BOOK35R

Notes:
"HFIR#2" on spine

Blank pages: inside cover sheet opposite page 1, 1, 2, 58, 151, inside back cover sheets

-page 37 has sheet clipped to it
-small sheet between pages 66 & 67

Scanned by:
Sheila Finch
RSICC /Oak Ridge National Lab.
August 7, 1999

HFIR Log #2

6/9/66 →

SHAW'S

PIONEERS SINCE 1831

Account Book

No. S 149

NO UNITS

Journal . . . . . .

Ledger, Single Entry . .

Ledger, Double Entry .

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.

6/9/66

See HFIR Log #1 for previous work and for check out of this date.

Installed L-D and L-I with 0.375-in. spacers. NO SPERT element or poison.

1026 Water at 21.2 cm. Subcritical

Added SPERT element with 2 fuel plates and #2 and #3 natural boron strips.

Fuel = 240, Strips = 27.56

1101 Water at 15.40cm. + Period #2 #1: 24.7°C #2: 25.0°C

T = 115.8 sec 8.8¢

1112 Water at 13.20 cm. Critical

Corr = -240 + 27.56 + 15 = -197.6 ± 8.4¢

Added 6 SS strips. Now have 2 fuel plates, 2 natural strips and 6 SS strips.

Fuel = 240, Poison = 35.6¢

1338 Water at 21.2 cm. + Period #3 #1: 25.0°C #2: 25.0°C

T = 158.1 sec 6.8¢

1350 Water at 15.40 cm. Critical

Drain

Corr = -240 + 35.6 + 6.2 = -198.2¢ ± 8.5¢

4

6/9/66

Now have 4 fuel plates in the SPERT element and 6 enriched strips (#2, 3, 7, 8, 5, 10) and 1 natural strip (#1). Fuel = 391, poison = 173.74

1604 Water at 14.05 cm. + period #4 #1: 25.3°C #2: 25.3°C

T = 84.8 sec 11.8 ¢

1610 Water at 14.05 cm. Critical

Drain

Core = 391 + 173.74 + 22.7 = 594.4 ¢ ± 18.7 ¢

Added natural strip #3. Now have 4 fuel plates, 6 enriched strips and 2 natural strips.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	4"	✓	3×10^{-12}
	"	Fast ✓		✓	"
K-2	3×10^{-12}	Meter ✓	5"	✓	3×10^{-12}
	"	Fast ✓			
R-1	—				
R-2	—				
PM-1	700V	Alarm ✓	Cont'	✓ 500V	
PM-2	1200V	Low ✓	15"	✓ 900V	
		Alarm ✓	cont.	✓	

LOG N' CALIBRATE ✓ OPERATE ✓ SOURCE No. B-80

DUMP WELL PROBE LIGHT ✓

START-UP CHECK LIST

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

Instruments and safeties checked and reset by D.C.

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

Emergency equipment in control room checked by D.C.

Instruments in trip circuit: K1-2 PM1-2

Red light on by D.C. Time 0805

Start-up CK'd by D.C. D.C. Date 6/10/66

New home 4 fuel plates. 2 natural strips #2 + 3 and 6 enriched strips # 2, 3, 7, 8, 9, 10

6/10/66

0840 Water at 21.25 cm. + Period #1 — #1: 24.5°C, #2: 24.7°C

T = 135.8 sec 7.7¢

0858 Water at 14.7 cm. Critical

Drain

Core = 391 - 187.52 - 8.5 = -193.58¢ ± 19.4

Installed 7-I in 6-D with 0.375 in. spacers. No SPERT element or period strips

1110 Water at 21.2 cm. Subcritical

Added SPERT element with 2 plates and natural strips #2 and #3.

1152 Water at 16.4 cm. + Period #2 — #1: 25.0, #2: 25.0

T = 104.2 sec 5.6¢

1200 P Water at 13.4 Cm. Critical

Core = -240 + 27.56 + 14.0 = -198.4¢ ± 8.4¢

Added 6 #SS strips. Now have 2 fuel plates, 2 natural strips and 6 #SS strips.

1353 Water = 21.4 cm, Period #3. Temp. #1 - 25.0°C, #2 - 25.0

T = 175.2 6.25¢

CRITICAL - Water Height 15.7 cm

Core = -240 + 35.60 + 5.8¢ = -198.6¢ ± 8.5¢

6/10/66

7:57P Installed Core T1 + 70 3/8" spacers
resting inner with respect to outer.
2 Spert Plates - D 3224 & D 5495
6 SS Strips
2 Natural B - SS Strips No. 2 & 3.

3:44P Water 11.4 cm Temp #1 25.1 °C
Period # 4 4 25.5
T = 26.6 cm 4.4 ¢

4:05P CRITICAL 16.35 cm. H2O Height.
Core = -24.0 + 35.6 + 4.4 = +200.0 ¢ ± 8.5 ¢

8

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	3"	—	3×10^{-12}
	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	"	—	"
	"	Fast ✓	"	✓	"
R-1					
R-2					
PM-1	700 ✓	Alarm ✓	cont	✓	500 ✓
PM-2	1200 ✓	Low ✓	18"	✓	900 ✓
	1'	Alarm ✓	3"	✓	1'

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

DUMP WELL PROBE LIGHT —

START-UP CHECK LIST

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

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

Red light on by AKA Time 0815

Start-up OK'd by I.D.C AKA Date 6-13-66

0825 Repeat of experiment described on page 7. 6-10-66. Core # 7-0 & 7-E

0907 Water ht = 21.25 cm (1) + Pin
E = 467.19 mc = 2.3 ¢
Core = -240.0 + 351.6 + 2.3 = 202.1 ± 8.5¢
Water Temp. °C
#1 = 24.3
2 = 25.0

0937 Water ht = 17.20 cm
System just critical
Drain.

Cores #'s 7-0 & 7-E.
Have 4 fuel plates. 2 natural strips, #2,3. and 6 enriched strips. 2, 3, 7, 8, 9, 10.

1125 Water ht = 21.30 cm (2) + Pin
E = 347.68 mc = 3.4 ¢
Water temp °C
#1 = 24.5
2 = 24.5

1135 added water to 24.15 cm.
No change in + Pos.

1145 Water ht = 16.80 cm
System just critical: Drain.
Core = -391.0 + 187.52 + 3.4 = 200.10

1300 Outter core # 7-0
Inner Core # 8-1
2 spent fuel plates.
2 natural boron strips # 2 & 3
6 stainless steel strips.

1336 Water ht = 21.20 cm
(3) + Per
τ = 81.49 μs = 11.6 ¢

Water temp °c
# 1 = 24.7
2 = 25.0

1342 Water ht = 14.00 cm
keyton just critical
Drain
core = -240.0 + 35.6 + 11.6 = 192.8¢ ± 6.5¢

1450 Now have:
Outter Core # 8-0
Inner Core # 8-1
2 spent fuel plates
2 natural boron strips # 2 & 3
6 stainless steel strips.

1540 Water ht = 18.10 cm
4 + Per
τ = 76.06 μs = 12.2 ¢

Water temp °c
# 1 = 24.7
2 = 25.0

1550 Water ht = 13.50 cm
System just critical
Drain.

Repeat of +Pw:

Water temp °C
#1 = 24.7
2 = 25.0

1555 Water ht = 21.30 cm
⑤ +Pw

°C
F.7
5.0

C = 60.84 cm = 14.3 ¢

1600 Water ht = 13.50 cm.
System just critical
Drain:

Cw = -240.0 + 35.6 + 14.3 = 190.10 ¢ ± 8.5¢

°C
.7
.0

12

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP			START-UP RANGE
K-1	3 X 10 -12	Meter ✓	3"	✓	3 X 10 -12
	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	"	✓	"
	"	Fast ✓	"	✓	"
R-1					
R-2					
RM-1	700 ✓	Alarm ✓	cont	✓	500 ✓
RM-2	1200 ✓	Low ✓	14"	✓	900 ✓
	"	Alarm —	3"	✓	"

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

BUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by RKA Personnel check by E.D.C

Instruments and safeties checked by RKA

Source in checked by RKA ... No. M-83

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

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

Red light on by RKA Time 0820

Start-up OK'd by E.D.C RKA Date 6-14-66

0820 outter core # 8-0
Inner core # 8-1
4 spent fuel plates.
2 natural boron strips # 2 & 3.
6 enriched boron strips # 2, 3, 7, 8, 9, 10.

0855 Water lvl = 19.10 cm. Water temp °C
(1) + Pwr #1 = 24.3
τ = 68.01 sec = 13.2 ¢ 2 = 24.5

0905 Water lvl = 13.20 cm
System just critical
Drain to — 8.5 cm. Report + Pwr.

0912 Water lvl = 19.30 cm. Water temp °C
(2) + Pwr. #1 = 24.3
τ = 71.06 sec = 12.8 ¢ 2 = 24.5

0922 Water lvl = 13.35
System just critical
Drain.
core = -391.0 + 187.52 + 14.0 (Shim core) = 189.48 ¢ ± 15.4¢

end.

1030 Outter core # 8.0
Inner Core # 8.1
4 spent fuel plates. = 391.00 ¢
2 natural boron strips. (2 & 3) = 27.56 ¢ Total gain
6 enriched boron strips (2, 3, 7, 8, 9, 10) = 159.96 ¢ = 192.88 ¢
4 stainless steel strips. = 5.36 ¢

1100 Water ht = 21.20 cm Water Temp °C
(3) + Per #1 = 24.5
ξ = 112.34 cm = 9.0 ¢ 2 = 24.5

1113 Water ht = 14.50 cm
Keyten just critical
Drain.
Core = −391.0 + 192.88 + 9.0 = 189.12 ¢ ± 19.4 ¢

1245 Outter Core # 8.0
Inner Core # 9-1
2 spent fuel plates (2 & 3) = 240.00 ¢ Total gain
2 natural boron strips = 27.56 ¢ = 35.60 ¢
6 stainless steel strips. = 8.04 ¢

1313 Water ht = 18.00 cm Water Temp °C
4 + Per #1 = 24.7
ξ = 81.91 cm = 11.1 ¢ 2 = 25.0

1325 Water ht = 13.55 cm
Lysteon just critical
Drain.
$\rho_{ave} = -240.00 + 35.60 + 12.10 = 192.40\,\phi \pm 9\phi$

1335 added 4 more stainless steel strips:
Now have.
outer core #8-0
inner core #9-1
2 spent fuel plates. = 240.00 ¢
2 natural boron strips = 27.5 ¢
10 stainless steel strips = 13.40 ¢
Total pcm = 40.96 ¢

1408 Water ht = 21.20 cm
(5) + Per
$\tau = 135.81$ sec = 7.7 ¢

Water Temp °C
#1 = 25.0
#2 = 25.0

1420 Water ht = 15.10 cm.
Lysteon just critical
Drain.
$\rho_{ave} = -240.00 + 40.96\,\phi + 7.7 = 191.42\,\phi \pm 9\phi$

1505 Rod level.
Outer core #9-0
Inner core #9-1
2 spent fuel plates #20B = 240.00 ¢
2 natural boron strips. 27.50 ¢
6 stainless steel strips. 7.9 ¢
Total worth = 35.60 ¢

1543 Water ht = 21.20 cm
(6)+ Per.
τ = 67.36 sec = 13.3 ¢
Water temp °C
#1 = 25.0
2 = 25.2

1552 Water ht = 13.65 cm.
Lyster just critical
Drain.
Core = -240.00 + 35.60 + 13.3 = 191.10 ¢ ± 5¢

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 X 10 -12	Meter ✓	4"	✓	3 X 10 -12
	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	"	✓	"
	"	Fast ✓	"	✓	"
R-1					
R-2					
PM-1	700 ✓	Alarm ✓	out	✓	500 ✓
PM-2	1200 ✓	Low ✓	12"	✓	900 ✓
	"	Alarm ✓	2"	✓	"

LOG N 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 RKR

Source in checked by RKR 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 R.K.R. Time 0802

Start-up CK'd by I.D.C RKR Date 6-15-66

0805 Repeat of experiment described on page 16.

ans.

