and reset by A.K.H.
 Source in checked by A.K.H. Source No. M-43
 Emergency equipment in control room checked by I.D.C.
 Instruments in trip circuit: K-1-2 PM-1-2
 Red light on by A.K.H. Time 0805
 Start-up OK'd by I.D.C., A.K.H. Date 1-31-74

Repeat of last run.

Water ht = 59.0 cm Temp °C
 -Per #15 = 24.5 °C
 C = -543.25 sec = -2.6 f 16 = 24.5 °C
 Core = 240.0 + 2.6
 = 242.6 f ✓

Now have spent fuel element with 9 fuel plate #0-3224, 0-5495, 0-3242, 0-2870.
 Plus 5 enriched strips # 3, 7, 8, 9, 10, and natural strip # 2.

Water ht = 58.6 cm Temp °C
 -Per #15 = 24.5 °C
 C = -747.57 sec = -1.8 f 16 = 24.7 °C
 1257 Drain. Core = -391.0 + 143.6 - 1.8
 = -249.2 f ✓

Removed natural strip # 2.
 Water ht = 59.0 cm Temp °C
 3+Per #15 = 25.0 °C
 C = 126.03 sec = 8.2 f 16 = 25.0 °C

1337 Water ht = 52.50 cm
 System just critical
 Drain. Core = -391.0 + 130.3 + 8.2
 = -252.5 f ✓

Had H.F.I.R cores 137-0 + 137-1 assemble in small reflector tank. Inner core spaced .375"

1511 Water ht = 58.80 cm Temp °C
 System sub critical #15 = 25.0°C
 Drain. 16 = 25.0°C

Now have spent fuel element with 7 fuel plates # D-3229 + D-5495.

1549 Water ht = 58.80 cm Temp °C
 System sub critical #15 = 25.1°C
 Drain. 16 = 25.1°C

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE DISTANCE | RESET | STARTUP RANGE |
|------------|---------------------|---------|-----------------|-------|---------------------|
| K-1 | 3x10 ⁻¹² | Meter ✓ | 3" | ✓ | 3x10 ⁻¹² |
| | | Fast ✓ | 2" | ✓ | " |
| K-2 | 3x10 ⁻¹² | Meter ✓ | 3" | ✓ | " |
| | | Fast ✓ | 2" | ✓ | " |
| PM-1 | 7000 | Alarm ✓ | 5" | ✓ | 5000 |
| PM-2 | 12000 | Low ✓ | 12" | ✓ | 9000 |
| | | Alarm ✓ | 2" | ✓ | " |

LOG N CALIBRATE OPERATE DUMP WELL PROBE LIGHT

RADIATION ALARM: A B C SOURCE NUMBER D-80

START-UP CHECK LIST

Equipment checked by ^{I.V.C.} AKH Personnel check by AKH
 Instruments and safeties checked and reset by AKH
 Source in checked by AKH Source No. M-93
 Emergency equipment in control room checked by F.V.C.
 Instruments in trip circuit: K-1-2 P121-2
 Red light on by AKH Time 0850
 Start-up OK'd by F.V.C. AKH Date 2-1-79

see p 66

Now have spent fuel element with 4 fuel plates # D-3224, D-5495, D-3292 & D-2870. plus 5 enriched strips # 2, 3, 4, 5, 6. and natural strip # 5.

0949 Water ht = 58.9 cm Temp °C
system sub critical #15 = 25.0°C
Drain #16 = 25.0°C

Removed enriched strip #5.
Water ht = 58.80 cm Temp °C
+ Res #15 = 25°C
C = 89.09 sec = 10.8 f #16 = 25°C

1027 Water ht = 51.80 cm
system just critical
Drain.

$$\text{Core} = 391.0 + 115.9 + 10.8 = 517.7$$

Have H.F.I.R core 144-0 & 144-1 assembled in small reflector tank. Inner core spaced .375"

1328 Water ht = 59.00 cm Temp °C
system sub critical #15 = 25.0°C
Drain #16 = 25.0°C

Now have spent fuel element with 2 fuel plates # D-3224 & D-5495.

1424 Water ht = 58.90 cm Temp °C
system sub critical #15 = 25.0°C
Drain #16 = 25.0°C

Now have spent fuel element with 4 fuel plates # D-3224, D-5495, D-3292, D-2870. plus 5 enriched strips # 2, 3, 4, 5, 6.

1512 Water ht = 59.0 cm Temp °C
system sub critical #15 = 25.0°C
Drain #16 = 25.0°C

| INSTRUMENT | RANGE | INSTRUMENT CHECK | | | |
|------------|---------------------|------------------|-----------------|-------|---------------------|
| | | TRIP | SOURCE DISTANCE | RESET | STARTUP RANGE |
| K-1 | 3x10 ⁻¹² | Meter ✓ | 3" | ✓ | 3x10 ⁻¹² |
| | | Fast ✓ | 1" | ✓ | " |
| K-2 | 3x10 ⁻¹² | Meter ✓ | 3" | ✓ | " |
| | | Fast ✓ | 2" | ✓ | " |
| PM-1 | 700V | Alarm ✓ | .5" | ✓ | 500V |
| PM-2 | 1200V | Low ✓ | 10" | ✓ | 900V |
| | | Alarm ✓ | 7" | ✓ | " |

LOG N CALIBRATE OPERATE DUMP WELL PROBE LIGHT
 RADIATION ALARM: A B C SOURCE NUMBER 830

START-UP CHECK LIST

Equipment checked by A.M.V. Personnel check by F.D.C.
 Instruments and safeties checked and reset by A.M.V.
 Source in checked by A.M.V. Source No. M-43
 Emergency equipment in control room checked by F.D.C.
 Instruments in trip circuit: A-1-2 PM1-2
 Red light on by A.M.V. Time 1330
 Start-up OK'd by F.D.C. A.M.V. Date 7-5-74

(see p 69.) Removed enriched strip #3.

1400 Water ht = 58.80 cm Temp °
 System sub critical #15 = 29.0°C
 Drain. 16 = 29.0°C

Removed enriched strip #5.

Water ht = 58.80 cm Temp °
 -Per #15 = 29.2°C
 $C = -814.87 \mu\text{e} = -1.7f$ 16 = 29.2°C

1570 Drain $\mu\text{e} = -391.0 + 75.5 = 1.7$
 $= -317.2f$

Removed enriched strip #6. and added natural strip #4.

Water ht = 58.90 cm Temp °
²+Per #15 = 29.5°C
 $C = 128.21 \mu\text{e} = 8.1f$ 16 = 29.5°C
 Water ht = 52.55 cm
 System just critical
 Drain.

$\mu\text{e} = -391.0 + 51.7 + 13.3 + 8.1$
 $= -317.9$

| INSTRUMENT | RANGE | INSTRUMENT CHECK | | | |
|------------|---------------------|------------------|-----------------|-------|---------------------|
| | | TRIP | SOURCE DISTANCE | RESET | STARTUP RANGE |
| K-1 | 3x10 ⁻¹² | Meter ✓ | 3" | ✓ | 3x10 ⁻¹² |
| | | Fast ✓ | 1" | ✓ | " |
| K-2 | 3x10 ⁻¹² | Meter ✓ | 3" | ✓ | " |
| | | Fast ✓ | 1" | ✓ | " |
| PM-1 | 700 ✓ | Alarm ✓ | 5" | ✓ | 500 ✓ |
| PM-2 | 1200 ✓ | Low ✓ | 12" | ✓ | 900 ✓ |
| | | Alarm ✓ | 2" | ✓ | " |

LOG N CALIBRATE OPERATE DUMP WELL PROBE LIGHT
 RADIATION ALARM: A B C SOURCE NUMBER B-80

START-UP CHECK LIST

Equipment checked by I.D.C. Personnel check by AKK
 Instruments and safeties checked and reset by AKK
 Source in checked by AKK Source No. M-93
 Emergency equipment in control room checked by F.D.C.
 Instruments in trip circuit: K-1-2 PM1-2
 Red light on by AKK Time 0800
 Start-up OK'd by F.D.C. AKK Date 2-6-79

(see p 71.) Repeat of last run:

Water ht = 58.9 cm Temp °C
 + Per #15 = 29.2 °C
 T = 130.38 sec = 8.0 f 16 = 29.2 °C
 0901 Water ht = 52.55 cm
 system just critical
 Drain Core = -391.0 + 51.7 + 13.3 + 8.0
 = -317.8 f

H.F.I.R. Cans 142-0 & 142-1.

Have H.F.I.R. cans 142-0 & 142-1 assemble in small reflector tank. Spacers spaced .375"

1025 Water ht = 58.70 cm Temp °C
 system sub critical #15 = 29.2 °C
 Drain 16 = 29.2 °C
 Now have spent fuel element with 2 fuel plates #D-3224 & D-5495.

1105 Water ht = 58.80 cm Temp °C
 system sub critical #15 = 29.5 °C
 Drain 16 = 29.5 °C

Mau have spent fuel element with 9 fuel plates # D-3229, D-5995, D-3292 & D-2870. Plus 5 enriched strips # 3, 7, 8, 9, 10.

1320 Water ht = 58.80 cm
~~Sub~~ system sub critical
 Drain.

Temp °C
 #15 = 29.7°C
 16 = 29.7°C

Removed enriched strip #3.

1351 Water ht = 58.90 cm
 system sub critical
 Drain.

Temp °C
 #15 = 29.8°C
 16 = 29.8°C

Removed enriched strip #7
 Water ht = 58.90 cm
 + Per

Temp °C
 #15 = 25.0°C
 16 = 25.0°C

1446 Water ht = 59.20 cm
 system just critical
 Drain.

$$\begin{aligned} \text{Core} &= -391.0 + 79.1 + 4.1 \\ &= -307.8 \checkmark \end{aligned}$$

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE DISTANCE | RESET | STARTUP RANGE |
|------------|---------------------|---|-----------------|-------------------------------------|---------------------|
| K-1 | 3x10 ⁻¹² | Meter <input checked="" type="checkbox"/> | 3" | <input checked="" type="checkbox"/> | 3x10 ⁻¹² |
| | | Fast <input checked="" type="checkbox"/> | 2" | <input checked="" type="checkbox"/> | " |
| K-2 | — | Meter <input type="checkbox"/> | | | |
| | | Fast <input type="checkbox"/> | | | |
| PM-1 | 700V | Alarm <input checked="" type="checkbox"/> | 5" | <input checked="" type="checkbox"/> | 500V |
| PM-2 | 1200V | Low <input checked="" type="checkbox"/> | 12" | <input checked="" type="checkbox"/> | 1200V |
| | | Alarm <input checked="" type="checkbox"/> | 1" | <input checked="" type="checkbox"/> | " |

LOG N CALIBRATE OPERATE DUMP WELL PROBE LIGHT

RADIATION ALARM: A B C SOURCE NUMBER B-80

START-UP CHECK LIST

Equipment checked by F.I.C. Personnel check by F.I.C.
 Instruments and safeties checked and reset by AKA
 Source in checked by AKA Source No. M-43
 Emergency equipment in control room checked by F.I.C.
 Instruments in trip circuit: K-1 PM1-2
 Red light on by AKA Time 0815
 Start-up OK'd by F.I.C. AKA Date 2-7-79

Have H.F.I.R. Core 130-0 & 130-1 assembly in small reflector tank. Inver core spaced, 375"

0847 Water ht = 58.90 cm Temp °C
system sub critical #15 = 24.5°
Drain 16 = 24.5°

Now have spent fuel element with 2 fuel plates #D-3224 & D-5495.

0938 Water ht = 58.90 cm Temp °C
-Per #15 = 24.7°
E = -673.63 f = -2.0 f 16 = 24.7°
Drain. core = -240.0 - 2.0
= -242.0 f

Now have spent fuel element with 4 fuel plates #D-3224, D-5495, D-3292, & D-2870. plus 5 enriched strips #3, 7, 8, 9, & 10.

Water ht = 58.90 cm Temp °C
E = 154.28 sec = 6.9 f #65 = 25.0°
+ Per. 16 = 25.0°

Water ht = 52.80 cm
system just critical core = -391.0 + 130.3 + 6.9
Drain = -253.80

Have H.F.I.R. Core 131-0 & 131-1 assembly in small reflector tank. Inver core spaced, 375"

1310 Water ht = 59.00 cm Temp °C
system sub critical #15 = 25.0°
Drain 16 = 25.0°

Now have spent fuel element with 2 fuel plates #D-3224 & D-5495.

1350 Water ht = 58.90 cm Temp °C
-Per #15 = 25.0°
E = -825.74 sec = -1.6 f 16 = 25.0°
Drain. core = -240 - 1.6
= -241.6 f

Have spent fuel element with 9 fuel plates #D-3224, D-5495, D-3292, & D-2870. Plus 5 enriched strips #2, 3, 4, 5, & 6.

Water ht = 58.90 cm Temp °C
+ Per #15 = 25.0°
E = 93.99 sec = 10.4 f 16 = 25.0°

Water ht = 51.90 cm
system just critical core = -391.0 + 126.70 + 10.4
Drain = -253.9 f

| INSTRUMENT | RANGE | INSTRUMENT CHECK | | | STARTUP RANGE |
|------------|---------------------|------------------|-----------------|-------|---------------------|
| | | TRIP | SOURCE DISTANCE | RESET | |
| K-1 | 3x10 ⁻¹² | Meter ✓ | 3" | ✓ | 3x10 ⁻¹² |
| | | Fast ✓ | 2" | ✓ | " |
| K-2 | 3x10 ⁻¹² | Meter ✓ | 3" | ✓ | " |
| | | Fast ✓ | 1" | ✓ | " |
| PM-1 | 700V | Alarm ✓ | 5" | ✓ | 500V |
| PM-2 | 1200V | Low ✓ | 12" | ✓ | 900V |
| | | Alarm ✓ | 2" | ✓ | " |

LOG N CALIBRATE OPERATE DUMP WELL PROBE LIGHT
 RADIATION ALARM: A B C SOURCE NUMBER B-80

START-UP CHECK LIST

Equipment checked by I.D.C. Personnel check by AKM
 Instruments and safeties checked and reset by AKM
 Source in checked by AKM Source No. M-43
 Emergency equipment in control room checked by Fibos
 Instruments in trip circuit: K-1-2 PM1-2
 Red light on by AKM Time 0837
 Start-up OK'd by I.D.C., AKM Date 2-8-78

Now have H.F.I.R. Core 133-0 & 133-1 assembly in small reflector tank. Inner core speed 1375"

Now have spent fuel element with 2 fuel plates # D-3228 & D-5495.

Water ht = 58.90 cm Temp °
 1-Per #15 = 29.5 °C
 C = -432.43 & a = -3.34 16 = 29.5 °C
 1097 Drain -242.3

Now have spent fuel element with 9 fuel plates # D-3228, D-5495, D-3229, D-2870. plus 5 enriched strips # 2, 3, 4, 5, 6.

Water ht = 59.00 cm Temp °
 2+Per #15 = 29.7 °C
 C = 210.78 sec = 5.34 16 = 29.7 °C
 Water ht = 53.70 cm
 System just critical
 Drain core = -391.0 + 126.7 + 5.3
 = -259.0 ✓

| INSTRUMENT | RANGE | INSTRUMENT CHECK | | | |
|------------|--------------------|------------------|-----------------|-------|---------------------|
| | | TRIP | SOURCE DISTANCE | RESET | STARTUP RANGE |
| K-1 | 3x10 ⁻² | Meter ✓ | 3" | ✓ | 3x10 ⁻¹² |
| | | Fast ✓ | 2" | ✓ | " |
| K-2 | 3x10 ⁻² | Meter - | 3" | ✓ | " |
| | | Fast - | 1" | ✓ | " |
| PM-1 | 700V | Alarm ✓ | .5" | ✓ | 500V |
| PM-2 | 1200V | Low - | 12" | ✓ | 900V |
| | | Alarm ✓ | 2" | ✓ | " |

LOG N CALIBRATE OPERATE DUMP WELL PROBE LIGHT
 RADIATION ALARM: A B C SOURCE NUMBER B-80

START-UP CHECK LIST

Equipment checked by I.D.C. / AKM Personnel check by F.D.C.
 Instruments and safeties checked and reset by AKM
 Source in checked by AKM Source No. M-43
 Emergency equipment in control room checked by I.D.C.
 Instruments in trip circuit: K-1-2 PM-1-2
 Rod light on by A.K.R. Time 1310
 Start-up OK'd by I.D.C. / AKM Date 2-11-79

Have H.F.I.R. conts 141-0 & 141-1 assembly in small reflector tank. Inner core spaced .375"

1345 Water ht = 58.80 cm Temp °
 System sub critical #15 = 23.5 °
 Drain. 16 = 23.5 °

Now have spent fuel element with 2 fuel plates #D-3224 & D-5495.

1420 Water ht = 58.90 cm Temp °
 System sub critical #15 = 23.0 °
 Drain. 16 = 23.0 °

Now have spent fuel element with 9 fuel plates #D-3224, D-5495, P-7242, & D-2870. plus 9 enriched strips #3, 4, 5, 6.

1500 Water ht = 59.00 cm Temp °
 System sub critical #15 = 23.2 °
 Drain. 16 = 23.2 °

over.

Removed enriched strip #6.

Water ht = 58.85 cm

+Per

C = 73.88 uw = 12.4 f

Water ht = 51.55 cm

System just critical

Drain

$$\text{Core} = -391.0 - 77.3 + 12.4$$

$$= -301.3 \checkmark$$

Temp °C

#15 = 23.2 °C

16 = 23.2 °C

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE DISTANCE | RESET | STARTUP RANGE |
|------------|---------------------|---|-----------------|-------------------------------------|---------------------|
| K-1 | 3x10 ⁻¹² | Meter <input checked="" type="checkbox"/> | 3" | <input checked="" type="checkbox"/> | 3x10 ⁻¹² |
| | | Fast <input checked="" type="checkbox"/> | 1" | <input checked="" type="checkbox"/> | " |
| K-2 | 3x10 ⁻¹² | Meter <input checked="" type="checkbox"/> | 3" | <input checked="" type="checkbox"/> | " |
| | | Fast <input checked="" type="checkbox"/> | 1" | <input checked="" type="checkbox"/> | " |
| PM-1 | 700V | Alarm <input checked="" type="checkbox"/> | .5" | <input checked="" type="checkbox"/> | 500V |
| PM-2 | 1200V | Low <input checked="" type="checkbox"/> | 12" | <input checked="" type="checkbox"/> | 900V |
| | | Alarm <input checked="" type="checkbox"/> | 1" | <input checked="" type="checkbox"/> | " |

LOG N CALIBRATE OPERATE DUMP WELL PROBE LIGHT

RADIATION ALARM: A B C SOURCE NUMBER B-85

START-UP CHECK LIST

Equipment checked by F.D.C. P.M.C. Personnel check by F.D.C. P.M.C.

Instruments and safeties checked and reset by P.M.C.

Source in checked by P.M.C. Source No. M-23

Emergency equipment in control room checked by F.M.C.

Instruments in trip circuit: K-1-2 PM-1-2

Red light on by P.M.C. Time 0850

Start-up OK'd by F.D.C. P.M.C. Date 2-12-74

H.F.L.R. Core 134-0 & 134-1

Have H.F.L.R. Cores 134-0 & 134-1 assembled in small reflector tank. Inner core spaced 375."

1020

Water ht = 58.90 cm
System sub critical
Drain

Temp °C

#15 = 23.5 °C

16 = 23.5 °C

Now have spent fuel element with 2 fuel plates #D-3224 & D-5495.

Water ht = 58.90 cm

+Per

C = -727.95 uw = -1.9 f

Drain

Temp °C

#15 = 23.7 °C

16 = 24.0 °C

1101

$$\text{Core} = -240.0 - 1.9$$

$$= -241.9 \checkmark$$

over

Now have spent fuel element with 4 fuel plates #D-3224, D-5495, D-3242, D-5495, plus 5 enriched strips # 2, 3, 4, 5, 6, and natural strip # 3.

1315 Water ht = 59.0 cm Temp °C
 system just critical #15 = 24.0°C
 Drain. 16 = 24.0°C
 $Core = -391.0 + 126.7 + 13.0$
 $= -251.3 \%$

H.F.I.R. Cores 140-0 & 140-1
 Now have H.F.I.R. cores 140-0 & 140-1 assembled in small reflector tanks. Inner core spaced 375"

1416 Water ht = 59.0 cm Temp °C
 system sub critical #15 = 24.2°C
 Drain. 16 = 24.2°C

Now have spent fuel element with 2 fuel plates #D-3224 & D-5495.

1453 Water ht = 59.00 cm Temp °C
 system sub critical #15 = 24.5°C
 Drain. 16 = 24.5°C

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE DISTANCE | RESET | STARTUP RANGE |
|------------|---------------------|---------|-----------------|-------|---------------------|
| K-1 | 3x10 ⁻¹² | Meter ✓ | 3" | ✓ | 3x10 ⁻¹² |
| | | Fast ✓ | 1" | ✓ | " |
| K-2 | 3x10 ⁻¹² | Meter ✓ | 3" | ✓ | " |
| | | Fast ✓ | 1" | ✓ | " |
| PM-1 | 700 ✓ | Alarm ✓ | 1.5" | ✓ | 500 ✓ |
| PM-2 | 1200 ✓ | Low ✓ | 12" | ✓ | 900 ✓ |
| | | Alarm ✓ | 1" | ✓ | " |

LOG N CALIBRATE OPERATE DUMP WELL PROBE LIGHT

RADIATION ALARM: A B C SOURCE NUMBER B-80

START-UP CHECK LIST

Equipment checked by ARK Personnel check by ILC
 Instruments and safeties checked and reset by ARK
 Source in checked by ARK Source No. M-43
 Emergency equipment in control room checked by ILC
 Instruments in trip circuit: K-1-2 PM-1-2
 Red light on by ARK Time 0820
 Start-up OK'd by ILC, ARK Date 2-13-79

Now have spent fuel element with 4 fuel plates #D-3224, D-5495, D-3242, + D-2870. plus 4 enriched strips # 3, 4, 5, 6.

0916 Water ht = 58.80 cm Temp °C
system sub critical #15 = 24.5°C
Drain. 16 = 24.5°C

Removed enriched strip #5.

Water ht = 59.05 cm Temp °C
+ Per #15 = 24.7°C
C = 80.80 cm = 11.7¢ 16 = 24.7°C

10:00 Water ht = 51.75 cm
system just critical
Drain core = -391.0 + 77.3 + 11.7
= -302.0¢/

Have H.F.I.R. core 136-0 + 136-1 assembly in small reflector tank, inner core spaced .375"

1254 Water ht = 58.90 cm Temp °C
system sub critical #15 = 24.7°C
Drain. 16 = 24.7°C

Now have spent fuel element with 2 fuel plates. #D-3224 + D-5495.

Water ht = ~~59.00~~ 59.00 cm Temp °C
2-Per #15 = 24.7°C
C = -521.52 cm = -2.7¢ 16 = 24.7°C
1353 Drain core = -240.0 - 2.7
= -242.7¢/

Now have spent fuel element with 4 fuel plates #D-3224, D-5495, D-3242, + D-2870. plus 5 enriched strips # 3, 7, 8, 9, + 10.