0836 Water ht = 21.30 cm
(1) + Per
T = 72.36 cm = 12.1 ¢

Water temp °C
#1 = 24.5
2 = 24.7

0848 Water ht = 13.75 cm
Lepton just critical
Drain.

core = −240.00 + 35.50 + 12.1 ¢ = 191.80 ¢ ± 9 ¢

0910 Now have:
Outer core #9-0
Inner core #9-1
4 spent fuel plates #2+3 = 391.00 ¢
2 natural boron strips = 27.56 ¢
#2.3.7.8.9.10
6 enriched boron strips = 159.96 ¢

0943 Water ht = 21.25 cm
(2) + Per

Water temp °C
#1 = 24.5
2 = 24.7

0952 Water ht = 13.80
Lepton just critical
Drain.

core = −391 + 187.52 + 13.20 = 190.30 ¢ ± 15.4 ¢

INSTRUMENT CHECK

°C

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	3"	✓	3×10^{-12}
29.5 / 29.7	"	Test ✓	"	—	"
K-2	"	Meter ✓	"	—	"
	"	Test ✓	"	—	"
R-1					
R-2					
PM-1	700 ✓	Alarm ✓	Cont	—	500 ✓
PM-2	1200 ✓	Low ✓	19"	—	900 ✓
	"	Alarm ✓	3"	—	"

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

DUMP WELL PROBE LIGHT _____ *

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKH

Source in checked by RKH Source No. M-43

°C

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

24.5 / 24.7

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

Red light on by RKH Time 0815

Start-up OK'd by F.D.C RKH Date 6-16-66

0830 Now have;
Outer core #9-0
Inner core #9-1
4 spent fuel plates = 391.00 ¢
1 natural boron strip = 12.78 ¢
5 enriched boron strip = 133.30 ¢
also have D.N. Fry Ion Chamber mounted against outer core.
Purpose to obtain worth of Ion Chamber when mounted next to core.

0900 Water ht = 21.20 cm:
(4) + Per
5 = 127.47 mm = 8.1 ¢
Core = -391.00 ¢ 155.18 ¢ = 232.82 ¢ Chamber = 42.12 ¢ using + Per values.
- 190.70 ¢
∴ Log n = .10

Water Temp °C
#1 = 24.2
2 = 24.4

0914 Water ht = 14.70 cm
System just critical

Core with Chamber
= -235.00 ¢
Chamber = 45.3 ¢
43.3 ¢

0915 - Per; to reduce power level:

0930 Water ht = 14.70
System just critical.
Start of power run for D.N. Fry.

Log m = .032
K-2 = 50% 10 X 10^-11
K-1 = 47% 10 X 10^-11

0957 Drain.

0959 120 MR at center of outter core.

1015 Removed spent fuel plates and all poison strips. Now have source # M-43 and M-227 opposite Fry's Ion Chamber. Purpose is for safe critical movement for Fry. Subcritical by 151.1 + 43.3¢ = 234.4¢

1040 Water ht = 21.20 cm. Sources in:

Log n = .012 Water temp °C

K-1 = ~40% 3×10^{-11} t1 = 24.3

K-2 = ~43% 3×10^{-11} t2 = 24.5

°C

4.2

4.4

1115 Removed sources.

Background run for Fry.

Log n = .0012

K-1 = ~15% 3×10^{-12}

K-2 = ~30% 3×10^{-12}

5.0¢

13.3¢

1205 Drain

-11

-11

dens.

1245 Now have:
Outter Core #7-0
Inner Core #7-1
Have source # M-43 & M-227 opposite Fry Sam Chamber. Purpose is sub critical measurment for Fry. Sub-critical by 200.7 + 43.3 = 244.0 ¢

1313 Water ht = 21.20 cm; Sauver is:
Log n = .0095
K-1 = ~ 34% 3×10^{-11}
K-2 = ~ 35% 3×10^{-12}

Water Temp °C
#1 = 24.5
2 = 24.7

1400 Drain.

1428 Now have:
outter Core #8-0
Inner Core #8-1
Have source # M-43 & M-227 opposite Fry Sam Chamber. Purpose is sub critical measurment for Fry. Sub critical by 189.6 + 43.3 = 232.9

1452 Water ht = 21.30. Sauver is:
Log n = .0095
K-1 = ~ 34% 3×10^{-11}
K-2 = ~ 35% 3×10^{-12}

Water temp. °C
#1 : 24.7
2 = 25.0

1540 Mauld Fry's Ion Chamber up 3.0". Other conditions same as described on bottom page 22

1612 Drain.

ing

+43.3

°C

24.5

24.7

Lon

mut

°C

7

.0

24

7/13/66

INSTRUMENT CHECK

INSTRUMENT	RANGE	TEST	[illegible]	S T	START-UP RANGE
K-1	3×10^{-12}	✓	4'	✓	3×10^{-12}
		✓			
K-2	3×10^{-12}	✓	4"	✓	3×10^{-12}
		✓			
PM-1	700 V	✓	Contact	✓	500 V
PM-2	1400 V	✓	8'	✓	900 V
		✓	2'	✓	

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

DUMP [illegible] LIGHT —

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 IDC Source No. M-43

Emergency equipment in control room checked IDC

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

Red light on by Eq Time 0915

Start-up cmpl by Eq IDC Date 7/13/66

7/13/66

HFIR cores 5 and 6 spaced 3" in hall.
Set feed rate: 2.4 cm/min.
Because of vibration induced beam, Isolate K-1 & K-2 and trip. Core pumping air.
10.45 Water at 44.6 cm (back scale). Critical.
Drain.

Invert #6 element assy. Put new hose clamp on suction side of pump. Tightened bolts on flange of drain valve. Throttle with system valve. Purged water and elements. Satisfactory. Ready for main line purged.
Water at 47.1 cm (back scale) when over fuel plates in outer annulus. (2 cm)
Feed rate: 3.4 cm/min.
Drain rate: 2.8 cm/min.

Top of fuel 42.0 cm

Respace elements to 3" separation.

1513 Water at 45.1 cm (back scale) + period #1
T = 112.5 sec = 9.0 ¢
1530 Water at 44.7 cm. Dump slight + period
Water at 44.7 cm. Dump slight - period
H = 2.68 cm above top of fuel. Cf 3.05 cm in TM-1488 for CE-2 and CE3 at this separation.

7/13/66

Elements have spaced 3.6 in.

1555 Water at 51.3 cm. + pinned
T = 85.4 mv ~ 11.2 ℉

1600 Water at 49.9 cm. Critical.
Drain

7/14/66

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
R-1	3 x 10^{-11} ✓	Meter ✓	4"	✓	3 x 10^{-11} ✓
		✓		✓	
R-2	3 x 10^{-11} ✓	Meter ✓	4"	✓	3 x 10^{-11} ✓
		✓		✓	
S-1	—			✓	
S-2	—			✓	
PM-1	2000	Alarm ✓	Contact	✓	5000 ✓
PM-2	1000	Low ✓	8"	✓	
		Alarm ✓	2"	✓	5000 ✓

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

DUMP WELL PROBE LIGHT —

START-UP CHECK LIST

Equipment checked by IDC, DC Personnel check by IDC

Instruments and safeties checked and reset by IDC

Source in checked by DC Source No. M-43

Emergency equipment in control room checked by IDC

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

Red light on by DC Time 0930

Start-up CK'd by DC, IDC, CJ Date 7/14/66

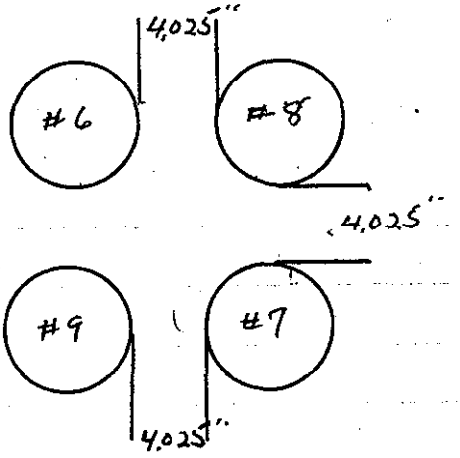
Elements 5 and 6 separated 3.55 in.

28

7/14/66

Check feed rate: 3.4 cm/min
W+w at 58.7 cm. Subcritical
0930 Pull source for leg. period. #1
Drain
T= 199.1 sec - 8.2 ℄

1330



Now have 4 elements spaced in square pattern as shown above.

1354 W+w at 43.7 cm. + period #2
T= 93.9 sec 10.4 ℄
1400 W+w at 43.30 cm. Critical.
Drain

Now spaced 4.535 in.
1445 W+w at 48.4 cm. + period #3
T= 48.1 sec 16.8 ℄

7/14/66

1455 Water at 47.6 cm. Critical.
Drain

Elements have spread 5.045 in.

1545 Water at 58.7 cm. + pencil #4.
T = 400.6 cm 3.0¢

1558 Water at 54.5 cm. Critical.
Drain

30

7/10/66

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 x 10^-12 ✓	Meter ✓	2"	✓	3 x 10^-12
		Fast ✓		✓	
K-2	3 x 10^-12 ✓	Meter ✓	2"	✓	3 x 10^-12
		Fast ✓		✓	
R-1					
R-2					
PM-1	200 ✓	Alarm ✓	Contact	✓	500 ✓
PM-2	1200 ✓	Low ✓	10"	✓	500 ✓
		Alarm ✓	2"	✓	

LOG N CALIBRATE _____ OPERATE _____ SOURCE No. 3-A

DUMP WELL PROBE LIGHT _____

START-UP CHECK LIST

Equipment checked by EJ, IDC Personnel check by IDC

Instruments and safeties checked and reset by EJ

Source in checked by EJ Source No. M-43

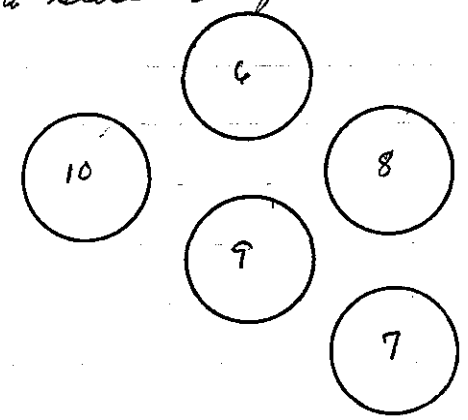
Emergency equipment in control room checked by IDC

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

Red light on by EJ Time 1430

Start-up OK'd by EJ, IDC Date 7/10/66

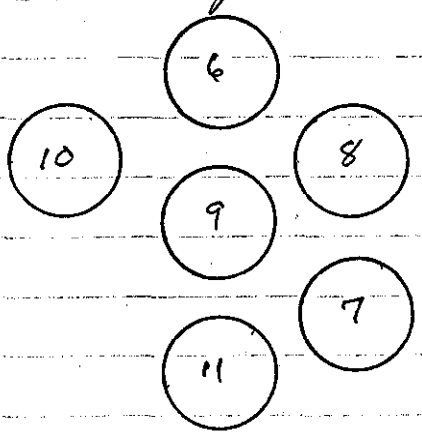
Now have 5 elements in triangular array
Side to side separation = 5,0"



1455 Water at 45.5 cm. + Period #1
T = 58.3 sec = 10.0 K

1503 Water at 44.9 cm. Critical
Drain

15:30 Now have 6 elements in triangular array
Side to side separation = 5,0"



1548 Water at 44.5 cm. + Period #2
T = 74.4 sec = 12.4 K

1555 Water at 44.1 cm. Critical.
Drain

32

7/15/64

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SET	START-UP RANGE
K-1	3x10⁻⁴ ✓	Meter ✓	4"	✓ 3x10⁻⁴ ✓
		Rate ✓		✓
K-2	3x10⁻⁴ ✓	Meter ✓	4"	3x10⁻⁴ ✓
		Rate ✓		
R-1				
R-2				
PM-1	700V	Alarm ✓	Content	✓ 500V
PM-2	1200V	Rate ✓	15"	✓ 900V ✓
		Alarm ✓	2"	✓

LOG N CALIBRATOR ✓ COUNTER ✓ SOURCE No. B-80

START-UP CHECK LIST

Equipment checked by CJ, IDC Personnel check by IDC

Instruments and safeties checked and reset by CJ

Source in checked by IDC Source No. M-43

Emergency equipment in control room checked by IDC

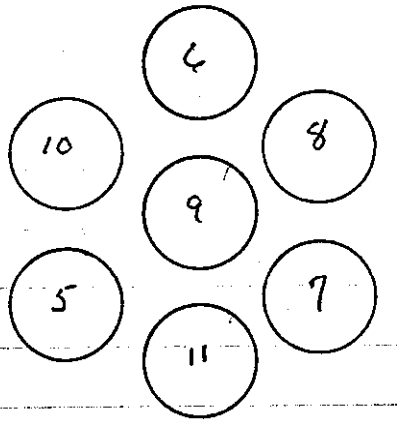
Instruments in trip circuit: K-1, PM-1, PM-2

Red light on by CJ Time 0910

Start-up OK'd by CJ, IDC Date 7/15/64

7/15/66

Now have 7 HFIR elements in Nell. Triangular pattern, 5.0 in. separation.



0945 Water at 43.1 cm. + Reinf. #1

0955 Water at 42.7 cm. Critical
Drain

Spacing now 5.60 in. 7 elements in Triangular pattern.

~~0~~ 1445 Water at 46.2 cm. + Reinf #2

1455 Water at 45.6 cm. Critical.
Drain

34

7/21/66

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	3"		3×10^{-4}
		Fast ✓			
K-2	3×10^{-12}	Meter ✓	3"		3×10^{-4}
		Fast ✓			
R-1					
R-2					
PM-1	700V	Alarm ✓	Contact		500V
PM-2	1200V	Low ✓	15"		900V
		Alarm ✓	2"		

LOG N CALIBRATE ✓ OPERATE ✓ SOURCE No. D-50

DUMP WELL PROBE LIGHT —

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: K-1, K-2,

Red light on by _____ Time 0840

Start-up OK'd by _____ Date _____

7/21/66

7 elements in triangular pattern spaced 6.7 in.

1002 W of w at 58.20 cm. Subcritical.
Source in to increase level.

1010 Remove source for Leg. Point #1. Too steep a increase.
Drain

Spacing now 6.55 in.

1405 W of w at 58.3 cm. Subcritical
Source in to increase level.

1415 Remove source for Leg Point #2.
T = ≈ 53 min; ρ 7-28 F
Drain

7/22/66

7 elements spaced 4.55 in. The center one (#9) now is adjusted so that it will be critical submerged; it contains 2 fuel plates, 1 enriched strip, 1 natural strip, and 6 SS strips.
240 - 48.5 = +191.5¢ Element measured as -191.1¢
∴ should have 0.4¢ excess associated with center element.

1048 Water at 46.0 cm. + Point #1
T = 47.6 sec; ρ = 16.9¢ (~6 ¢/cm)

1055 Water at 47.35. Critical

Drain

Added 2 enriched strips to #9 (center).
Now have 48.5 + 53.4¢ in poison = 101.9¢
240 - 101.9 - 191.1 = 53.0¢ The center element is subcritical.

1125 Water at 50.9 cm. + Point #2
T = 68.6 sec; ρ = 13.1¢ (8.7 ¢/cm)

1133 Water at 49.4 cm. Critical

Drain

Replace poison to have 4 enriched strips and 1 natural strip. Poison = 120.6¢
240 - 120.6 - 191.1 = 71.7¢ subcritical (center element)

1203 Water at 52.6 cm. + Point #3
T = 100.35 sec; ρ = 5.9¢

Top of foil	42.02 cm
6" reflector	57.26 cm
3" reflector	49.64 cm

7/22/66

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 x 10⁻¹²	Meter ✓	3"	✓	3 x 10⁻¹²
		Test ✓		✓	
K-2	3 x 10⁻¹²	Meter ✓	3"	✓	3 x 10⁻¹²
		Test ✓		✓	
R-1	—				
R-2	—				
PM-1	2000 ✓	Alarm ✓	Contact	✓	500 ✓
PM-2	1-100 ✓	Low ✓	10'	✓	900 ✓
		Alarm ✓	2"	✓	

LOG N CALIBRATE ✓ OPERATE ✓ SOURCE No. B-20

DUMP WELL PROBE LIGHT —

START-UP CHECK LIST

Equipment checked by CJ, IDC **Personnel check by** IDC

Instruments and safeties checked and reset by CJ

Source in checked by CJ **Source No.** M-40

Emergency equipment in control room checked by IDC

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

Red light on by CJ **Time** 1020

Start-up OK'd by CJ, IDC **Date** 7/22/66

33

7/27/66

1340 Water at 50.65 cm. Critical

Drain.

Add 1 natural strip. Now have 4 enriched and 2 natural strips. Poison = 325.5 (individually el.)

245 - 325.5 = -80.5 ¢ that the center element is subcritical.

1412 Water at 58.3 cm. + Period #4

T = 112.8 sec; ρ = 9.0 ¢

1420 Water at 52.25 cm. Critical.

Drain

245 - 325.5 - = -9.0 = 94.5 ¢ that center element should have been subcritical to make array critical submerged. ∴ added 96.6 ¢ to center element to make array critical.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	7"	✓	3×10^{-12}
		Fast ✓		✓	
K-2	3×10^{-12}	Meter ✓	4"	✓	3×10^{-12}
		Fast ✓		✓	
R-1	—				
R-2	—				
PM-1	700 V	Alarm ✓	Cent	✓	500 V
PM-2	1200 V	Low ✓	10"	✓	900 V
		Alarm ✓	3"	✓	

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

DUMP WELL PROBE LIGHT —

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: K1 K2 PM1 PM2

Red light on by D C Time 0815

Start-up OK'd by D C, I D C Date 7/25/66

7/25/66

7 elements, triangular pattern, spaced 6.40 cm.

0850 Water at 58.0 cm. Scram in to increase level.

0855 Remove scram for beg. period #1

T = 124.4 sec; ρ = +16.6 ¢

Drain

Removed spacers for plates. Replaced spacers. Now have 7 elements, triangular pattern, 6.4 in. separation.

1343 Water at 58.0 cm. Scram in to increase neutron level.

1352 Remove source for beg. period #2

T = 124.0 sec; ρ = +16.6 ¢

Drain.

At same spacing, installed SPERT element with 2 fuel plates and 4 natural boron strips in center element (05).

Fuel = +24.2, element = -191.4, strips = -55.2 ¢

1442 Water at 47.8 cm. + period #3

T = 30.7 sec; ρ = +2.8 ¢

1444 Water at 47.1 cm. Critical

Drain.

7/25/66

Now have 2 fuel plates, 3 enriched and 3 natural strips.

~40 fuel, -191.1 element, -121.4 strips.

1500 Water -152.8 cm. + Plate by

T=57.0 cm; ρ=15.0 ¢

1530 Water at 49.6 cm. Critical

Does not fit core.

Dozin

240 - 191.1 - 121.4 - 15 = -87.5 ¢, cannot center element must be subcritical to make any critical. ∴ added 191.1 - 87.5 = 103.6 ¢ to center element to make any critical. See p. 43 for better numbers.

42

7/24/66

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	5"	✓	3×10^{-12}
		Fast ✓		✓	
K-2	3×10^{-12}	Meter ✓	5"	✓	3×10^{-12}
		Fast ✓			
R-1	—				
R-2	—				
PM-1	700V	Alarm ✓	Cond.	✓	500V
PM-2	1200V	Low ✓	10"	✓	900V
		Alarm ✓	3"	✓	

LOG N CALIBRATE ✓ OPERATE ✓ SOURCE No. B-86

DUMP WELL PROBE LIGHT ✓

START-UP CHECK LIST

Equipment checked by EDC Personnel check by DC

Instruments and safeties checked and reset by EDC

Source in checked by DC Source No. M-43

Emergency equipment in control room checked by EDC

Instruments in trip circuit: K1-K2-PM1 PM2

Red light on by DC Time 0810

Start-up OK'd by DC DMC Date 0815

7/26/66

Now have 1 more enriched strip, making a total of 4 enriched and 3 natural strips. Spacing 6.4 cm. Poison = 148.2 g

0850 Water at 51.8 cm. Critical

T = 90.9 cm; p = 10.6 g

0853 Water at 56.0 cm. + period #1

0900 Water at 52.2 cm. Critical

Drain

∴ Center element was +2.40 - 19.1 - 148.2 - 10.6 g subcritical = 99.9 g; added 91.2 g to center element.

Removed the inner annuli from all elements except the center one. The center element contains 2 fuel plates, 3 enriched and 3 natural strips. Poison = 121.5 g; center element subcritical by 72.6 g

1053 Water at 58 cm. Essentially no multiplication

Drain.

Now have 2 fuel plates and 2 enriched strips in the center element. Poison = 53.2 g; element subcritical by 4.5 g

1145 Water at 58 cm. Slight + period. #2.

1155 Water at 57.2 cm. Critical (10.3 cm) Key = 4.5 g

Drain

11

1966

7/26 Seven HFIR outer annuli - Δ pattern in Contact

1.05P Critical H_2O @ 25.9 cm

Seven HFIR outer annuli Δ pattern 4.4 in. s-to-s.

2.0P VERY SUBCRITICAL

Spacing now 1.025 in.

1545 Water at 58. cm. Very subcritical. Drain.

Spacing now 1.060 in.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	5"	✓	3×10^{-12}
		Fast ✓		✓	
K-2	3×10^{-12}	Meter ✓	5"	✓	3×10^{-12}
		Fast ✓			
R-1	—				
R-2	✓				
PM-1	700 V	Alarm ✓	Cont	✓	500 V
PM-2	1200 V	Low ✓	10"	✓	900 V
		Alarm ✓	2"	✓	

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

DUMP WELL PROBE LIGHT ✓

START-UP CHECK LIST

Equipment checked by d w e Personnel check by w e

Instruments and safeties checked and reset by d w e.

Source in checked by w e Source No. M-43

Emergency equipment in control room checked by d w e

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

Red light on by d w e Time 0810

Start-up OK'd by d w e, w. e. Date 7/27/66

0838 Spacing now 1.06 in. 7 cm. Water at 36.1 cm. + Period #1

0847 Water at 36.1 cm. Critical. Drain.

7/27/66

Spacing now 1.535 in. ± 0.010 in..

0948 Water at 58.2 cm. Little multiplication.
Drain

Spacing now 1.420 in.