Water ht = 58.90 cm Temp °C
3 + Per #15 = 25.0°C
C = 91.78 cm = 10.0¢ 16 = 25.0°C

1510 Water ht = 52.10 cm
system just critical
Drain. core = -391.0 + 130.3 + 10.0
= -250.7¢/

| INSTRUMENT | RANGE | INSTRUMENT CHECK | | | |
|------------|---------------------|---|-----------------|-------------------------------------|---------------------|
| | | TRIP | SOURCE DISTANCE | RESET | STARTUP RANGE |
| K-1 | 3x10 ⁻¹² | Meter <input checked="" type="checkbox"/> | 3" | <input checked="" type="checkbox"/> | 3x10 ⁻¹² |
| | | Fast <input checked="" type="checkbox"/> | 1" | <input checked="" type="checkbox"/> | " |
| K-2 | 3x10 ⁻¹² | Meter <input checked="" type="checkbox"/> | 3" | <input checked="" type="checkbox"/> | " |
| | | Fast <input checked="" type="checkbox"/> | 1" | <input checked="" type="checkbox"/> | " |
| PM-1 | 700 V | Alarm <input checked="" type="checkbox"/> | 5" | <input checked="" type="checkbox"/> | 500 V |
| PM-2 | 1200 V | Low <input checked="" type="checkbox"/> | 12" | <input checked="" type="checkbox"/> | 900 V |
| | | Alarm <input checked="" type="checkbox"/> | 1" | <input checked="" type="checkbox"/> | " |

LOG N CALIBRATE OPERATE DUMP WELL PROBE LIGHT
 RADIATION ALARM: A B C SOURCE NUMBER B-80

START-UP CHECK LIST

Equipment checked by I.P.C. Personnel check by I.P.C.
 Instruments and safeties checked and reset by B.K.H.
 Source in checked by B.K.H. Source No. M-43
 Emergency equipment in control room checked by I.P.C.
 Instruments in trip circuit: K-1-2 PM-1-2
 Red light on by B.K.H. Time 0820
 Start-up OK'd by I.P.C., B.K.H. Date 7-19-78

Have H.F.I.R. core 139-0 & 139-1 assembly in small reflector tank, inner core spaced 1.375"

0906 Water ht = 58.80 cm Temp °C
 System sub critical #15 = 29.7 °C
 Drain 16 = 29.7 °C

Now have spent fuel element with 2 fuel plates D-3224 & D-5495.

0949 Water ht = 58.90 cm Temp °C
 System sub critical #15 = 25.0 °C
 Drain 16 = 25.0 °C

Now have spent fuel element with 4 fuel plates, D-3224, D-5495, D-3242, & D-2870, plus 5 enriched strips # 7, 7, 8, 9, & 10.

1059 Water ht = 58.90 Temp °C
 System sub critical #15 = 25.0 °C
 Drain 16 = 25.0 °C

Removed enriched strip # 8
 Water ht = 58.90 cm Temp °C
 + Per Core = 391.0 + 102.2 + 3.9 #15 = 25.2 °C
 = 284.9 ✓ 16 = 25.2 °C
 avr.

1322 Water ht = 54.10 cm
 System just critical
 Drain

| INSTRUMENT | RANGE | INSTRUMENT CHECK | | | STARTUP RANGE |
|------------|---------------------|------------------|-----------------|-------|---------------------|
| | | TRIP | SOURCE DISTANCE | RESET | |
| K-1 | 3x10 ⁻¹² | Meter ✓ | 4" | ✓ | 3x10 ⁻¹² |
| | | Fast ✓ | 1" | ✓ | |
| K-2 | 3x10 ⁻¹² | Meter ✓ | 4" | ✓ | " |
| | | Fast ✓ | 1" | ✓ | " |
| PM-1 | 700v | Alarm ✓ | 5" | ✓ | 500v |
| PM-2 | 1200v | Low ✓ | 12" | ✓ | 900v |
| | | Alarm ✓ | 1" | ✓ | " |

LOG N CALIBRATE OPERATE DUMP WELL PROBE LIGHT
 RADIATION ALARM: A B C SOURCE NUMBER B-82

START-UP CHECK LIST

Equipment checked by F.P.C. Personnel check by F.P.C.
 Instruments and safeties checked and reset by AKL
 Source in checked by AKL Source No. M-03
 Emergency equipment in control room checked by F.P.C.
 Instruments in trip circuit: K-1-2 PM-1-2
 Red light on by AKL Time 1225
 Start-up OK'd by F.P.C. AKL Date 2-19-79

H.F.I.R. Cons 135-0 & 135-1
 Have H.F.I.R. Cons 135-0 & 135-1 assembly
 in small reflector tank, tubes are
 spaced .375"

1258 Water ht = 59.0 cm Temp °C
 System sub critical #15 = 24.5 °C
 Drain #16 = 24.5 °C

Now have spent fuel element with 2
 fuel plate # D-3224 & D-5995.

Water ht = 59.0 cm Temp °C
 'Drain' #15 = 24.7 °C
 #16 = 24.7 °C
 T = -749.685e. = -1.84

1345 Drain
 Can = -241.8 ✓

New home sput fuel element with
 4 fuel plates D-3224, D-5495, D-³²⁴²~~4222~~,
 D-2870. Enriched strips # 1, 7, 8, 9, 10. Natural
 strip # 3.

3:10 Water ht. 58.80 cm.
 System just critical Temp # 15-25.0 °C
 Drain 16-25.0 °C
 Core = -391.0 + 130.1 + 13.0
 = -247.9 f

| INSTRUMENT | RANGE | INSTRUMENT CHECK | | | |
|------------|--------------------|------------------|-----------------|-------|--------------------|
| | | TRIP | SOURCE DISTANCE | RESET | STARTUP RANGE |
| K-1 | 3x10 ¹² | Meter ✓ | 3" | ✓ | 3x10 ¹² |
| | | Fast ✓ | 1" | ✓ | " |
| K-2 | 3x10 ¹² | Meter ✓ | 3" | ✓ | " |
| | | Fast ✓ | 1" | ✓ | " |
| PM-1 | 700V ✓ | Alarm ✓ | 0.5" | ✓ | 500V |
| PM-2 | 1200V | Low ✓ | 12" | ✓ | 900V |
| | | Alarm ✓ | 1" | ✓ | " |

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT _____
 RADIATION ALARM: A ✓ B ✓ C ✓ SOURCE NUMBER B-80

START-UP CHECK LIST

Equipment checked by FDC RKR Personnel check by RKR
 Instruments and safeties checked and reset by FDC
 Source in checked by FDC Source No. M-43
 Emergency equipment in control room checked by RKR
 Instruments in trip circuit: K1-2 PM1-2
 Red light on by RKR Time 08:15
 Start-up OK'd by FDC RKR Date 2-20-74

0855

Repeat of last experiment on Page 92
 Water ht = 58.9 cm

System just critical slightly Temp # 15-24.5 °C
 Drain 1727.5 Sec = 77 f # 16: 24.5 °C

1 - Period Time = ~~749.68~~ =

09:08

Drain Core = 391.0 + 143.1 - .8
 = -248.7 f ✓

Removed natural strip # 3 - New home sput
 fuel element with 4 fuel plates, D-3224, D-5495,
 D-3242, D-2870 + enriched strips # 1, 7, 8, 9, 10

08:43

Water ht = 58.9 cm

2 System + Period Temp # 15: 25.0 °C
 System Water ht. 57.75 cm 16: 25.0 °C

09:52

System just critical T = 73.88 Sec = 12.4 f
 Drain Core = 391.0 + 130.1 + 12.4 f
 = -248.5 f ✓

H.F.I.R Core 138-0, 138-I

Have H.F.I.R Core #138-0, 138-I assembled in small reflector tank. Inner core spaced at .375"

13:45

Water HT. 58.9 Cmm
System sub. critical

Temp. # 15 = 23.0 °C

13:47

Drain

16 = 25.0 °C

14:00

New home spent fuel element with 3 fuel plates # D-3224, L D-5495.

14:29

Water HT. 58.90 Cmm
System sub. critical
Drain

Temp. # 15 = 23.5 °C

16 = 25.5 °C

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE DISTANCE | RESET | STARTUP RANGE |
|------------|--------------------|---------|-----------------|-------|--------------------|
| K-1 | 3X10 ¹² | Meter ✓ | 3 | ✓ | 3X10 ⁻² |
| | | Fast ✓ | 1 | ✓ | " |
| K-2 | 3X10 ¹² | Meter ✓ | 3 | ✓ | " |
| | | Fast ✓ | 1 | ✓ | " |
| PM-1 | 700V | Alarm ✓ | .5 | ✓ | 500V |
| PM-2 | 1200V | Low ✓ | 12" | ✓ | 900V |
| | | Alarm ✓ | 2" | ✓ | " |

LOG N CALIBRATE OPERATE DUMP WELL PROBE LIGHT

RADIATION ALARM: A B C SOURCE NUMBER B-8

START-UP CHECK LIST

Equipment checked by RKR Personnel check by RKR

Instruments and safeties checked and reset by I.D.C

Source in checked by I.D.C Source No. M-43

Emergency equipment in control room checked by RKR

Instruments in trip circuit: K-1, K2, PM-1, PM-2

Red light on by RKR Time 08:30

Start-up OK'd by I.D.C RKR Date 2-21-74

H.F.I.R. Core 138-0, 138-I

09:05

New home spent fuel element with 4 fuel plates D-3224, D-5495, D-3242, D-2890, + 5 enriched strips # 1, 7, 8, 9, 10.

(OVER)

09:40

Water ht = 58.90 cm

#1 - Period

09:55

Drain

Temp. #15: 25.0 °C

#16: 23.0 °C

T = 1212.5 sec = 1.1 φ

Corr = -391.0 + 130.1 - 1.1

= -262.0 φ

Removed enriched strip #7 and added natural strip #3. Now have spent fuel element with 4 fuel plates # D-3224, 05495, D-3242, D-2870 + 4 enriched strips #1, 8, 9, 10 + 1 natural strip #3

13:13

Water ht. 58.90 cm

#2 + Period

Temp. #15: 25.2 °C

T = 97.78 sec = 10.0 φ

#16: 25.2 °C

Water ht. = 52.00 cm

System just critical

13:29

Drain

Corr = -391.0 + 119.3 + 10.0

= -261.7 φ

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE DISTANCE | RESET | STARTUP RANGE |
|------------|---------------------|---------|-----------------|-------|---------------------|
| K-1 | 3x10 ⁻¹² | Meter ✓ | 3" | ✓ | 3x10 ⁻¹² |
| | | Fast ✓ | 1" | ✓ | " |
| K-2 | 3x10 ⁻¹² | Meter ✓ | 3" | ✓ | " |
| | | Fast ✓ | 1" | ✓ | " |
| PM-1 | 700V | Alarm ✓ | 15" | ✓ | 500V |
| PM-2 | 1200V | Low ✓ | 12" | ✓ | 900V |
| | | Alarm ✓ | 1" | ✓ | " |

LOG N CALIBRATE OPERATE DUMP WELL PROBE LIGHT

RADIATION ALARM: A B C SOURCE NUMBER B-80

START-UP CHECK LIST

Equipment checked by F.I.C. Personnel check by F.I.C.

Instruments and safeties checked and reset by AKL

Source in checked by AKL Source No. M-43

Emergency equipment in control room checked by F.I.C.

Instruments in trip circuit: K-1-2 PM1-2

Red light on by AKL Time 0935

Start-up OK'd by F.I.C. AKL Date 2-22-78

H.F.I.R. Cans 144-0 & 135-1.

Have spent fuel element with 4 fuel plates # D-3224, D-5495, D-3242, & D-1870, plus 4 enriched strips # 1, 2, 3, & 4, plus 1 natural strip # 3

Water ht = 59.0 cm
+ Per

$\Sigma = 178.19 \text{ cm} = 6.2 \text{ f}$

1040 Water ht = 53.30 cm
system just critical
Crain.

Temp
#15 = 25.0°C
16 = 25.0°C

$$\begin{aligned} \text{Com} &= -391.0 + 106.3 + 13.0 \\ &+ 6.2 \\ &= -265.5 \text{ f} \end{aligned}$$

| INSTRUMENT | RANGE | INSTRUMENT CHECK | | | |
|------------|---------------------|------------------|-----------------|-------|---------------------|
| | | TRIP | SOURCE DISTANCE | RESET | STARTUP RANGE |
| K-11 | 3X10 ⁻¹² | Meter ✓ | 2" | ✓ | 3X10 ⁻¹² |
| | | Fast ✓ | 1" | ✓ | " |
| K-2 | 3X10 ⁻¹² | Meter ✓ | 3" | ✓ | " |
| | | Fast ✓ | 1" | ✓ | " |
| PM-1 | 700V | Alarm ✓ | 5" | ✓ | 500V |
| PM-2 | 1200V | Low ✓ | 12" | ✓ | 900V |
| | | Alarm ✓ | 2" | ✓ | " |

LOG: CALIBRATE OPERATE DUMP WELL PROBE LIGHT

RADIATION ALARM: A B C SOURCE NUMBER B-80

START-UP CHECK LIST

Equipment checked by RKR Personnel check by I.D.C.

Instruments and safeties checked and reset by I.D.C.

Source in checked by I.D.C. Source No. M-43

Emergency equipment in control room checked by RKR.

Instruments in trip circuit: K1, K2, PM1, PM2

Red light on by RKR Time 08:45

Start-up OK'd by I.D.C. RKR Date 2-26-74

0900

Repeat of experiment on Page 98.

09:30

Water ht: 59.00 cm

Temp. #15: 24.5°C

+1 + Period

16 = 24.5°C

$\Sigma = 245.97 \text{ Dec. 11.1 f}$

(OVER)

Water Ht = 54.25 cm.

System just critical

09:47 Drain

$$\text{Core} = -391.0 + 106.3 + 13.0 + 4.1 = -267.6 \phi$$

010:20 Repeat of above experiment.

10:48 Water Ht = 58.90 cm

+2 + Period

$$T = 258.588 = 4.4 \phi$$

Temp. #15 = 24.7°C

16 = 24.7°C

Water Ht. = 54.30 cm

System just critical

11:10 Drain

$$-391.0 + 106.3 + 13.0 + 4.4 = -267.3 \phi$$

HFIR Core 135-0 +144-I

Now have #135-0, +144-I with 4 fuel plates
4 enriched strips #1, 2, 3, 4 + 1 natural strip #3

14:00 Water Ht = 58.90 cm

Temp #15 = 25.0°C

System sub. critical

16 = 25.0°C

14:03 Drain

14:10 Removed natural strip #3

14:46 Water Ht = 59.00 cm

Temp. #15 = 25.2°C

14:52 #3 - Period

16 = 25.2°C

$$T = -516.02 = -2.7 \phi$$

$$\text{Core} = -391.0 + 106.3 - 2.7$$

15:00 Drain

$$= -287.4 \phi$$

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE DISTANCE | RESET | STARTUP RANGE |
|------------|---------------------|---------|-----------------|-------|---------------------|
| K-1 | 3X10 ⁻² | Meter ✓ | 3" | ✓ | 3X10 ⁻¹² |
| | | Fast ✓ | 1" | ✓ | ✓ |
| K-2 | 3X10 ⁻¹² | Meter ✓ | 3" | ✓ | ✓ |
| | | Fast ✓ | 1" | ✓ | ✓ |
| PM-1 | 700V | Alarm ✓ | .5" | ✓ | 500V |
| PM-2 | 1200V | Low ✓ | 12" | ✓ | 900V |
| | | Alarm ✓ | 2" | ✓ | " |

LOG N CALIBRATE ✓ C RATE ✓ DUMP WELL PROBE LIGHT

RADIATION ALARM: A ✓ B ✓ C ✓ SOURCE NUMBER B-80

START-UP CHECK LIST

Equipment checked by RKR. Personnel check by RKR

Instruments and safeties checked and reset by I.D.C.

Source in checked by F.D.C.. Source No. M-43

Emergency equipment in control room checked by RKR

Instruments in loop circuit: K1, K2, PM-1, PM-2

Red line to I.D.C. Time 12:50

Start-up OK'd by RKR, I.D.C. Date 2-27-74

HFIR 135-0 + 144-I

(OVER)

13:00 Removed enriched #1 and added natural strip #3. Now have 3 enriched strips and one natural. Drain #2, 3, 4. natural #3.

13:37 Water Ht. = 58.90 cm. temp. #15 = 24.7°C
 + Period #16 = 24.7°C
 $T = 156.45 \text{ sec} = 6.84$

13:50 Water Ht. = 53.30 cm
 System just critical

13:51 Drain Core = $391.0 + 92.10 + 6.84 = -292.1 \text{ } \phi 1$

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE DISTANCE | RESET | STARTUP RANGE |
|------------|---------------------|---------|-----------------|-------|---------------------|
| K-1 | 3x10 ⁻¹² | Meter ✓ | 2" | ✓ | 3x10 ⁻¹² |
| | | Fast ✓ | 1" | ✓ | ✓ |
| K-2 | 3x10 ⁻¹² | Meter ✓ | 2" | ✓ | ✓ |
| | | Fast ✓ | 1" | ✓ | ✓ |
| PM-1 | 700V | Alarm ✓ | .5" | ✓ | 500V |
| PM-2 | 1200V | Low ✓ | 12" | ✓ | 900V |
| | | Alarm ✓ | 2" | ✓ | " |

LOG N CALIBRATE OPERATE DUMP WELL PROBE LIGHT

RADIATION ALARM: A B C SOURCE NUMBER B-80

START-UP CHECK LIST

Equipment checked by RKR Personnel check by RKR

Instruments and safeties checked and reset by I.D.C.

Source in checked by I.D.C. Source No. M-43

Emergency equipment in control room checked by RKR

Instruments in trip circuit: K1, K2, PM-1, PM-2

Red light on by I.D.C. Time 13:55

Start-up OK'd by I.D.C. R.K.R. Date 3-7-74

H.F.I.R # 147-0, 147-I

Done H.F.I.R. Core 147-0, 147-I assembled in small reflector tank inner core spaced at .375"

14:37 Water Ht. = 59.00 cm. temp. #15 = 25.5°C
 System sub. critical #16 = 25.5°C

14:38 Drain

Now have spent fuel element with 2 plates # D-3224, + D-5495

15:25 Water Ht. = 59.00 cm. temp. #15 = 25.5°C
 System sub. critical #16 = 25.5°C

15:28 Drain

| INSTRUMENT CHECK | | | | | |
|------------------|---------------------|---------|-----------------|-------|---------------------|
| INSTRUMENT | RANGE | TRIP | SOURCE DISTANCE | RESET | STARTUP RANGE |
| K-1 | 3X10 ⁻² | Meter ✓ | 3" | ✓ | 3X10 ⁻¹² |
| | | Fast ✓ | 1" | ✓ | ✓ |
| K-2 | 3X10 ⁻¹² | Meter ✓ | 3" | ✓ | ✓ |
| | | Fast ✓ | 1" | ✓ | ✓ |
| PM-1 | 700V | Alarm ✓ | .5" | ✓ | 500V |
| PM-2 | 1200V | Low ✓ | 12" | ✓ | 900V |
| | | Alarm ✓ | 3" | ✓ | " |

LOG N CALIBRATE OPERATE DUMP WELL PROBE LIGHT

RADIATION ALARM: A B C SOURCE NUMBER B-80

START-UP CHECK LIST

Equipment checked by RKR Personnel check by RKR
 Instruments and safeties checked and reset by I.D.C.
 Source in checked by I.D.C. Source No. M-43
 Emergency equipment in control room checked by RKR
 Instruments in trip circuit: K-1, K-2, PM-1, PM-2
 Red light on by I.D.C. Time 08:40
 Start-up OK'd by I.D.C. RKR Date 3-8-74

HFIR 147-0, 147-F
 Now have spent fuel element with
 4 fuel plates D-3224, D5495, D-3242, D-2870
 + 4 enriched strips # 2, 3, 5.

09:29 Water Ht = 59.00 cm.
 System sub critical temp. #15 = 25.5°C
 09:31 Drain 16 = 25.5°C

Removed enriched strip # 3.

10:08 Water Ht. = 59.00 cm
 System sub critical Temp. #15 = 26.0°C
 10:14 Drain 16 = 26.0°C

Removed enriched strip #5
 (1) + Period Water Ht = 59.00 cm. T = 15 = 26.0°C
 T = 65.190 sec = 13.6 s 16 = 26.0°C
 System just critical
 Water Ht = 51.30 cm

10:58 Drain
 Core = -391.0 + 51.7 + 13.6
 = -325.7

12:35 Repeat of above experiment.
 (2) + period Water Ht = 59.00 cm. Temp. #15 = 26.0°C
 T = 65.190 sec. = 13.6 s 16 = 26.0°C

13:10 Water Ht = 51.30 cm
 13:13 System just critical
 13:14 Drain Core = -391.0 + 51.7 + 13.6
 = -325.7

N.F. IR # 145-0, 145-I

Have N.F. IR fuel element 145-0, 145-I assembled in small reflector tank
inner core spaced at .375"

14:48

Water Ht = 59.00 cm
System sub critical

14:50

Drain Temp. # 15 = 26.2°C
16 = 26.2°C

Now have spent fuel element with 2 plates # D-3224, D-5495.

15:23

Water Ht = 59.00 cm
System sub critical

15:24

Drain Temp. # 15 = 26.5°C
16 = 26.5°C

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE DISTANCE | RESET | STARTUP RANGE |
|------------|--------------------|---------|-----------------|-------|---------------------|
| K-1 | 3x10 ⁻² | Meter ✓ | 3" | ✓ | 3x10 ⁻¹² |
| | | Fast ✓ | 1" | ✓ | " |
| K-2 | 3x10 ⁻² | Meter ✓ | 3" | ✓ | " |
| | | Fast ✓ | 1" | ✓ | " |
| PM-1 | 700V | Alarm ✓ | .5" | ✓ | 500V |
| PM-2 | 1200V | Low ✓ | 12" | ✓ | 900V |
| | | Alarm ✓ | 2" | ✓ | " |

LOG N CALIBRATE OPERATE DUMP WELL PROBE LIGHT

RADIATION ALARM: A B C SOURCE NUMBER B-80

START-UP CHECK LIST

Equipment checked by I.D.E. Personnel check by RKR

Instruments and safeties checked and reset by I.D.E.

Source in checked by I.D.E. Source No. M-43

Emergency equipment in control room checked by RKR

Instruments in trip circuits: K-1, K-2, PM-1, PM-2

Red light on by I.D.E. Time 09:45

Start-up OK'd by I.D.E. RKR Date 3-11-74

N.F. IR # 145-0, 145-I

Now have spent fuel element with 4 fuel plates
D-3224, D-5495, D-3242, D-2890 + 3 enriched strips
5, 6, 7.

(OVER)

108

09:30

Water ht = 59.00 cm.

System sub critical

09:41

Drain

Removed enriched strip #6

(1) Water ht = ^{59.00}~~50.60~~ cm + Period

$\tau = 43.46 \text{ sec} = 18.0 \phi$

Water ht = 50.60 cm

System just critical

13:30

Drain

Temp. = 15 = 25.5 °C

16 = 25.5 °C

Core = -391.0 + 47.6 + 18.0

= -325.4 φ

14:00

Added natural strip #3. Now have 2 enriched strips #5, 7, + natural strip #3 + 4 plates.