1042 Water at 49.4 cm. + prime thr

1050 Water at 48.6 cm. Critical.
Drain.

7-8/66

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE TO SET	START-UP RANGE
K-1	3 x 10^{-12}	Meter ✓	5"	3 x 10^{-12} ✓
		Fast ✓		
K-2	3 x 10^{-12}	Meter ✓	4"	3 x 10^{-12}
		Fast ✓		
R-1				
R-2				
PM-1	2000 V	Alarm ✓	Content	500 V
PM-2	1200 ✓	Low ✓	10"	900 V
		Alarm ✓	2"	

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

DUMP WELL PROBE LIGHT —

START-UP CHECK LIST

Equipment checked by EQ, IDC Personnel check by IDC

Instruments and safeties checked and reset by EQ

Sources in checked by EQ Source No. M-43

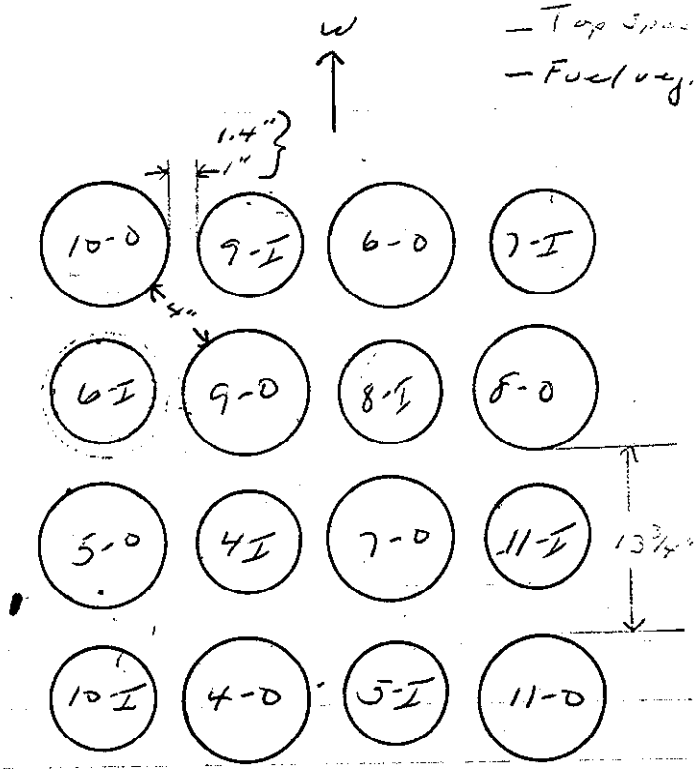
Emergency equipment in control room checked by IDC

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

Red light on by EQ Time 1100

Start-up CK'd by EQ, IDC Date 7/28/66

7/28/66



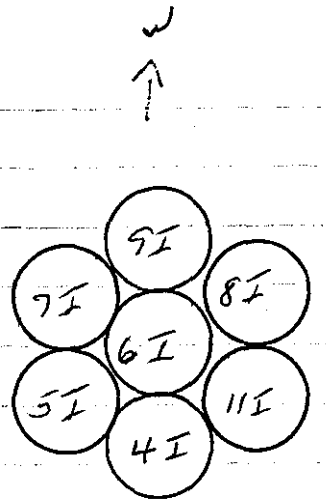
11/28 Water at 58 cm. Subcritical.
Drain

Annuli spaced as close as possible. Some in contact at top, some gaps. Slightly irregular spacing.

10:5 Water at 40.7 cm. + Point #1
T= 80.1 cm; ρ= 11.7 ¢

10:20 Water at 40.5 cm. Critical.
k_eff 1.754
Water 1.5+ cm below top of fuel.

7/28/66



All inner annuli; raised ½" off floor by plastic spacers because of center flange in floor of tank. ~~Elev~~ Annuli in contact at top; fuel spacing 1.2 in.

1555 Water at 60 cm. Subcritical; little multiplication Drain

50

7/29/66

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	5"	✓	3×10^{-12}
		Rate ✓		✓	
K-2	3×10^{-12}	Meter ✓	5"	✓	3×10^{-12}
		Rate ✓		✓	
R-1	—				
R-2	—				
PM-1	700V	Alarm ✓	Contact	✓	500V
PM-2	1200V	Low ✓	10'	✓	900V
		Alarm ✓	2"	✓	

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

DUM[illegible] — —

START-UP CHECK LIST

Equipment checked by Ef, EDC Personnel check by EDC

Instruments and safeties checked and reset by Ef

Source in checked by Ef Source No. M-43

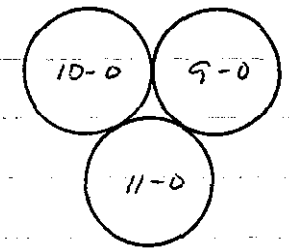
Emergency equipment in control room checked by EDC

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

Red light on by Ef Time - 1630

Start-up OK'd by Ef, EDC Date - 7/29/66

7/27/66



13.9

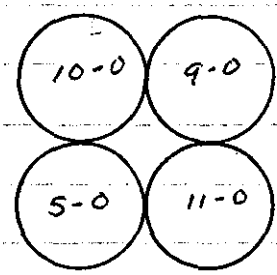
Three outer annuli in contact as shown above.

1103 Water at 51.8 cm. + Point #1

T = 63.7 sec ; ρ = 13.4 ¢

1111 Water at 49.6 cm. Critical.

Drain. This assembly was about 2.5¢ supercritical.



Four outer annuli in contact, square pattern.

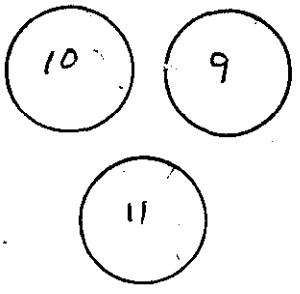
1333 Water at 58 cm. Very subcritical.

Drain via vacuum button. It works!

52

7/29/66

3 elements spaced 5.050 in.



1550 Water at 58.0 cm. + pump #2
T= 113.0 sec ; P= 5.1 psi

1600 Water at 52.0 cm. Critical
Drain.

8/1/66

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	5"	✓	3×10^{-12}
		Fast ✓		✓	
K-2	3×10^{-12}	Meter ✓	5"	✓	3×10^{-12}
		Fast ✓		✓	
R-1	—				
R-2	—				
PM-1	700 V	Alarm ✓	Contact	✓	500 V
PM-2	1200 V ✓	Low ✓	12"	✓	900 V
		Alarm ✓	2"	✓	

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

DUMP WELL PILOT LIGHT —

START-UP CHECK LIST

Equipment checked by DC, IDC Personnel check by IDC

Instruments and safeties checked and reset by IDC

Source in checked by DC Source No. M-43

Emergency equipment in control room checked by IDC

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

Red light on by IDC Time 0830

Start-up OK'd by EQ, DC, IDC Date 8/1/66

54

8/1/66

Element #9 with 2 SPERT plates and 2 natural strips.

1020 Water at 52.7 cm. + period #1
T = 59.6 sec ρ = 14.5 ¢

1027 Water at 50.1 cm. Critical
Core = 240 − 27.6 (poison) − 22.6 (water level) = 189.8 ¢
Drain

Element #10 with 2 SPERT plates and 2 natural strips.

1320 Water at 50.2 (12.3) cm. + period #2
240 − [illegible] − 30.4 = 182.0 ¢ ±8.4 T = 12.6 sec 8.5 ¢

1335 Water at 49.4 (11.5) cm. Critical
Drain.

Added 1 natural strip. Now have 2 fuel plates and 3 natural strips. Poison = 41.4 ¢

1406 Water at 56.4 (18.5) cm. + Period #3
T = 69.2 sec 13.0 ¢

1414 Water at 51.05 (13.15) cm. Critical
240 − 41.4 − 5.6 = 193.0 ¢ ±9.1
Drain

Now have 4 SPERT plates, 6 enriched and 3 natural strips. Total poison = 201.6
391 − 201.6 = 189.4

8/1/66

1517 Water at 58.8 cm. + Point #4

T = 112.6 sec 9.0¢

1526 Water at 52.5 cm. Critical

Drain

39/-20.1.6 - 5 = 180.4¢ ± 20.1

SPERT element with 2 fuel plates, 3 structural strips

9.8¢

1607 Water at 56.0 cm. + Point #5

T = 62.1 sec 14.1¢

1614 Water at 51.1 cm. Critical.

Drain

24 - 41.2 - 15.6 = 183.0 ± 9.1

56

8/2/66

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE SET	START-UP RANGE
K-1	3x10⁻¹²	Meter ✓	4"	3x10⁻¹²
		Test ✓		
K-2	3x10⁻¹²	Meter ✓	4"	3x10⁻¹²
		Test ✓		
R-1	—			
R-2	—			
PM-1	700V	Alarm ✓	Constant	500V
PM-2	1200V	Low ✓	10"	900V
		Alarm ✓	2"	

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

DIRECT WELL TYPE LIGHT —

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 IDC Source No. M-43

Emergency equipment in control room checked by IDC

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

Red light on by EQ Time 0945

Start-up OK'd by EQ, IDC Date 8/2/66

8/2/66

Element #11 in Null; SPERT element with 2 fuel plates and 3 natural strips.

1030 Water at 38.1 cm. + Period #1

1035 Water at 51.8 cm. Critical

Drain

2-15 - 41.4 - 11.2 = 187.2¢ ± 5.1

Now have 4 fuel plates, 6 enriched and 3 natural strips.

391 - [illegible] = [illegible]¢

1128 Water at 38.1 cm. + Period #2

1139 Water at 54.1 cm. Critical

Drain

391 - 201.6 - 4.7 = 184.7¢ ± 20.1

Stripped data summary 5/14/66

See summary sheet in Reedy's file marked operating history

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	2"	✓	3×10^{-12}
	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	"	✓	"
	"	Fast ✓	"	✓	"
R-1					
R-2					
PM-1	700 v	Alarm ✓	cont	✓	500 v
PM-2	1200 v	Low ✓	12"	✓	900 v
	"	Alarm ✓	3"	✓	"

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

DUMP WELL PROBE LIGHT ____

START-UP CHECK LIST

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

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

Source in checked by AKK Source No. M-93

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

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

Red light on by AKK Time 345

Start-up OK'd by I.D.C AKK Date 1-12-66

ans

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 X10⁻¹²	Meter ✓	cont	✓	3 X10⁻¹²
	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	2"	✓	"
	"	Fast ✓	"	✓	"
R-1					
R-2					
PM-1	700 V	Alarm ✓	cont	✓	500 V
PM-2	1200 V	Low ✓	10"	✓	900 V
	"	Alarm ✓	2"	✓	"

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

DUMP WELL PROBE LIGHT _____

START-UP CHECK LIST

Equipment checked by AKH Personnel check by FDC

Instruments and safeties checked and reset by AKH

Source in checked by AKH Source No. M-43

Emergency equipment in control room checked by FDC

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

Red light on by AKH Time 0910

Start-up OK'd by FDC AKH Date 1-13-67

ave.

Cores 20-0 & 20-1
Now have spent element with 4 fuel plates, and 6 enriched strips, and 3 (2,3,4) natural strips. Tamm = 201.6 ¢
195.5

1103 Water ht = 21.0 cm — Water Temp °C
+2 Per.
τ = 158.6 μs = 6.8 ¢ — #1 = 24.2
#2 = 24.2

1111 Water ht = 15.20 cm
System just critical
Drain 195.5 — 391.0 − 160.2 − 41.7 − 6.8 = 182.3 ¢ (188.7)
391 − 201.6 − 6.8 = 182.6 ¢ ± 20.1

Core 20-0 & 20-1.
1310 Now have spent element with 2 fuel plates (# 0-3224 & 0-5495). and 4 (2,3,4 & 5) natural strips. & 2,3,4 Tamm = 55.2 ± 9.8 (55.6)

1341 Water ht = 21.10 cm — Water Temp °C
(3) +Per.
τ = 912.7 μs = 1.4 ¢ — #1 = 24.3
#2 = 24.3

1351 Water ht = 19.20 cm
System just critical
Drain 55.2 (55.6) — 240.0 − 55.20 − 1.4 = 183.4 ¢ (182.5)
240 − 55.2 − 0.9 = 183.9 ¢ = 9.8

Fuel rate = 2.9 cm/min.
3/4" drain rate = 9.8 cm/min.
3" deep rate = 73.9 cm/30 min.