Water ht = 59.00 cm

Temp. #15 = 26.0 °C

(2) + Period

16 = 26.0 °C

$\tau = 192.05 \text{ sec} = 5.8 \phi$

Water ht = 53.50 cm

System just critical

14:40

Drain

Core = -391.0 + 60.6 + 5.8

= -324.6 φ

H F I R #146-0, 146-I 109

15:50

Done H F I R Core #146-0, 146-I assembled in small reflector tank. Inner core spaced at .375"

Water ht = 5900 cm.

System sub critical

15:52

Drain

Temp #15 = 26.2 °C

16 = 26.2 °C

| INSTRUMENT | RANGE | INSTRUMENT CHECK | | | |
|------------|---------------------|---|-----------------|-------------------------------------|---------------------|
| | | TRIP | SOURCE DISTANCE | RESET | STARTUP RANGE |
| K-1 | 3×10^{-12} | Meter <input checked="" type="checkbox"/> | 2" | <input checked="" type="checkbox"/> | 3×10^{-12} |
| | | Fast <input checked="" type="checkbox"/> | 1" | <input checked="" type="checkbox"/> | " |
| K-2 | 3×10^{-12} | Meter <input checked="" type="checkbox"/> | 2" | <input checked="" type="checkbox"/> | " |
| | | Fast <input checked="" type="checkbox"/> | 1" | <input checked="" type="checkbox"/> | " |
| PM-1 | 700V | Alarm <input checked="" type="checkbox"/> | .5" | <input checked="" type="checkbox"/> | 500V |
| PM-2 | 1200V | Low <input checked="" type="checkbox"/> | 12" | <input checked="" type="checkbox"/> | 900V |
| | | Alarm <input checked="" type="checkbox"/> | 3" | <input checked="" type="checkbox"/> | " |

LOG N CALIBRATE OPERATE DUMP WELL PROBE LIGHT.

RADIATION ALARM: A B C SOURCE NUMBER B-80

START-UP CHECK LIST

Equipment checked by F.D.C. Personnel check by RKR

Instruments and safeties checked and reset by F.D.C.

Source in checked by F.D.C. Source No. M-43

Emergency equipment in control room checked by RKR

Instruments in trip circuit: K-1, K-2, PM-1, PM-2

Red light on by F.D.C. Time 08:05

Start-up OK'd by F.D.C. RKR Date 3-12-74

08:15 Now have spent fuel element with 2 plates # D-3224, D-5495

Water ht. = 59.00 cm
System sub critical
Drain

Temp. # 15 = 26.0 °C
16 = 26.0 °C

Now have spent fuel element and 4 fuel plates # D-3224, D-5495, D-3242, D-2870 + 2 enriched strips # 3+4 + 1 natural strip # 4

Water ht. = 59.10

(1) + Period
T = 62799 sec = 1.9 φ

0 10:15 Water ht = 55.80 cm, Temp. # 15 = 26.2 °C

0 10:16 System just critical core = $(-391.0 + 66.8 + 1.9) / 6 = 26.2 °C$
Drain = -322.3

13:00 Now H.F.I.R element # 146-0, 147-I with 4 fuel plates # D-3224, D-5495, D-3242, D-2870 + 2 enriched strips # 3+4 and 1 natural strip # 4

Water ht. = 59.30 cm.

(2) - Period Temp. # 15 = 26.5 °C
T = 164.0 sec = -0.37 φ 16 = 26.5 °C

13:40 Drain Core = $-391.0 + 66.8 - 0.37 = -324.6 φ$

H.F.I.R # 146-0, 145-I

Now have H.F.I.R # 146-0, 145-I with 4 fuel plates D-3224, D-5495, D-3242, D-2870 + 2 enriched strips # 3+4 and 1 natural strip # 4.

Water ht. = 59.10 cm.

(2) + Period Temp. # 15 = 26.7 °C
T = 191.2 sec = 5.8 φ 16 = 26.7 °C

Water ht. = 53.50 cm

System just critical

15:00 Drain Core = $-391.0 + 66.8 + 5.8 = -318.4 φ$

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE DISTANCE | RESET | STARTUP RANGE |
|------------|---------------------|---------|-----------------|-------|---------------------|
| K-1 | 3X10 ⁻¹² | Meter ✓ | 2" | ✓ | 3X10 ⁻¹² |
| | | Fast ✓ | 1" | ✓ | " |
| K-2 | 3X10 ⁻¹² | Meter ✓ | 2" | ✓ | " |
| | | Fast ✓ | 1" | ✓ | " |
| PM-1 | 700V | Alarm ✓ | 5" | ✓ | 500V |
| PM-2 | 1200V | Low ✓ | 12" | ✓ | 900V |
| | | Alarm ✓ | 2" | ✓ | " |

LOG N CALIBRATE OPERATE DUMP WELL PROBE LIGHT
 RADIATION ALARM: A B C SOURCE NUMBER B-80

START-UP CHECK LIST

Equipment checked by J. DC Personnel check by RKR
 Instruments and safeties checked and reset by J. DC
 Source in checked by J. DC Source No. M-43
 Emergency equipment in control room checked by RKR
 Instruments in trip circuit: K-1, K-2, PM-1, PM-2
 Red light on by RKR Time 08:20
 Start-up OK'd by J. DC RKR Date 3-17-74

H.F.I.R # 146-0, 144-I

08:40 New home 146-0, 144-I with spent fuel ^{element} plates + 4 fuel plates D-3224, D-5495, D-3224⁴², D-2870 + 2 enriched strips # 3 + 4, + 1 natural strip # 4

09:17 Water ht. = 59.20
 System just critical

09:24 Drain Temp. #15: 24.5 °C
 Core = -391.0 + 66.8: 16 = 24.5 °C
 = -324.2 °C

H.F.I.R # 146-0, 141-I

09:40 New home H.F.I.R # 146-0, 141-I with spent fuel element and 4 fuel plates ^{D-3224, D-5495, D-3224⁴², D-2870} + 2 enriched strips # 3 + 4 + 1 natural strip # 4.

10:15 Water ht. = 59.00 cm
 (1) + Period temp. #15: 25.5 °C
 16: 25.5 °C
 T = 76.05 sec = 12.1 φ

Water ht. = 51.50 cm.

10:27 Drain Core = -391.0 + 66.8 + 12.1
 = -312.1 °C

H.F.I.R # 146-0, 135-I

13:14 New home H.F.I.R # 146-0, 135-I with spent fuel ~~plate~~ element and 4 fuel plates ^{D-3224, D-5495, D-3224⁴², D-2870} + 4 enriched strips # 1, 3, 4, 10. + 1 natural strip # 4.

13:43 Water ht. = 59.10 cm.
 (2) - Period temp. #15 = 26.5 °C
 16 = 26.5 °C
 T = 706.2 sec = -1.9 φ

13:53 Drain Core = -391.0 + 120.2 - 1.9
 = -272.7 °C

Removed natural strip # 4
 (OVER)

14:18 Water ht. = 59.00 cm

(3) + Period

$T = 115.1 \text{ sec} = 9.3 \text{ \#}$

Temp. #15 = 26.5 °C

16 = 26.5 °C

14:28 Water ht. = 52.50 cm

System just critical

14:29 Drain

$Con = -391.0 + 107.2 + 9.3$

$= -275.5 \text{ \#}$

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE DISTANCE | RESET | STARTUP RANGE |
|------------|---------------------|---------|-----------------|-------|---------------------|
| K-1 | 3x10 ⁻¹² | Meter ✓ | 2" | ✓ | 3x10 ⁻¹² |
| | | Fast ✓ | 1" | ✓ | " |
| K-2 | 3x10 ⁻¹² | Meter ✓ | 3" | ✓ | " |
| | | Fast ✓ | 1" | ✓ | " |
| PM-1 | 700V | Alarm ✓ | 5" | ✓ | 500V |
| PM-2 | 1200V | Low ✓ | 12" | ✓ | 900V |
| | | Alarm ✓ | 2" | ✓ | " |

LOG N CALIBRATE OPERATE DUMP WELL PROBE LIGHT

RADIATION ALARM: A B C SOURCE NUMBER B-80

START-UP CHECK LIST

Equipment checked by I.D.C Personnel check by RKR

Instruments and safeties checked and reset by I.D.C

Source in checked by I.D.C Source No. M-42

Emergency equipment in control room checked by RKR

Instruments in trip circuit: K1, K2, PM-1, PM-2

Red light on by RKR Time 08:40

Start-up OK'd by I.D.C RKR Date 9:05 3-14-74

09:00

New home H.F.I.R. element #135-0, 146-I with spent fuel element and 4 fuel plates # D-3224, D-5495, D-32~~24~~⁴², D-2870. + 3 enriched strips # 3, 8, 10. + natural strip # 4

09:43

Water ht. = 59.00 cm

(1) + Period $T = 132.5 = 7.8 \text{ \#}$ Temp. #15 = 26.0 °C

Water ht = 52.80 cm 16 = 26.0 °C

09:52

System just critical

Drain

$Con = -391.0 + 93.5 + 7.8 \text{ \#}$

$= -289.7 \text{ \#}$

H.F.I.R. # 135-0, 147-I

10:31

New home H.F.I.R. element 135-0, 147-I with spent fuel element and 4 fuel plates # D-3224, D-5495, D-32~~24~~⁴², D-2870. + 3 enriched strips # 3, 8, 10. + 1 natural strip # 4

(OVER)

116

11:00 Water Ht = 59.00 cm.

(2) + Period

 $T = 210.7 \text{ sec} = 5.3 \phi$

Temp. #15 = 26.2 °C

11:10 Water Ht = 53.65 cm

16 = 26.2 °C

System just critical

Drain

Core = $-391.0 + 93.5 + 5.3$ $= -292.2 \phi$ H.F.I.R # 135-0, 144-I

13:00 77 am home H.F.I.R # 135-0, 144-I with spent fuel element and 4 fuel plates # D-3224, D-5495, D-3224^{#2}, D-2870. + 3 enriched strips # 3, 8, 10. + 1 natural strip # 4.

13:30 Water Ht = 59.00 cm

(3) + Period

 $T = 206.4 \text{ sec} = 5.4 \phi$

Temp. # 15 = 26.2 °C

16 = 26.2 °C

13:38 Water Ht = 53.70 cm

System just critical

13:40 Drain

Core = $-391.4 + 93.5 + 5.4$ $= -292.1 \phi$ H.F.I.R # 135-0, 141-I

117

14:30 77 am home H.F.I.R # 135-0, 141-I with spent fuel element and 4 fuel plates # D-3224, D-5495, D-3224^{#2}, D-2870. + 3 enriched strips # 3, 8, 10. + 1 natural strip # 4.

15:00 Water Ht = 59.00 cm

(4) + Period

 $T = 41.28 \text{ sec} = 18.6 \phi$

Temp. # 15 = 26.2 °C

16 = 26.2 °C

15:10 Water Ht = 50.50 cm

System just critical

15:12 Drain

Core = $-391.0 + 93.5 + 18.6$ $= -278.9 \phi$

| INSTRUMENT | RANGE | INSTRUMENT CHECK | | | |
|------------|---------------------|---|-----------------|-------------------------------------|---------------------|
| | | TRIP | SOURCE DISTANCE | RESET | STARTUP RANGE |
| K-1 | 3×10^{-12} | Meter <input checked="" type="checkbox"/> | 3" | <input type="checkbox"/> | 3×10^{-12} |
| | | Fast <input checked="" type="checkbox"/> | 1" | <input checked="" type="checkbox"/> | " |
| K-2 | 3×10^{-12} | Meter <input checked="" type="checkbox"/> | 3" | <input type="checkbox"/> | " |
| | | Fast <input checked="" type="checkbox"/> | 1" | <input checked="" type="checkbox"/> | " |
| PM-1 | 700V | Alarm <input checked="" type="checkbox"/> | 1.5" | <input checked="" type="checkbox"/> | 500V |
| PM-2 | 1200V | Low <input checked="" type="checkbox"/> | 12" | <input checked="" type="checkbox"/> | 900V |
| | | Alarm <input checked="" type="checkbox"/> | 2" | <input checked="" type="checkbox"/> | " |

LOG N CALIBRATE OPERATE DUMP WELL PROBE LIGHT RADIATION ALARM: A B C SOURCE NUMBER B-80

(OVER)

START-UP CHECK LIST

Equipment checked by I.D.C. Personnel check by I.D.C.

Instruments and safeties checked and reset by I.D.C.

Source in checked by I.D.C. Source No. M-43

Emergency equipment in control room checked by I.D.C.

Instruments in trip circuit: K-1, K-2, PM-1, PM-2

Red light on by RKR Time 12:35

Start-up OK'd by I.D.C. RKR Date 3-18-74

H.F.I.R.# 135-0-145-I

Now have H.F.I.R.# 135-0, 145-I with spent fuel element and 4 fuel plates # D-3224, D-5495, D-3242, D-2870. + 3 enriched strips # 3, 8, 10 + 1 natural strip # 4.

13:14 Water Ht = 59.00 cm.

(1) + Period Temp. # 15 = 25.2°
T = 128.140.0 8.14 16 = 25.2°

13:34 Water Ht = 53.00 cm

System just critical

13:36 Drain Core = -391.0 + 93.5 + 8.1
= -289.4 φ

Repeat

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE DISTANCE | RESET | STARTUP RANGE |
|------------|---------------------|---------|-----------------|-------|---------------------|
| K-1 | 3X10 ⁻¹² | Meter ✓ | 3" | ✓ | 3X10 ⁻¹² |
| | | Fast ✓ | 1" | ✓ | " |
| K-2 | 3X10 ⁻¹² | Meter ✓ | 3" | ✓ | " |
| | | Fast ✓ | 1" | ✓ | " |
| PM-1 | 700V | Alarm ✓ | .5" | ✓ | 500V |
| PM-2 | 1200V | Low ✓ | 12" | ✓ | 900V |
| | | Alarm ✓ | 2" | ✓ | " |

LOG N CALIBRATE OPERATE DUMP WELL PROBE LIGHT

RADIATION ALARM: A B C SOURCE NUMBER B-80

START-UP CHECK LIST

Equipment checked by I.D.C. Personnel check by RKR

Instruments and safeties checked and reset by I.D.C.

Source in checked by I.D.C. Source No. M-43

Emergency equipment in control room checked by RKR

Instruments in trip circuit: K-1, K-2, PM-1, PM-2

Red light on by I.D.C. Time 09:30

Start-up OK'd by I.D.C. RKR Date 3-19-74

135-0, 141-I

Now have H.F.I.R.# 135-0, 141-I with spent fuel element and 4 fuel plates D-3224, D-5495, D-3242, D-2870. + 3 enriched strips # 3, 8, 10. + 1 natural strip # 4
(OVER)

120

10:25 Water Ht = 59.00 cm
 (1) + Period Temp. #15 = 25.5 °C
 l = 52.15 = 16.0 φ 16 = 25.5 °C

10:32 Water Ht. = 51.00 cm
 System just critical

10:38 Drain Core = -391.0 + 93.5 + 16.0
 = -281.5 φ

12:30 Repeat of above experiment.

12:55 Water Ht = 59.00 cm.
 (2) + Period T = 54.3 sec = 15.5 φ Temp #15 = 25.5 °C
 16 = 25.5 °C

13:10 Water Ht. = 50.95 cm
 13:11 Drain Core = -391.0 + 93.5 + 15.5
 = -282.0 φ

| INSTRUMENT CHECK | | | | | |
|------------------|-------|-------|-----------------|-------|---------------|
| INSTRUMENT | RANGE | TRIP | SOURCE DISTANCE | RESET | STARTUP RANGE |
| K-1 | | Meter | | | |
| | | Fast | | | |
| K-2 | | Meter | | | |
| | | Fast | | | |
| PM-1 | | Alarm | | | |
| PM-2 | | Low | | | |
| | | Alarm | | | |

LOG N CALIBRATE _____ OPERATE _____ DUMP WELL PROBE LIGHT _____

RADIATION ALARM: A _____ B _____ C _____

141-0, 135-I

121

| INSTRUMENT CHECK | | | | | |
|------------------|---------------------|---------|-----------------|-------|---------------------|
| INSTRUMENT | RANGE | TRIP | SOURCE DISTANCE | RESET | STARTUP RANGE |
| K-1 | 3X10 ⁻¹² | Meter ✓ | 3" | ✓ | 3X10 ⁻¹² |
| | | Fast ✓ | 1" | ✓ | " |
| K-2 | 3X10 ⁻¹² | Meter ✓ | 3" | ✓ | " |
| | | Fast ✓ | 1" | ✓ | " |
| PM-1 | 700V | Alarm ✓ | .5" | ✓ | 500V |
| PM-2 | 1200V | Low ✓ | 12" | ✓ | 900V |
| | | Alarm ✓ | 1" | ✓ | ✓ |

LOG N CALIBRATE OPERATE DUMP WELL PROBE LIGHT _____

RADIATION ALARM: A B C SOURCE NUMBER B-80

START-UP CHECK LIST

Equipment checked by I.D.C. Personnel check by RKR

Instruments and safeties checked and reset by I.D.C.

Source in checked by I.D.C. Source No. M-43

Emergency equipment in control room checked by RKR

Instruments in trip circuit: K-1, K-2, PM-1, PM-2

Rod light on by I.D.C. Time 08:45

Start-up OK'd by I.D.C. RKR Date 3-20-74

New have H.F.I.R # 141-0, 135-I with spent fuel element + 4 fuel plates # D-3224, D-5495, D-3242, D-2870, + enriched strips # 1, 2, 3, 4, + 2 natural strips # 3, 5.

(OVER)

09:30 Water Ht = 59.00 cm

(1) - Period

T = -651.9 Sec = -2.1 φ

Temp. #15 = 25.5 °C

#16 = 25.5 °C

09:42 Drain

Core = -391.0 + 132.3 - 2.1 φ

= -260.8 φ

Removed natural strip # 3

10:14 Water Ht = 59.00 cm.

(2) + Period

T = 119.5 Sec = 8.6 φ

Temp. #15 = 25.7 °C

#16 = 25.7 °C

10:33 Water Ht = 52.60 cm.

Drain

Core = -391.0 + 119.3 + 8.6 φ

= -263.1 φ

checked
09:10
5.7 φ

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE DISTANCE | SET | START-UP RANGE |
|------------|---------------------|---------|-----------------|-----|---------------------|
| IC-1 K-1 | 3X10 ⁻¹² | Meter ✓ | 3" | ✓ | 3X10 ⁻¹² |
| " | " | Fast ✓ | " | ✓ | " |
| IC-2 K-2 | " | Meter ✓ | " | ✓ | " |
| " | " | Fast ✓ | " | ✓ | " |
| -R-1 | | | | | |
| -R-2 | | | | | |
| PM-1 | 700 V | Alarm ✓ | 5" | ✓ | 500 V |
| PM-2 | 1200 V | Low | | | 900 V |
| " | | Alarm | | | |

LOG N CALIBRATE OPERATE SOURCE No. B-80

DUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by A.K.M. Personnel check by A.K.M.

Instruments and safeties checked and reset by A.K.M.

Source in checked by A.K.M. Source No. M-93

Emergency equipment in control room checked by F.D.C.

Instruments in trip circuit: IC-1 & 2 PM-1

Red light on by A.K.M. Time 20845

Start-up OK'd by F.D.C. A.K.M. Date 1-29-75

Have C.E.-2 Core assembly in small reflector tank. Have spent fuel element with 4 fuel plates # D-3224, D-5495, D-3224, D-2870. Have 3 enriched strips # 4, 8, 10, and natural #2 strip # 2.

1/2" feed water = 3.7 cm/min
3/4" Drain " = 11.4 cm/min
3.0" Drain " = 35.2 cm/min

Water ht = 57.9 cm
+ pres.

$t = 95.6 \text{ sec} = 10.2 \text{ f}$

Water ht = 50.5 cm
System just critical

1022 Drain Core = -391.0 - 78.9 - 13.2
-10.2 = -288.6 f

H.F.I.R. Core 157-0 & 157-1

Have Core 157-0 & 157-1 assembly in small reflector tank. Inner core spaced .375".

1120 Water ht = 57.9 cm Temp °C
System sub critical #15 = 23.5°
Drain 16 = 23.5°

H.F.I.R. Core 157-0 & 157-1

Now have spent fuel element with 2 fuel plates # D-3224 & D-5495.

1255 Water ht = 58.5 cm Temp °C
System sub critical #15 = 23.8
Drain 16 = 23.8

Now have spent fuel element with 4 fuel plates # D-3224 & D-5495, D-3224, & D-2870 and 3 enriched strips # 4, 8, 10, and natural strip # 2.

Water ht = 58.40 cm Temp °C
System sub critical #15 = 24.2°
Drain 16 = "

Removed enriched strip # 4.
Water ht = 58.9 cm Temp °C
System sub critical #15 = 24.2°
1410 Drain 16 = "

Removed natural strip # 2
Water ht = 58.3 cm Temp °C
Drain system sub critical #15 = 24.3
Drain 16 = "

Now have enriched strip #10. and natural strip #2.

Water ht = 58.6 cm

#7 Per

$\Sigma = 95.61 \text{ sec} = 10.2 \text{ f}$

1530 Water ht = 52.2 cm.

System just critical
Drain.

Core = $391.0 - 39.8 - 10.2$

= -341.0 f.

Temp °C
#15 = 29.8°
16 = "

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE DISTANCE | SET | START-UP RANGE |
|------------|-----------------------|-----------|-----------------|-----|---------------------|
| IC-1 | 3X10 ⁻¹² | Meter ✓ | 3" | - | 3X10 ⁻¹² |
| IC-2 | " | Fast ✓ | " | - | " |
| IC-2 | " | Meter ✓ | " | - | " |
| IC-2 | " | Fast ✓ | " | - | " |
| PM-1 | 700 V | Alarm ✓ | 5" | - | 500 V |
| PM-2 | 1200 V | Low ✓ | 6" | - | 900 V |
| | " | Alarm ✓ | 2" | - | " |
| 10-3 | LOG N CALIBRATE ✓ | OPERATE ✓ | SOURCE No. B-80 | | |
| | PUMP WELL PROBE LIGHT | | | | |

Top of fuel element = 47.3 cm
" " lower = 47.9 cm

START-UP CHECK LIST

Equipment checked by F.D.C. Personnel check by AKM
Instruments and safeties checked and reset by AKM
Source in checked by AKM Source No. M-43
Emergency equipment in control room checked by F.D.C.
Instruments in trip circuit: IC-1 & 2 PM-1-2
Red light on by AKM Time 0918
Start-up OK'd by F.D.C. AKM Date 1-27-75

H.F.L.R. Cores 148-0 & 148-1

Now have core 148-0 & 148-1 assembly in small reflector tank. Inner core spaced .375"

Water ht = 58.6 cm

System sub critical

0940 Drain.

Temp °C
#15 = 29.2°
16 = "

Now have spent fuel element with 2 fuel plates, # D-3224 and D-5495.

Water ht = 58.3 cm

System sub critical

1037 Drain.

Temp °C
#15 = 29.2°
16 = "

FC2 = 235% - 3X10⁻¹²

Now have spent fuel element with 4 fuel plates # D-3224, D-5495, D-3242 & D-2870. Plus 1 enriched strip #10 and natural strip #2.

Water ht = 49.3 cm
1 + Per
Temp °C
#15 = 29.5°
16 = "

C = 115.2 sec = 8.8 f
Water ht = 48.65 cm
System ~~sub~~ just critical
1125 Drain

Added enriched strip #5.