When Water ht on mirror rule reads:
8.9 cm outer element covered
9.1 cm inner element covered

Repeat of critical conditions with CE-2 core.
See page 116 & 117 in H.E.I.R. Log book #1.
Have core only for first run.

1430 Water ht = 22.4 cm
Lysten sub critical

1455 Now have the spent fuel element installed, with 4 fuel plate. #D-3224, D-5495, D-3242, ~~D-2870~~ and D-2870. Also have 3 enriched boron shim #s 4, 8, & 10. and 1 natural shim #2.
Power = 93.9 ¢

1525 Water ht = 21.10 cm
Lysten just critical
Drain.
391 - 93.9 = 297.1 ¢

When water ht on mirror scale reads 10.4 cm water is even with top of plates of inner Core. When it reads 9.8 cm water is even with top of outer fuel plates.

Have cores #'s 20-0 and 20-1 assemble in small reflector tank. Inner core spaced .375" with plastic spacers.

0947 Water ht = 21.0 cm
System sub critical.

Water Temp °C
1 = 24.0°
2 = 24.0°

Now have spent fuel elements installed with 4 fuel plates. #D-3224, D-5495, D-3242, and D-2870. Also have 6 enriched strips # 2, 3, 7, 8, 9, 10. and 2 natural strips # 2 & 3. Top of spent fuel plates one .250" below top of inner core fuel plates. Pcrit = 187.8 ¢
182.2 ¢

1048 Water ht = 18.80 cm.
+Per.
C = 39.1 cm = 19.3 ¢

Water Temp °C
1 = 24.2
2 = 24.2

1051 Water ht = 12.6 cm
System just critical Cor = 391 - 187.8 - 19 = 184.2 ¢
Drain to ~ 9.0 cm on mirror scale and added 1 natural ~~strip~~ strip # 4.

391 - 182.2 - 18 = 190.8
± 19.4

— Need (7-8) cells of strips

Cores 20-0 & 20-1
Now have spent element with 4 fuel plates, and 6 enriched strips and 3 (2,3,4) natural strips. Tamm = 201.6 ¢
195.5

1103 Water ht = 21.0 cm — Water Temp °C
2 + Per.
τ = 158.6 μs = 6.8 ¢ — #1 = 24.2
2 = 24.2

1111 Water ht = 15.20 cm
System just critical
Drain 195.5 — 391.0 − 160.2 − 41.7 − 6.8 = 182.3 ¢
391 − 201.6 − 6.8 = 182.6 ¢ ± 20.1 (188.7)

Core 20-0 & 20-1.

1310 Now have spent element with 2 fuel plates (# 0-3224 & 0-5495) and 4 (5-1.6) natural strips. & 2,3,4 & 5 Tamm = 195.2 ± 9.8

1341 Water ht = 21.10 cm — Water Temp °C
(3) + Per.
τ = 912.7 μs = 1.4 ¢ — #1 = 24.3
2 = 24.3

1351 Water ht = 19.20 cm
System just critical
Drain 5-2.6 — 240.0 − 55.20 − 1.4 = 183.4 ¢
240 − 55.2 − 0.9 = 183.9 ¢ = 9.8 (176.1)

64

1/16/67

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	PROBE	SET	START-UP RANGE
K-1	3×10^{-12} ✓	Meter ✓	2"	~	3×10^{-12}
		Rate ✓		~	"
K-2	3×10^{-12} ✓	Meter ✓	2½"	~	"
		Rate ✓		~	"
R-1	—				
R-2	—				
PM-1	>200 V	Alarm ✓	Contact	~	500 V
PM-2	1200 V	Low ✓	10"	~	900 V
		Alarm ✓	2"	~	"

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

DUMP WELL PROBE LIGHT —

START-UP CHECK LIST

Equipment checked by Ef & RKH Personnel check by RKH

Instruments and safeties checked and reset by Ef.

Source in checked by RKH Source No. M-43

Emergency equipment in control room checked by RKH

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

Red light on by RKH Time 0920

Start-up OK'd by Ef RKH Date 1-16-67

Cores 21-0 & 21-1

Have cores 21-0 & ~~21-0~~ 21-1 assembled in small reflector tanks. Inner core spacing .375" with ~~plastic~~ spacers.

1003 Water ht = 21.0 cm
System sub critical
Drains.

Now have 4pct element with 2 fuel plates. (# D-3224 & D-5495) and 4 natural boron strips. (# 2, 3, 4 & 5) Power = 52.6 55.2 ± 5.8

1045 Water ht = 21.10 cm $\nu\Sigma_f = 5.90$
+ Per
$\tau = 143.4$ sec = 7.4 ℓ

1049 Water ht = 15.20 cm
System just critical
Drains. 52.6 15.6 240.0 − 55.2 − 7.4 = 177.4 ℓ
240 − 55.2 − 6.8 = 178.0 ± 9.8

Now have 4pct element with 4 fuel plates. (# D-3224 & D-5495, D-3242, & D-2870) Plus 6 enriched strips (# 2, 3, 7, 8, 9, 10) and 3 natural strips (# 2, 3, 4.) and 4 stainless steel strips Power = 206.5 200.7 ± 20.1 cals.

1340 Water lvl = 21.15 cm
2. + Per
τ = 152.1 sec = 7.0 ¢

Water temp °C
II 24.0
2 = 24.2

1352. Water lvl = 15.25 cm.
System just critical
Traces. 391.0 - 160.2 - 41.4 - 5.20 - 7.0
391 - 206.8 - 6.8 = 177.4 ± 20.1 = 173.0 ¢

1353 Loaned system: Check system's across system with screened bottom.

Core #'s 22-0 & 22-1

Have core 22-0 & 22-1 assemble in small reflector tank. Inner core spaced .375" with plastic spacers.

1500 Water lvl = 21.20 cm
System sub critical
Traces.

Now have spent fuel element with 4 plates, 6 enriched strips, 3 natural strips, and 4 stainless steel strips. (See bottom of page 65 for numbers.) Pu = 206.)
= 206.7

REQUISITION 684502

'67 JAN 9 PM 2:27

REPORT TO R. K. Reedy

BUILDING NO. 9213

PHONE NO. 3-5237

		0	0	0	0	0	0	0	4	g U/g
										g Ay/g
										g D/g
										g H/g
										g Mo/g
										g F/g
										SPEC.
										ASSAY

Water sample of
reflective water for
H.F.I.R. elements.
1-12-67

	REPT. BY
1-11-67	DATE
	DEPT.

7

1603 Water lvl = 21.20 cm
Lyden very slightly - Neg.
Drain - V ≈ 150 = cm

Water Temp °C
#1 = 24.8
2 = 24.8

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 X 10 -12	Meter	1"	—	3 X 10 -12
	"	Fast	"		"
K-2	"	Meter	2"		"
	"	Fast	"		"
P-1					
P-2					
PM-1	700 V	Alarm	Cent	—	500 V
PM-2	1200 V	Low	10"		900 V
	"	Alarm	1"		"

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

DUMP WELL PROBE LIGHT

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKH

Source in checked by RKH Source No. M-83

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

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

Red light on by RKH Time 1030

Start-up OK'd by F.D.C RKH Date 1-17-67

Cover 22-0 & 22-1

Remove the 4 stainless steel strips, Row Law 4 fuel plates. 6 enriched strips and 3 natural strips. τ_{inn} = 201.6 (195.0)

1103 Water ht = 21.40 cm Water Temp °C

(1) - Per π_1 = 24.0

τ = - 1303.80 sec = -1.0 ϕ 2 = 24.2

1112 Drain. 391 - 201.6 (195.0) + 1.0 = 190.4 (195.0) ± 20.1

Removed 1 natural strip (π 4). and added 6 stainless steel strips:

τ_{inn} = 155.8 (190.0)

1305 Water ht = 21.40 cm. Water Temp °C

(2) + Pers. #1 = 24.0

C = 149.9 cm = 7.1 ft #2 = 24.2

1316 Water ht = 15.00 cm

Lights just initial

Drain. 391.0 − 160.2 − 27.6 − 7.8

192.0 192.2 − 7.1 = 188.9 ft

351 − 155.8 − 7.8 = 187.4 ± 1.5

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	1"	✓	3×10^{-12}
	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	"	✓	"
	"	Fast ✓	"	✓	"
R-1					
R-2					
PM-1	~~700 V~~ 600 V	Alarm ✓	Cart	✓	500 V
PM-2	~~1200 V~~ ~~900 V~~	Low ✓	12"	✓	900 V
	"	Alarm ✓	2"	✓	"

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

DUMP WELL PROBE LIGHT

70

START-UP CHECK LIST

Equipment checked by AKH I.U.C Personnel check by I.U.C

Instruments and safeties checked and reset by AKH

Source in checked by AKH Source No. M-43

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

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

Red light on by AKH Time 0830

Start-up OK'd by R.K.B. I.U.C Date 1-18-67

Core 22-0 & 22-1

Now have spent fuel element with 4/5
2 fuel plate (D-3224 & D-5495) and
natural strips (~~2,3,4 & 5~~ 2,3,4 & 5 Power = 52.6

0930 Water lvl = 21.4 cm
System sub critical
Drain.

0935 Removed #5 natural strip, and added
6 stainless steel strips.

Water lvl = 22.0 cm
+Per
t = 434.60 sec = 2.7¢
47.4
Power = 49.2¢

Water Temp °C
#1 = 24.2
2 = 24.2

1002 Water ht = 17.40 cm
Lyden just critical
Drain. 240.0 - 40.4 - 7.8 - 2.7 = 189.1 ¢
240 - 45.2 - 2.4 = 188.4 ± 5.2

Core # 19-0 & 19-1

1430 Now have core 19-0 & 19-1 assembled in small reflector tank. Inner core spaced .375" with plastic spacers.

Water ht = 21.50 cm
Lyden sub critical
Drain

Now have spent fuel element with 2 fuel plates (#s 0-32 2a & 0-54 95) and 4 natural strips (# 2, 3, 4 & 5). Poison = 55.2

1654 Water ht = 21.30 cm. Water temp °C
Lyden sub critical #1 = 29.2
Drain. 2 = 29.5

.2
.2

72

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 X 10-12	Meter ✓	1"	✓	3 X 10-12
	"	Trip ✓	"	✓	"
K-2	"	Meter ✓	"	✓	"
	"	Trip ✓	"	✓	"
R-1					
R-2					
PM-1	700 V	Alarm ✓	Cont	500 V	
PM-2	1200 V	Low ✓	12"	900 V	
	"	Alarm ✓	3"	"	

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

DUMP WELL PROBE LIGHT _____

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKH

Source in checked by AKH Source No. M-93

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

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

Red light on by AKH Time 0825

Start-up OK'd by I.D.C. AKH Date 1-19-67

Core 19-0 & 19-1

Removed #5 natural strips (see page 71) and added 3 stainless steel strips. $P_{xenon} = 45.3$

0855 Water lvl = 21.40 cm — Water Temp °C
+ Pos. — #1 = 24.0
T = 532.4 mm ρ = 2.3¢ — 2 = 24.2

0915 Water lvl = 17.80 cm
System just critical
Drain.

240 - 45.3 - 2.3 = 192.4 NC

1045 Have have spent element with 4 fuel plates (#s D-3224, D-5495, D-3242, & D-2870.) 6 enriched strips (# 2, 3, 7, 8, 9 & 10.) and 2 natural strips (# 2 & 3). ~~and 4 stainless steel strips.~~

$P_{xenon} = 187.8$ — Water Temp °C

1115 Water lvl = 21.50 cm — 1 = 24.0
System slightly - Neg. — 24.2
Drain.

Core 203 NC

74

Area 19-04-19-1

Removed natural strip #3. and added 3 stainless steel strips.

Enriched, Natural, 3.5%

Water lvl = 21.20 cm

2 + Per

C = 543.25 cm = 2.3%

Water Temp °C

#1 = 24.2

24.5

1350 Water lvl = 17.6'

System just critical ~~1775~~

Drain - 391.0 - (160.20) - 13.80 - 3.90 - 2.3 = 210.80 ¢

391 - 177.5 - 2.3 = 210.8 ¢ NG

In order to Checked above, removed natural strip #2 and added 3 stainless steel strip. Now have as shown on page 73, 4 fuel plate, 6 enriched strips, and 6 stainless steel strips.

Pairs = 168.0

Water lvl = 21.50 cm

3 + Per

C = 78.2 cm = 11.9 ¢

Water Temp °C

#1 = 24.3

2 = 24.5

1452 Water lvl = 19.20 cm

System just critical

Drain - 391.0 - 160.2 - 7.8 - 11.9 = 211.1

NG

Cores 18-0 & 18-1

1530 / Have loaded cores 18-0 & 18-1 assembly in small aqueous tank. Inner core spaced .375" with plastic spacer.

1559 Water ht = 21.2 cm
System sub critical
Ozzie.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	1"	✓	3×10^{-12}
	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	"	✓	"
	"	Fast	"	✓	"
R-1					
R-2					
PM-1	700 V	Alarm ✓	Cent	✓	500 ✓
PM-2	1200 V	Low ✓	12"	✓	900 V
	"	Alarm ✓	3"	✓	"

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

DUMP WELL PROBE LIGHT

76

START-UP CHECK LIST

Equipment checked by RKH/ FDC Personnel check by F.D.C

Instruments and safeties checked and reset by RKH/

Source in checked by RKH/ Source No. 19-43

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

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

Red light on by RKH/ Time 0840

Start-up OK'd by F.D.C RKH/ Date 1-20-68

Core 19-0 & 19-1

Purpose is to check critical or shown on top of page 73. Have Depot fuel element with 2 fuel plates (# D-3229 & D-5495) and 3 natural strips (# 2.3.4.) and 3 stainless steel strips. Pavg = 45.3

Water ht = 21.30 cm Water temp °C

(1) + Rev T1 = 24.2

T = 217.3 cm = 5.2 ¢ T2 = 24.3

0937 Water ht = 15.80 cm

Depleten just critical

Drain.

43.5 191.3

+40.0 − 45.3 − 5.2 = 189.5¢ INC.

Page 73 = 193.4¢

1-19-67

Now have spent element with 4 fuel plates (# D-3224, D-5495 D-3242 & D-2870). and 6 enriched strips (# 2, 3, 7, 8, 9, & 10) and 6 stainless steel strips. 168.0 ℄

Water ht = 21,30 Cm. (3/4 full)
= 28,25 cm = 235 ℄

Water temp °C
II 1 = 28.3
2 = 29.3

1100 Water ht = 12,50 cm
Lyden just arrived
Drain. 391.0 - 160.2 - 7.8 - 23.5 N ℄
= 199.5 ℄ ✓

1-20-67
1300 added more water to fold tank.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 X 10 -12	Meter ✓	1"	✓	3 X 10 -12
	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	"	✓	"
	"	Fast ✓	"	✓	"
R-1					
R-2					
PM-1	700 ✓	Alarm ✓	cent	✓	500 ✓
PM-2	1200 ✓	Low ✓	12"	✓	900 ✓
	"	Alarm ✓	3"	✓	"

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

DUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by [illegible] Personnel check by F.D.C

Instruments and safeties checked and reset by [illegible]

Source in checked by [illegible] Source No. M-43

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

Instruments in trip circuit K-1-2 PCM-1-2

Red light on by [illegible] Time 0810

Start-up OK'd by F.D.C [illegible] Date 1-23-67

Purpose is to check critical conditions shown on page 77. (4 full plates, 6 enriched strips and 6 stainless steel strips) 168.0 ℓ

Water ht = 21.40 cm
+Per.
C = 30.4 cm = 22.5 ℓ

Water Temp °C
#1 = 24.3
2 = 25.0

0850 Water ht = 12.50 cm
Lepton just critical 391.0 - 160.2 - 7.8 - 22.5
= 200.5 ℓ ~ NC

Removed 3 stainless steel strips, and added natural strip # 2. (see page 74.) 177.5

Water ht - 21.30 cm.
+Per
C = 76.06 cm = 12.2 ℓ

Water Temp °C
#1 = 25.0
2 = 25.0

0956 Water ht = 13.80 cm
Lysteu just critical
Drain. 391.0 - 160.2 - 13.8 - 3.9 - 12.2
Cond = 200.9 ¢ ~ NC

New bare spent element with 2 fuel plate (= D-3224 + D-5495) with 3 natural strips and 3 stainless steel strips. 4 5 3

Water ht = 21.50 cm
3 +/or
c = 386.8 cm = 3.1 ¢

Water Temp °C
#1 = 25.2
#2 = 25.3

1104 Water ht = 17.30 cm.
Lysteu just critical
Drain 240.0 - 41.4 - 3.9 - 3.1
Cond. = 191.6 ¢ ~ NC

80

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE	SET	START-UP RANGE
K-1	3 X 10 -12	Meter ✓	1"	✓	3 X 10 -12
	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	"	✓	"
	"	Fast ✓	"	✓	"
R-1					
R-2					
PM-1	700 V	Alarm ✓	Cal	✓	500 V
PM-2	1200 V	Low ✓	12"	✓	900 V
	"	Alarm ✓	3"	✓	"

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

DUMP WELL PROBE LIGHT ✓

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKH

Source in checked by RKH Source No. M-93

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

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

Rod light on by RKH Time 0815

Start-up OK'd by F.D.C RKH Date 1-24-67

Core 19-0 & 19-1

Have spent element with 2 fuel plates (#s D-3224 & D-5495), and 1 enriched strip and 1 natural strip. 43.5

0858 Water lvl = 22.10 cm — Water temp °C
1 + Per — #1 = 25.5 ?
#2 = 25.7 ?

0905 Water lvl = 13.45 cm
Lyster just critical
Drain 240.0 - 40.5 - 15.5
Core = 184.0 ml

CE-2 Core!

Water lvl = 21.60 cm — Water temp °C
2 + Per — #1 = 25.7 ?
5 = 173.8 ml = 6.3 ℓ — #2 = 26.0 ?

1132 Water lvl = 13.80 cm
Lyster just critical
Drain 391.0 - 93.6 - 6.3
Core = 291.1 ℓ

aw

1-24-67

Cores 18-0 & 18-1:

See page 75 for 1st or sub critical expt, for above # elements.

Now have spent element with 4 fuel plates. (#s D-3224, D-5495, D-3242 and D-2870) and 6 enriched strips, (# 2, 3, 7, 8, 9 & 10) ~~and 6 stainless steel strips~~, and 3 natural strips # 2, 3, & 4.

Prediction 155.5
201.3 ± 20.1

1445 Water ht = 21.50 cm

3 + Per

$\bar{c}$ = 182.5 cm = 0.0 ¢

Water temp °C

#1 = 26.0?

2 = 26.2?

*note when measured with thermometer temp = 24.0°

1455 Water ht = 15.60 cm

System just critical

Drain.

155.5

391.0 - 160.2 - 41.4 - 0.0

189.5

Core = 183.40 ¢ ± 20.1

183.1

Now have spent element with 2 fuel plates (#s D-3224, D-5495.) with 4 natural strips (# 2, 3, 4, 5.)

Prediction = 52.6
55.1 ± 9.8

Water ht = 21.60 cm

+ Per.

$\bar{c}$ = 669.3 cm = 1.8 ¢

Water temp °C

#1 = 26.2

2 = 26.5

1600 Water Mt = 18,55 Cm
Lysten just artificial
Chrom

240.0 — 55.2 — 1.8
Cone = 183.0 = 9.8

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 X 10 -12	Meter ✓	1"	—	3 X 10 -12
	"	Fast ✓	"	—	"
K-2	"	Meter ✓	"	—	"
		Fast —	"	—	"
R-1					
R-2					
PM-1	700 V	Alarm ✓	Cent	—	500 V
PM-2	1200 V	Low ✓	12"	—	900 V
	"	Alarm ✓	3"	—	N "

LOG N CALIBRATE ✓ OPERATE ✓ SOURCE No. 12-80

DUMP WELL PROBE LIGHT —

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKH.

Source in checked by RKH Source No. M-93

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

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

Red light on by RKH Time 1045

Start-up OK'd by F.D.C. RKH Date 1-25-67

Core 18-0 & 18-1

Now have spent element with 2 fuel plates, (ES D-3224 & D-5495), with 3 natural strips, and 6 stainless-steel strips. P = 47.7 49.4

Water Ht = 21.60 cm

water temp °C

(1) + Per

a1 = 26.0

τ = 191.2 sec = 5.8 ¢

2 = 26.0

Thermo = 24.0

1130 Water Ht = 15.80 cm

System first critical

Drain.

47.7

240.0 - 41.4 - 7.8 - 5.8

Core = 185.0 ¢ 186.8

184.8 = 9.2

4-25-67

Cores 17-0 & 17-1

Have cores 17-0 & 17-1 assembly in small reflector tank. Inner core spaced .375" with plastic spacers.

1415 Water ht = 21.60 cm
System sub critical.

Water temp °C
#1 = 26.0 ?
2 = 26.0 ?
Room temp 24.0 °C ?

Now have spent fuel element with 2 steel plates (#s D-32247 0-5495), with 3 natural strips and 6 stainless-steel strips. Room = 47.4 45.4

1500 Water ht = 21.60 cm.
2 Pm

Water temp °C

τ = 41.3 sec = 18.6 ℓ
Water ht = 13.0 cm
System just critical
Drain.

240.0 - 41.4 - 7.8 - 18.6
172.2 ℓ
172.2 ÷ 19.2

avg -

1-

Removed 4 stainless steel strips and added #5 natural strip. Flow = 52.6 57.8 ℄

Water ht = 21.60 cm
3 + Pts.
τ = 99.9 sec = 9.9 ℄

Water temp °C
#1 = 26.2
#2 = 26.5
Thermometer read off 2.0°
check by E.A.A.

1530 Water ht = 14.40 cm
Layton just critical
Drain: 52.6
240.0 − 55.2 − 2.6 − 9.9
core = 172.3 ℄ 172.5
±9.9

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	1"	✓	3×10^{-12}
	"	Fast —	"	✓	"
K-2	"	Meter ✓	"	✓	"
	"	Fast —	"	✓	
R-1					
R-2					
PM-1	700V	Alarm ✓	Cent	✓	500V
PM-2	1200V	Low ✓	12"	✓	900V
	"	Alarm ✓	3"	✓	"

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

DUMP WELL PROBE LIGHT _____

START-UP CHECK LIST

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

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.D.C

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

Red light on by AKH Time 0810

Start-up OK'd by F.D.C AKH Date 1-26-67

ans.

1-20-67

Core 17-0 & 17-10

Now have spent fuel element with 4 fuel plates (# 0-3228, 0-5495, 0-3242 & 0-2870.) and 8 enriched strips (# 2.3.4.5.7.8. 9.10). k_{eff} = 203.5 = 213.3 ± 1%

Water ht = 21.6 cm

Water temp °C

(1) + Pos

#1 = 24.2

τ = 119.52 cm = 8.6 ¢

2 = 24.2

0912 Water ht = 14.7 cm

System just critical

Drain. 391.0 − 213.6 − 8.6

Core = 168.8 ¢ 170.6

169.1 ± 1%

Removed enriched strip # 2. and added natural strip # 2. also added 8 stainless-steel strips. k_{eff} = 203.5 = 211.1

Water ht = 21.5 cm.