Water ht = 58.3 cm
2 + Per
Temp °C
#15 = 29.7
16 = 29.7

1303 Water ht = 51.3 cm
System just critical
Drain
Core = -391.0 + 63.6 + 19.2
= -313.1 f

Now have H.F.I.R. core 151-0 & 151-1 assemble in small reflector tank. Inver core spaced .375"

Water ht = 58.20 cm
System sub critical
1923 Drain
Temp °C
#15 = 25.0°
16 = "

Now have spent fuel element with 2 fuel plates # D-3224 & D-5495.

Water ht = 58.7 cm
System sub critical
Drain, 10-2 ... 33% 3×10^{-12}
Temp °C
#15 = 25.0°
16 = 25.0°

Now have spent fuel element with 4 fuel plates # D-3224, D-5495, D-3242 & D-2870 plus 2 enriched strips # 1, & 3 and natural strip # 4.

Water ht = 58.6 cm
3 + Per
Temp °C
#15 = 25.7°
16 = 25.7°

Water ht = 53.6 cm
System ~~sub~~ just critical
Drain
Core = -391 + 67.9 + 6.2
= -316.9

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE DISTANCE | SET | START-UP RANGE |
|-----------------------------|---------------------|-----------|-----------------|-----------------|---------------------|
| 1C-1 | 3×10^{-12} | Meter ✓ | 3 | ✓ | 3×10^{-12} |
| " | " | Fast ✓ | 2 | ✓ | " |
| 1C-2 | " | Meter ✓ | 3 | ✓ | " |
| " | " | Fast ✓ | 3 | ✓ | " |
| S-1 | | | | | |
| S-2 | | | | | |
| PM1 | 700V | Alarm ✓ | 1/2 | ✓ | 500V |
| PM2 | 1200V | Low ✓ | 10 | ✓ | 900V |
| " | " | Alarm ✓ | 2 | ✓ | " |
| LOG N CALIBRATE ✓ | | OPERATE ✓ | | SOURCE No. B-80 | |
| DUMP WELL PROBE LIGHT _____ | | | | | |

START-UP CHECK LIST

Equipment checked by V.B. Personnel check by A.K.A.
 Instruments and safeties checked and reset by A.K.A.
 Source in checked by V.B. Source No. M-43
 Emergency equipment in control room checked by A.K.A.
 Instruments in trip circuit: 1C-1 & 2 PM1-2
 Red light on by A.K.A. Time 0755
 Start-up OK'd by V.B. A.K.A. Date 1-28-75

H.F.I.R. Core 151-0 - 151-1

Repeat of last run. $\rho = -129$

Water ht = 58.6 cm

Temp °C
 #15 = 25.2 °C
 16 = "

+Pr

$T = 4.6 \mu$

Water ht = 53.85 cm

System fuel critical

0852 Drain.

Core: $-391 + 67.9 + 4.6 = -318.5 \mu$

H.F.I.R. Core 152-0 & 152-1

Now have H.F.I.R. core 152-0 & 152-1
 assembly in small reflector tank.
 Inner core spaced .375"

Water ht = 58.5 cm

Temp °C
 ?
 ?

System sub critical.

1043 Drain.

Now have first fuel elements with 2
 fuel plates # D-3229 & D-5495.

1302 Water ht = 58.80

Temp °C
 #15 = 25.8 °C
 16 = 25.8 °C

System sub critical

Drain

1C-2 = $28-317 \times 10^{-12}$

Now have spec fuel element with 9
fuel plates # D-3224, D-5495, D-3292 &
D-2870. Plus 2 enriched strips # 1 + 3.

Water ht = 58.8 cm

Temp °C

+PS

#15 = 26.0 °C

C = 132.5 cm = 7.9 φ

10 = 26.0 °C

+ Water ht = 52.95 cm
System just critical

1408 Drain.

$$\text{core} = -391 + 27.2 + 27.4 + 7.9$$

$$= -328.5 \phi$$

1508 HFIR Core 149-I & 149-O

Now have lifter cover 149-I & 149-O
assembled in small reflector tank. Inner
core spaced .375"

Water height - 58.6 cm

Temp -

System subcritical

15 - 26.1 °C

1530

Drain

16 - 26.1 °C

Now have spec fuel elements with 2 fuel
plates # D-3224 & D-5495

1604 Water height 58.8 cm
System subcritical

Temp

15 - 25.9 °C

16 - 26.0 °C

$$IC-2 \approx 32\% \text{ m } 3 \times 10^{-12}$$

Drain.

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE DEVICE | SET | START-UP RANGE |
|------------------------------|---------------------|-----------|---------------|-----------------|---------------------|
| IC-1 | 3×10^{-12} | Meter ✓ | 3 | ✓ | 3×10^{-12} |
| " | " | FRT ✓ | 2 | ✓ | " |
| IC-2 | 3×10^{-12} | Meter ✓ | 3 | ✓ | 3×10^{-12} |
| " | " | FRT ✓ | 3 | ✓ | " |
| PM-1 | | | | | |
| PM-2 | 700 V | Alarm | 1/2 | ✓ | 500V |
| PM-3 | 1200 V | Low | 8 | ✓ | 900V |
| " | " | Alarm | 1 | ✓ | |
| LOC N CALIBRATE ✓ | | OPERATE ✓ | | SOURCE No. B-80 | |
| CLEAR WELL PROBE LIGHT _____ | | | | | |

START-UP CHECK LIST

Equipment checked by RKR Personnel check by JHS
TMS IDC
 Instruments and safeties checked and reset by TMS
RKR
 Source in checked by TMS Source No. M-43
RKR
 Emergency equipment in control room checked by JHS
IDC
 Instruments in trip circuit: IC-1E-2, PM-1E-2
 Red light on by RKR Time 0810
EDC
 Start-up OK'd by RKR Date 1-29-75
EDC

0850

Now have HFIR cover 149-I & 149-O assembled in small reflector tank. Inner core spaced 0.375". Have spent fuel element with 4 plates D-3224, D-5495, D-3242 & D-2870 plus 2 enriched strips # 6, # 7, and natural strip # 3

0932

water height 58.7
 system just critical
 Drain
 Temp
 15 - 25.1 °C
 16 - 25.2 °C
 Core - 391 + 23.8 + 23.8 + 13
 = -330.4 d

1025

Cores 153-0 & 153-I
 Installed HFIR core 153-0 & 153-I in tank. Inner core spaced 0.375".
 Water height 59.0
 Subcritical
 Drain
 Temp
 15 - 25.2 °C
 16 - 25.5 °C

1222

Now have spent fuel element with 2 fuel plates # D-3224 & D-5495
 Water height 58.7
 Subcritical
 Temp (°C)
 15 = 25.5
 16 = 25.6

1255

Drain

1314

Now have HFIR cores 15B-0 and 153-I assembled in small reflector tank. Inner core spaced 0.375". Have spent fuel element with 4 plates D-3224, D-5495, D-3242, and D-2970. Have #1 & #3 enriched poison strips.

Temp °C
 Water height 59.0 15 = 25.9
 + period #1 = 50 sec 16 = 26.0
 Water height 51.1 system just critical
 Drain

$$\text{Core} = -391 + 27.2 + 27.4 + 16.4 = -320.4$$

1448

HFIR Cores 155-I & 155-0
 Have HFIR cores 155-I & 155-0 installed in small reflector tank. Inner core spaced 0.375"

Water height 58.7 cm Temp
 System Subcritical 15 - 25.9°C
 Drain 16 - 26.0°C

1520

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE DISTANCE | SET | START-UP RANGE |
|----------------------------|---------------------|----------------|------------------------|-----|---------------------|
| K-1 | 3×10^{-12} | Meter <u>B</u> | 3" | ✓ | 3×10^{-12} |
| | " | Fast <u>B</u> | 3" | ✓ | " |
| K-2 | 3×10^{-12} | Meter ✓ | 2" | ✓ | 3×10^{-12} |
| | " | Fast ✓ | 2" | ✓ | " |
| R-1 | | | | | |
| R-2 | | | | | |
| PM-1 | 700V | Alarm ✓ | 5" | ✓ | 500V |
| PM-2 | 1200V | Low ✓ | 8" | ✓ | 900V |
| | | Alarm ✓ | 1" | ✓ | " |
| LOG N CALIBRATE ✓ | | OPERATE ✓ | SOURCE No. <u>B-80</u> | | |
| DUMP WELL FADE LIGHT _____ | | | | | |

START-UP CHECK LIST

Equipment checked by RKR Personnel check by RKR
 Instruments and safeties checked and reset by TMS
RKR
 Source in checked by TMS Source No. M-43
RKR
 Emergency equipment in control room checked by IDC
 Instruments in trip circuit: IC-1 & 2, PM-1 & 2
 Red light on by RKR Time 0800
 Start-up OK'd by RKR Date 1-30-75
EDC

0825

Now have HFIR cores 155-I & 155-O installed in small reflector tank. Inner core spaced .375". Have Spert fuel element with 2 fuel plates, D-3224 & D-5495 installed

Water height 58.6 cm
 system subcritical
 IC-2 31 m 3 x 10⁻¹²

Temp
 15 - 25.2 °C
 16 - 25.2 °C

0856

Drain

Now have HFIR cores 155-I & 155-O installed in small reflector tank. Inner core spaced .375". Have Spert fuel element with 4 fuel plates, D-3224, D-5495, D-3242 and D-2870. Have #6 & #7 enriched poison strips and #3 natural poison strip.

Water height 58.7 cm
 + period # 1 782 sec = 116¢

Water Temp
 15 - 25.5 °C
 16 - 25.7 °C

water height 57.3 cm
 system just critical

1010

Drain

$$\text{core} = -391 + 73.8 + 23.8 + 13 + 1.6 = -328.8¢$$

1040

Now have HFIR cores 154-I and 154-O installed in small reflector tank. Inner core spaced 0.375"

Water height 58.6 cm
 Subcritical
 Drain

Temp °C
 15 = 25.5
 16 = 25.7

1111

1224

Now have HFIR cores 154I & 154O installed in small reflector tank. Inner core spaced .375". Have Spert fuel element with 2 fuel plates, D-3224 & D-5495 installed,

Water height = 58.7
 Drain
 Subcritical
 IC-2 ~ 33

Temp °C
 15 = 25.7
 16 = 26.0

1255

1314

Now have HFIR cores 154I and 154-O installed in small reflector tank. Inner core spaced 0.375". Have Spert fuel element with 4 fuel plates D3224, D5495, D 3242, D 2870. Also have enriched strips #1 & 3, and natural strip #4.

Water height 58.7 cm
 + period # 2 = 136.9 sec = ¢

Temp °C
 15 - 26.0
 16 - 26.2

Water height 52.7 cm @ critical

1350

Drain

$$\text{Core} = -391 + 67.9 + 7.7 = 315.4¢$$

1432 HFIR Cores 159-I & 159-O
 Now have HFIR cores 159-I & 159-O installed
 in small reflector tanks. Inner core
 spaced 0.375".