Water temp °C

2 + Pos

#1 = 24.0

τ = 117.3 cm = 8.8

2 = 24.2

1020 Water ht = 14.70 203.5 391.0 − 211.1 − 8.8

System just critical. Core = 171.1 ¢ 173.3

Drain to ~ 10.0 cm. Repeating + Pos.

Water lvl = 21.5 cm.
^{3} + Per
C = 119.5 cm = 8.6 ¢

1036 Water lvl = 14.70 cm 391.0 - 211.1 - 8.6
Lyden just critical core = 171.3 ¢ ± 15.3
Drain.

Cores 16-0 & 16-1

Have cores 16-0 & 16-1 assemble in small reflector tank. Inner core spaced .375" with plastic spacers.

1320 Water lvl = 21,50 water temp °C
Lyden sub critical #1 = 24.2
#2 = 24.5

Now have spent fuel elements with 4 fuel plates (# D-3224, D-5495, D-3242 & D-2870), and 6 enriched strips (# 2, 3, 7, 8, 9, 10.) and 3 natural strips (# 2, 3 & 4.)

Cores 16-0 & 16-1

Water ht = 21.50 cm

Water temp °C

#1 = 24.5

2 = 25.5

4 + Pu

C = 219.5 cm = 5.1 ¢

1415. Water ht = 15.70 cm

System just critical

Drain.

391.0 − 201.6 − 5.1

core = 184.3 ¢

Removed 2 natural strips #3 & 4. and added enriched strip # 4.

Water ht = 21.5 cm

Water temp °C

#1 = 24.5

2 = 24.5

5 + Pu

C = 165.1 cm = 6.6 ¢

1522 Water ht = 15.45 cm.

System just critical

Drain.

391.0 − 200.7 − 6.6

core = 183.7

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter —	1"	✓	3×10^{-12}
	"	Fast ✓	"	—	"
K-2	"	Meter ✓	"	✓	"
		Fast ✓	"	✓	"
R-1					
R-2					
PM-1	700 V	Alarm ✓	Coil	✓	500 V
PM-2	1200 V	Low ✓	12"	✓	900 V
		Alarm ✓	3"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ SOURCE No. 13-8

DUMP WELL PROBE LIGHT —

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKM

Source in checked by RKM Source No. M-43

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

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

Red light on by RKM Time 0810

Start-up OK'd by F.D.C RKM Date 1-27-67

1-27-67 Core 16-0 & 16-1

Now have spent element with 2 fuel plates (#s D-3224 & D-5495), with 4 natural plates (# 2. 3. 4. & 5.)

0950 Water ht = 21.50 cm
System just critical
Drain.

Water temp °C
#1 = 24.2
2 = 24.2

240.0 − 55.2
Core = 184.8 ¢
±9/8

Removed natural strip #2. and added 6 stainless-steel strips.

Water ht = 21.60 cm.
1+ per
ε = 278.1 sec = 4.2 ¢

Water temp °C
#1 = 24.5
2 = 24.5

0940 Water ht = 16.70 cm
System just critical.
Drain ht = 0.0 cm.

240.0 − 49.3 − 4.2
Core = 186.6 ¢
186.4 ± 9.2

Rotated spent fuel element 90°. Not changing critical height. No other changes made.

Water Lvl = 21.50 cm. Water Temp °C

2 + Per

T = 271.6 mr = 4.3 ✓

II 1 = 24.5

2 = 24.5

°C

24.2 1030 Water Lvl = 16.70 cm.

24.2 System just critical core = 186.5

Cores 19-0 & 19-1 /

2/

Have spent element with 2 fuel plates. (#D-3224 & D-5495). with ~~2 core~~ 1 enriched strip (#2) and 1 natural strip (#2). See pag 81

°C

4.5

4.5

Water Lvl = 21.5 cm Water Temp °C

3 + Per

T = 52.2 mr = 15.9 ✓

II 1 = 24.5

2 = 24.5

1400 Water Lvl = 13.30 cm

System just critical

Drums. 40.0 - 40.5 - 15.9

Core = 183.6 & N =

over.

1-27-67

Rotated spent fuel element 90°. Not changing vertical height. No other changes made.

Water ht = 21.60 cm.

4 + Per
τ = 45.6 sec = 17.2 ¢

1450 Water ht = 13.25 cm
System just critical
Drain. 240 - 40.5 - 17.2 ¢
core = 182.3 ¢ NC

Rotated spent fuel element back to its original pos. (page 93). Removed enriched strip #2. and added natural strips #3 & 4, and 3 stainless-steel strips. Total of 3 natural strips and 3 stainless-steel strips.

Water ht = 21.60 cm.

5 + Per
τ = 115.2 sec = 8.8 ¢

Water temp °C
#1 = 24.7
2 = 25.0

1540 Water ht = 14.80 cm.
System just critical 240.0 - 41.4 - 3.9 - 8.8
Drain. core = 186.9 NC

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	1"	✓	3×10^{-12}
	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	1"	✓	"
	"	Fast ✓	"	✓	"
R-1					
R-2					
RM-1	700 ✓	Alarm ✓	Bank	✓	500 ✓
RM-2	1200 ✓	Low ✓	12"	✓	900 ✓
	"	Alarm ✓	3"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ SOURCE No. 12-80

SUMP WELL PROBE LIGHT _____

START-UP CHECK LIST

Equipment checked by FDC AKA Personnel check by F.D.C

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.D.C

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

Red light on by AKA Time 1025

Start-up CK'd by FDC AKA Date 1-30-67

Cores 19-0 & 19-1

Repeat of expt described on bottom of page 94. (1-27-67)

Water ht = 21.70 cm
1 + Per
t = 152.1 sec = 7.0 ¢

Water temp °C
#1 = 22.7°
2 = 23.0°
Mean = 22.9

1108 Water ht = 15.40 cm
Keyton just critical
Drain.

240.0 - 41.4 - 3.9 - 7.0
Core = 186.7 ¢

Repeat of above:

Water ht = 21.70 cm
2 + Per.
t = 149.9 sec = 7.1 ¢

Water temp °C
#1 = 23.0
2 = 23.2

1318 Water ht = 15.40 cm
Keyton just critical
Drain.

Now ~~top~~ have spent element with 4 fuel plates (#D-3224 & D-5495, D-3242, D-2870.) and 6 enriched strips (#2.3.7,8,9.10.) plus 6 stainless steel strips. (Spent fuel is same long + next pos as with 2 fuel plates).

Water ht = 14.7cm

3 + Per

t = 34.8 cm = 20.7 ¢

Water temp °C

#1 = 23.0

2 = 23.0

1350 Water ht = 11.6.

System just critical

Drain.

391.0 - 168.0 = 29.5

core = 193.5 ¢ N =

Rotated spent fuel 90°. Not changing vertical ht. No other changes made.

Water ht = ~~14~~ 14.6 cm

4 + Per

t = 32.6 cm = 21.6 ¢

Water temp °C

#1 = 23.0

2 = 23.0

1415 Water ht = 11.6 cm

System just critical

Drain.

391.0 - 168.0 - 29.4

core = 193.6 ¢ N =

over.

Rotated spent fuel element back to its original pos; Removed the 6 stainless-steel ~~strips~~, and added 2 natural strips (# 2, 3).

Water ht = 21.6 cm. Water temp °C

5 + Per

τ = 58.7 sec = 14.7 ¢ #1 = 23.0

2 = 23.2

1450 Water ht = 13.5 cm

Leptos just critical

Drain.

391.0 - 160.2 = 27.6 - 14.7

core = 188.5 ¢ NC

Added 4 stainless-steel strip to have ~~6~~ Now have ~~8~~ 4 fuel plates, ~~4 fuel~~ 4 stainless steel strip. 6 enriched strips, one 2 natural strips:

Water ht = 21.6 cm Water temp °C

6 + Per

τ = 117.3 sec = 8.7 ¢ #1 = 23.2

2 = 23.2

1550 Water ht = 14.70 cm.

Leptos just critical

Drain.

391.0 - 160.2 - 27.6 - 5.2 - 8.7

core = 189.3 NC

INSTRUMENT CHECK

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

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

DUMP WELL PROBE LIGHT —

START-UP CHECK LIST

Equipment checked by AK/F.D.C Personnel check by F.D.C

Instruments and safeties checked and reset by AK/F

Source in checked by AK/F Source No. M-93

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

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

Red light on by AK/F Time 0810

Start-up OK'd by F.D.C AK/F Date 1-31-67

amw

Core 19-0 & 19-1

Repeat of sept listed on bottom of page 98.

Water Ht = 21.6 cm
+ Per.
t = 121.1 sec = 8.5 ϕ

Water Temp °C
#1 = 23.2
2 = 23.5

0858. Water Ht = 14.8 cm
Lysters just critical
Drain.

391 - 160.2 - 27.6 - 5.2 - 8.5
Core = 189.5. N =

Same as above except (19-1) former element rotated 45° (#7)

Water Ht = 21.6 cm
+ Per.
t = 117.3 sec = 8.7 ϕ

Water Temp °C
#1 = 23.2
2 = 23.5

1039 Water Ht = 14.75
Lysters just critical
Drain to ~ 0.0 cm on scale.

391.0 - 160.2 - 27.6 - 5.2 - 8.7
Core = 189.3 ϕ

Runs 19-0 + ~~19-1~~ 19-1

Rotated Inner element another 45° (#0-6).

Water ht = 21.6 cm
+ Per
t = 113.0 sec = 8.9 ¢

Water temp °C
#1 = 23.2
2 = 23.5

1110 Water ht = 14.75 cm
System just critical
Drain.

391.0 - 100.2 - 27.6 - 5.2 - 8.9
Corr = 189.1 ¢ MC

Rotated Inner element another 45° (#0-5)

Water ht = 21.6 cm
+ Per
t = 103.2 sec = 9.6

Water temp °C
#1 = 23.5
2 = 23.5

1300 Water ht = 14.5 cm
System just critical
Drain to ~ 0.0 cm on scale

Rotated Inner element another 45° (#0-4)

Water ht = 21.6 cm
+ Per
t = 111.9 sec = 9.0 ¢

Water temp °C
#1 = 23.5
2 = 24.0

1330 Water ht = 14.7 cm
System just critical
Drain.

ave.

Rotated former element back to its original pos. Marked each poison strip four (4) slots in the clockwise pos in outter element.

~~#4~~ (6) Water ht = 21.6 cm
+Res
t = 49.9 sec = 16.4 ℄

Water temp °C
#1 = 23.5
2 = 24.0

~~1420~~ 1420 Water ht = 13.20 cm
System just critical
Drain to 0.0 cm on scale.

391.0 - 193.0 - 16.4
conc = 181.6 ℄ Nit

Marked poison strips four (4) slots in the clockwise pos in outter element. Total of 8 slots from original pos.

Water ht = 21.6 cm
7 +Res
t = 58.7 sec = 14.7 ℄

Water temp °C
#1 = 23.7
2 = 24.0

1520 Water ht = 13.3 cm.
System just critical
Drain to 0.0 cm on scale

conc = 183.3 ℄ Nit

Moved poison strips back to there original pos.