Water height 58.6 cm Temp.
 System subcritical 15 - 26.1 °C
 Drain 16 - 26.3 °C

1510 Now have HFIR Cores 159-I & 159-O installed in
 small reflector tank. Inner element spaced 0.375".
 Have spent fuel element ~~plus~~ with 2
 fuel plates, # D-3224 & D-5495 installed

Water height 58.6 Temp.
 System Subcritical 15 - 26.2 °C
 16 - 26.6 °C

IC2 - 35% on 3×10^{-12}

1541 Drain.

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE DISTANCE | SET | START-UP RANGE |
|------------|----------------------|---|-----------------------------------|--|----------------|
| K-1 | 3×10^{-12} | Meter <input checked="" type="checkbox"/> | 3" | $\checkmark 3 \times 10^{-12}$ | |
| | " | Fast <input checked="" type="checkbox"/> | 3" | $\checkmark 3 \times 10^{-12}$ | |
| K-2 | 10×10^{-12} | Meter <input checked="" type="checkbox"/> | $\frac{1}{2}$ " (1") | $\checkmark 3 \times 10^{-12}$ | |
| | " | Fast <input checked="" type="checkbox"/> | $\frac{1}{2}$ " (1") | $\checkmark 3 \times 10^{-12}$ | |
| R-1 | | | | | |
| R-2 | | | | | |
| PM-1 | 700V | Alarm <input checked="" type="checkbox"/> | $\frac{1}{2}$ " | <input checked="" type="checkbox"/> 500V | |
| PM-2 | 1900V | Low <input checked="" type="checkbox"/> | 8" | <input checked="" type="checkbox"/> 900V | |
| | " | Alarm <input checked="" type="checkbox"/> | 1" | <input checked="" type="checkbox"/> " | |

LOG No. OPERATE SOURCE No. B-80
 DUMP WELL FLOOD LIGHT

START-UP CHECK LIST

Equipment checked by TMS RKR Personnel check by RKR
 Instruments and safeties checked and reset by TMS RKR
 Source in checked by TMS RKR Source No. M-43
 Emergency equipment in control room checked by TMS RKR
 Instruments in trip circuit: IC-1 & 2, PM-1 & 2
 Red light on by RKR Time 0805
 Start-up OK'd by RKR ZDC Date 1-31-75

0846 Now have HFIR cores 159-I & 159-O installed in small reflector tank. Inner core spaced 0.375". Have Spert fuel element with 4 plates D-3224, D-5495, D-3242, D-2870, also have 2 enriched poison strips, nos 1 & 3, plus natural poison strip no 4.

Water Height 58.7 cm Temp
+ Period #1 = 78.2 sec 15 = 25.7°C
Water Height 57.6 cm 16 = 25.7°C
system just critical

0926

Drain

$$\text{core} = -391 + 27.2 + 27.4 + 13.3 + 11.9 = -311.2 \text{ \textcircled{f}}$$

1007

Now have HFIR cores 162-O & 162-I installed in small reflector tank. Inner core spaced 0.375".

Water height 58.6 cm Temp °C
Subcritical 15 = 25.7
16 = 25.7

1036

Drain

1040

Now have HFIR core 162-O & 162-I installed in small reflector tank. Inner core spaced 0.375". Have Spert fuel element with 2 plates D-3224 and D-5495.

Water height 58.8 cm Temp °C
System subcritical - period #2 = -8.94 15 = 26.0
Drain 16 = 26.0

1113

1239

Now have HFIR cores 162-O & 162-I installed in small reflector tank. Inner core spaced 0.375". Have Spert fuel element with 4 fuel plates D-3224, D-5495, D-3242, D-2870 and 5 enriched poison strips #'s 3, 7, 8, 9, 10.

Water height 58.7 cm Temp °C
- period #3 15 = 26.0
Drain 16 = 26.1

1320

1336

Now have HFIR cores 162-O & 162-I installed in small reflector tank. Inner core spaced 0.375". Have Spert fuel element with 4 fuel plates D-3224, D-5495, D-3242, D-2870 and 4 enriched poison strips #'s 3, 8, 9, 10 and 1 natural poison strip # 2.

Water height 58.7 cm Temp °C
15 = 26.2

+ period #4 = 119.5 sec 16 = 26.5
 $\beta = +8.6 \text{ \textcircled{f}}$

Water height = 52.4 cm for system just critical
over

1420 Set system screen reading 10-1. Tripped on meter 3×10^{-11} .

$$\text{Core} = -391.0 + 27.4 + 26.3 + 26.3 + 26.5 + 13.3 + 8.64 = -262.64$$

1455 HFIR Covers 160-I & 160-O now have HFIR covers 160-I & 160-O installed in small reflector tank. Inner core raised .375"

Water Height - 58.8 cm
 System subcritical
 Drain

Temp
 15 - 26.0°C
 16 - 26.3°C

1527

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE DISTANCE | SET | START-UP RANGE |
|-----------------------------|---------------------|-----------|-----------------|-----------------|---------------------|
| K-1 | 3×10^{-12} | Meter ✓ | 2" | ✓ | 3×10^{-12} |
| | " | Fast ✓ | 1" | ✓ | " |
| K-2 | 3×10^{-12} | Meter ✓ | 2" | ✓ | 3×10^{-12} |
| | | Fast ✓ | 1" | ✓ | " |
| R-1 | | | | | |
| R-2 | | | | | |
| PM-1 | 700 V | Alarm ✓ | 1/2" | ✓ | 500 V |
| PM-2 | 1200 V | Low ✓ | 10" | ✓ | 900 V |
| | " | Alarm ✓ | 2" | ✓ | " |
| LOG IN CALIBRATE ✓ | | OPERATE ✓ | | SOURCE No. B-80 | |
| DUMP WELL PROBE LIGHT _____ | | | | | |

START-UP CHECK LIST

Equipment checked by RKR Personnel check by RKR
 Instruments and safeties checked and reset by TMS
RKR
 Source in checked by TMS Source No. M-43
 Emergency equipment in control room checked by JTB
RKR
 Instruments in trip circuit: PM-1 & 2, IC-1 & 2
 Red light on by RKR Time 0805
 Start-up OK'd by RKR Date 2-3-75

0813 Now have HFIR covers 160-I & 160-O installed in small reflector tank. Inner core raised .375. Have Spert fuel element with 2 fuel plates, D-3224 & D-5495 installed

Water height 58.9 cm
 system subcritical
 Temp
 15 - 24.7°C
 16 - 24.7°C
 IC-2 .35% on 3×10^{-2}

0845 Drain

1033 Now have HFIR covers 160-I & 160-O installed in small reflector tank. Inner core raised .375". Have Spert fuel element with 4 fuel plates, D-3224, D-5495, D-2870 & D-3242 and 2 enriched person strips #1's, 1 & 3, and 1 natural strip, #2.

1118 Water height 49.9 cm Temp
 System just critical 15 - 24.5°C
 Drain 16 - 24.7°C

1232 Now have HFIR cores 160-I & 160-O installed
 in small reflector tank, inner core spaced 0.375"
 Have Spect fuel element with 4 fuel plates,
 D-3224, D-5495, D-2870, & D-3242,
 plus 3 enriched poison strips #'s, 1, 3, & 10

Water height 58.7 cm Temp
 + period #1 = 67.4 sec = 13.3¢ 15 - 24.7°C
 16 - 24.9°C

Water height = 51.6 cm
 System just critical
 core = -391 + 27.2 + 27.4 + 26.5 + 13.3
 = -296.6¢

1315 Drain

1347 Now have HFIR cores 161-I and 161-O
 installed in small reflector tank, inner core
 spaced 0.375".

Water height = 58.5 cm Temp °C
 System subcritical 15 = 24.9
 Drain 16 = 25.1

1417

1421 Now have HFIR cores 161-I and 161-O
 installed in small reflector tank, inner core
 spaced 0.375". Have Spect fuel element
 with 2 plates D-3224 and D-5495 installed.

Water height 58.7 cm Temp °C
 System subcritical 15 = 25.2
 Drain 16 = 25.4

1503

$3 \times 10^{-12} = -40\% \text{ IC-2}$

1521

Now have HFIR cores 161-I and 161-O
 installed in small reflector tank. Inner
 core spaced 0.375". Have Spect fuel element
 with 4 plates D-3224, D-5495, D-2870, & D-3242.
 Also have enriched strips 3, 7, 8, 9, 10.

Water height = 58.7 cm Temp °C
 System subcritical 15 = 25.3
 - period: $\tau \approx -130 \text{ sec.}$ 16 = 25.6
 $\beta \approx -15\%$

1551

Drain

INSTRUMENT CHECK

| INSTRUMENT | RANGE | TRIP | SOURCE DISTANCE | SET | START-UP RANGE |
|------------|-----------------------|---------|-----------------|-----|-----------------------|
| K-1 | 3 x 10 ⁻¹² | Meter ✓ | 3" | ✓ | 3 x 10 ⁻¹² |
| " | " | Fast ✓ | 1" | ✓ | " |
| K-2 | " | Meter ✓ | 2" | ✓ | " |
| " | " | Fast ✓ | " | ✓ | " |
| R-1 | | | | | |
| R-2 | | | | | |
| PA-1 | 7000 | Alarm ✓ | 1.5" | ✓ | 5000 |
| PA-2 | 2000 | Low ✓ | 6" | ✓ | 9000 |
| " | " | Alarm ✓ | 1" | ✓ | " |

LOG N CALIBRATE OPERATE SOURCE No. B-80

CUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by D.V.C. Personnel check by J.S.

Instruments and safeties checked and reset by R.K.M.

Source in checked by R.K.M. Source No. M-43

Emergency equipment in control room checked by J.S.

Instruments in trip circuit: IC-1 & 2 PM-1 & 2

Red light on by R.K.M. Time 0800

Start-up OK'd by F.D.C. R.K.M. Date 2-4-75

H.F.I.R. Core 161-I + 161-0.

Removed enriched trap #10. (see p 147)

Water height 58.8 cm Temp °C
15 = 25.0

+ period #1 = 210.1 sec. 16 = 25.3

$g = + 5.3 \text{ f}$

Core = $-391 + 103.8 + 5.3 = -281.9$

Water height = 53.9 cm @ just critical.

0920 Drain

H.F.I.R. Cores 158-I & 158-0

0955 Now have H.F.I.R. Cores 158-I & 158-0 installed in small reflector tank. Inner core spaced .375"

Water height 58.7 cm Temp
System Subcritical 15 = 25.2°C

1028 Drain 16 = 25.2°C

Now have H.F.I.R. cores 158-I & 158-0 installed in small reflector tank. Inner core spaced .375". Hope Spect fuel element with 2 plates D-3224 & D-5495 installed.

Water height 58.6 cm Temp
System Subcritical 15 = 25.5°C

1100 Drain 25% on IC-2, 3 x 10⁻¹² 16 = 25.5°C

1115 Now have HFIR core 158-I & 158-O installed in small reflector tank. Inner core spaced .375".
 Have Spert fuel element with 4 fuel plates D-3224, D-5495, D-2870, & D-3242 plus 2 enriched poison strips nos. 1 & 3 installed.
 Water height 58.8 cm Temp
 + period # 2 = 139.07 sec 15- 25.7°C
 p = 7.6 φ 16- 25.7°C

Water height = ~~52.3 cm~~ 53.2 cm
 system just critical

1258

Drain

$$\text{core} = -391.1 + 27.2 + 27.4 + 7.6$$

$$= -328.8 \phi$$

HFIR Core 150-I & 150-O

1335

Now have HFIR Core 150-I & 150-O installed in small reflector tank. Inner core spaced .375".
 Water height - 58.6 cm Temp
 System subcritical 15- 25.7°C
 Drain 16- 26.0°C

1406

Now have HFIR core 150-I & 150-O installed in small reflector tank. Inner core spaced .375".

Have Spert fuel element with 2 fuel plates D-3224 & D-5495 installed.
 Water height 58.7 cm Temp.
 System Subcritical 15- 26.0°C
 24.9% on IC-2 3×10^{-12} 16- 26.2°C

1440

Drain
 Now have HFIR cores 150-I & 150-O installed in small reflector tank. Inner core spaced .375".
 Have Spert fuel element with 4 plates, D-3224, D-5495, D-2870, & D-3242 plus 2 enriched poison strips nos. 4 & 6 installed.
 Water height 58.5 cm Temp
 + period # 3 = 58.7 sec; p = 14.7 φ 15- 26.0°C
 Water height 51.3 cm 16- 26.2°C
 system just critical

1530

Drain.

$$\text{core} = -391.1 + 26.1 + 23.8 + 14.7$$

$$= -326.4 \phi$$