Water Lvl = 21.6 cm
& Ber

Water Temp °C
H = 23.7
2 = 29.0

1550 Water Lvl = 13.7 cm
Left two jars artificial
Drain.

391.0 - 193.0 - 13.0
cow = 185.0 g NG

10± 2/1/67

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	5"	—	3×10^{-12}
	"	Fast ✓	"	—	"
K-2	3×10^{-12}	Meter ✓	4"	—	"
		Fast ✓	"	—	
R-1	✓				
R-2	✓				
PM-1	900V	Alarm ✓	Count	—	300V
PM-2	1200V	Low ✓	8"	—	900V
		Alarm ✓	3"	—	"

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

DUMP WELL PROBE LIGHT ✓

START-UP CHECK LIST

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

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

Source in checked by W.C Source No. M-43

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

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

Red light on by W.C Time 0820

Start-up OK'd by W.C D.W.C Date 2-1-67

7/1/67 Element 190 - 19E

8:55A + Pos Water - 21.65 cm - Supercritical -
C = 65.2 cm = 13.6 f Period 91 7/1/67
Temp #1 24.0 °C #2 24.0 °C

900 Water 13.8 cm Slightly Supercritical
905 " 13.7 cm Slightly Subcritical
903 " 13.7 " "

Repeat of above after removing each poison strip, and placing it back in the slot from which it was removed, (or original (pos.)

Water Lvl = 21.60 cm, Water temp °C
2 + Pos #1 = 24.0
C = 67.4 cm = 13.3 f #2 = 24.2

1030 Water Lvl = 13.70 cm
Cycles just critical
Drain to ~ 0.0 cm on scale

Moved each poison strip four (4) slots in the clockwise pos in outer element. (See top of page 102.)

Water Lvl = 21.70 cm
3 + Pos C = 71.7 cm = 12.7 f

over

2/1/67

1100 Water ht = 13.70 cm
Lysters just critical
Drain.

Water Temp °C
#1 = 24.2
2 = 24.2

Mand each step four (4) more slats in the clockwise per. (See bottom page 102.) total of 8 slats.

Water ht = 21.70 cm
4 + Per
t = 49.9 m = 16.4 f

Water Temp °C
#1 = 24.2
2 = 25.0

1315 Water ht = ~~21.1~~ 13.1 cm.
Lysters just critical
Drain to ~ 0.0 cm

391.0 - 193.0 = 16.4
one = 181.6 f MG

Mand each step four (4) more slats in the clockwise per. (Total of 12 slats).

Water ht = 21.60 cm
5 + Per

Water Temp °C
#1 = 24.2
2 = 25.0

1350 Water ht = 13.7 cm
Lysters just critical
Drain.

391.0 - 193.0 - 12.7
one = 185.3 f MG

Moved each strip four (4) more slats in the clockwise pos. (total of 16 slats)

Water ht = 21.6 cm
+ Pos
C = 54.3 cm = 15.5 ¢

Water temp °C
#1 = 24.5
2 = 24.5

1445 Water ht = 13.20
Lyptus just critical
Drain to ~20.0 cm

391.0 - 193.0 - 15.5 ¢
cm = 182.5 ¢ NG

Moved each strip four (4) more slats in the clockwise pos. (total of ~~16~~ 20 slats)

Water ht = 21.6 cm
+ Pos
C = 49.9 = 16.4 ¢

Water temp °C
#1 = 24.5
2 = 24.5

391.0 - 193 - 16.4
cm = 181.6 NG

1526 Water ht = 13.15 cm
Lyptus just critical
Drain to ~20.0 cm

Moved each strip four (4) more slats in the clockwise pos. (total of 24 slats)

Water ht = 21.6 cm
+ Pos C = 67.9 cm = 13.3 ¢ aver.

108

2-1-67

1604 Water ht = 13.60 cm Water temp °C
Lysteria just critical T 1 = 29.5
Drain. one = 84.7 % NC 2 = 29.5

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE	SET	START-UP RANGE
K-1	3 X10 -12	Meter ~	1"	~	3 X10 -12
	"	Fast ~	"	~	"
K-2	"	Meter ~	"	~	"
	"	Fast ~	"	~	"
R-1					
R-2					
PM-1	700 V	Alarm ~	cont	~	500 V
PM-2	1200 V	Low ~	12"	~	900 V
	"	Alarm ~	3"	~	"

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

DUMP WELL PROBE LIGHT

✓

Zone 19-D & 19-B

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKH.

Source in checked by AKH 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 AKH Time 0815

Start-up OK'd by I.D.C AKH. Date 2-2-67

Moved each strip four (4) more slots in the clockwise pos. (Total of 28 slots)

Water ht = 21.6 cm — Water temp °C

1 + Pos — #1 = 24.2

C = 69.5 cm = 130 # — 2 = 24.2

0900 Water ht = 13.70 cm — cm = 185.0 # NC

System just critical

Counter 0.0. cm.

Moved each strip back to it original pos.

Water ht = 21.6 cm — Water temp °C

2 + Pos — #1 = 24.2

C = 82.6 cm = 11.4 # — 2 = 24.2

0950 Water ht = 14.1 cm — Cm = 186.6 # NC

System just critical

Removed core from tank, and made a visual inspection of the core, and could not find any slate plugs. Replaced core in tank. Now have 4 fuel plates and 7 enriched strips. Strips (# 2,3,4,7,8,9 & 10.)

Water Temp °C
#1 = 24.3
2 = 24.5

Water ht = 21.6 cm.
3 + Per
τ = 36.9 sec = 20.0 ¢

1104 Water ht = 12.6 cm
System just critical
Drain.

4 fuel plates in Center (# 98)
Repeat of above after centering the 7 enriched strips at top & bottom of core. (19-0).

Water Temp °C
#1 = 24.5
2 = 24.5

Water ht = 21.6 cm
4 + Per
τ = 28.3 = 23.5 ¢

1430 Water ht = 12.3
OK System just critical
Drain.
143.5 dial
391 − 179.9 − 21.3 = 189.8 mm
186.5

Repeat of experiment (1-27-67 Page 94): Have
0-3224 & 0-5495 2 fuel plates and 2 enriched strips (#2 & 2).
Strips are centered at top and bottom on
core (19-0).

Water Htt = 21.6 cm
5 + Plex
T = 34.8 Rm = 20.7 ¢

Water temp °C
#1 = 24.5
#2 = 24.5

1553 Water Htt = 12.7 cm.
Keyless just critical
Dneton

core = 178.80 ¢ NC

240 - 51.4 - 20.7 = 167.5 Lmm
240 - 53.4 - 20.7 = 165.9

112

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	1"	✓	3×10^{-12}
	"	Fast —	"	—	"
K-2	"	Meter ✓	"	—	"
	"	Fast —	"	—	"
R-1					
R-2					
PM-1	700 v	Alarm ✓	out	—	500 v
PM-2	12000 v	Low ✓	12	—	900 v
	"	Alarm ✓	3"	—	"

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

DUMP WELL PROBE LIGHT _____

START-UP CHECK LIST

Equipment checked by AKM J. DC Personnel check by FDC

Instruments and safeties checked and reset by AKM

Source in checked by AKM Source No. M-93

Emergency equipment in control room checked by AKM

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

Red light on by AKM Time 0830

Start-up OK'd by FDC AKM Date 2/3/67

19

Have been spent element with 4 fuel plates (# D-3224, D-5495, D-3242, & D-2870). Plus 6 enriched strips (# 2, 3, 7, 8, 9, 10) and 2 natural strips (#s 2 & 8) plus 4 stainless steel strips. Each strip is centered in center element (18-0) top and bottom.

192.5 ± 19.5

Water lvl = 21.7 cm
1 + Pu
r = 41.3 cm = 18.6 ¢

Water temp °C
#1 = 24.3
2 = 24.3

0914 Water lvl = 12.9 cm
System just critical
Drain.

193.7
391.0 - 193.0 - 18.6
Core = 178.4 185.0
179.5 ± 19.5

Removed all poison strips, then using the regular ~~procedure~~ procedure replaced strip back in the same slot. (centering from top only).

Water lvl = 21.6 cm
2 + Pu
r = 84.7 cm = 11.2 ¢
Water lvl = 14.1 cm.
1008 System just critical.
Drain.

Water temp. °C
#1 = 24.3
2 = 24.5

water.

Repeat of experiment described on top of page 113. After centering strip at top and bottom of core (19-0).

Water ht = 21.6 cm
3 + Per

Water temp °C
#1 = 24.5
2 = 24.5

1307 Water ht = 13.0 cm
Lysteria just critical
Drain.

Mount the strips poison strips to the outter edge of slots in outter element. Same number of fuel plates and poison strips as above.

1534 Water ht = 21.6 cm
Lysteria sub critical
Drain.

Water temp °C
#1 = 24.5
2 = 24.5

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	1"	✓	3×10^{-12}
	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	"	✓	"
	"	Fast ✓	"	✓	"
R-1					
R-2					
PM-1	700 V	Alarm ✓	Cent	✓	500 V
PM-2	1200 V	Low ✓	12"	✓	900 V
	"	Alarm ✓	3	✓	"

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

DUMP WELL PROBE LIGHT ✓

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKH EBV

Source in checked by RKH Source No. M-93

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

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

Red light on by RKH. Time 0920

Start-up OK'd by F.D.C RKH. Date 3-6-67

over

Repeat of experiment described on top of page 113.

Water ht = 21.6 cm.
+Per
C = 56.5 cc = 15.0 ¢
Water ht = 13.35 cm
Hysteresis just critical
Drain to = 0.0 cm.

Water temp °C
#1 = 23.5°
2 = 23.5°

Remand natural strip #3 to side of cone.
Water ht = 21.6 cm
2 +Per.
C = 95.6 cc = 10.2 ¢
10 30 Water ht = ~~14.3~~ 14.40 cm.
Hysteresis just critical
Drain.

Water temp °C
#1 = 23.5°
2 = 23.5

Remand natural strip #3. = 12.2 ¢

Water ht = 13.35 cm.
3 +Per
C = 76.1 cc = 12.2 ¢
11 32 Water ht = 11.8 cm
Hysteresis just critical

Water temp °C
#1 = 23.5
2 = 23.5

Removed 4 stainless steel strips. = 1.6 $

Water ht = 13.35 cm. Water temp °C

4 + Per #1 = 23.5

C = 41.3 - 18.6 $ #2 = 23.7

1150 Water ht = 11.35

System just critical.

Drain.

Core 17-0 & 17-1

Have 2 fuel plates (# D-322 & D-5495) and 5 natural strips; the strips are against the top and bottom outside ring. (See page 86)

1555 Water ht = 21.6 cm

System just critical. - Per C = 919.8 ml

Drain = -1.5 $

The aluminum strips are in error. Due to the fact that "$ can not read."

MH 2-7-67

INSTRUMENT CHECK

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

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

DUMP WELL PROBE LIGHT _____

START-UP CHECK LIST

Equipment checked by AKM F.D.C 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 F.D.C

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

Red light on by AKM. Time 0900

Start-up OK'd by F.D.C AKM. Date 2-7-67

Core 17-0 & 17-1

Have 2 spent fuel plates (#D-3229 & D-5495) and 4 natural strips, and 2 stainless steel strips. The strips are against the top and bottom of outside ring. (See page 85 & 86)

Total fission = 55.2 - 51.8 ¢

Water ht = 21.6 cm

1 + Per

C = 128.2 cc = 8.1 ¢

Water Temp °C

#1 = 23.5

#2 = 23.5

0945 Water ht = 15.0 cm

Leaves just critical

Drain.

Difference = 1.8 ¢

Core = 174.1 ¢

Same as above except poison strips are moved to the second (2nd) inside ring.

Water ht = 21.6 cm

2 + Per

C = 86.9 cc = 11.0 ¢

Water ht = 14.30 cm

Leaves just critical.

Drain to = 20.0 cm.

diff'n = 2.9.

Core = 171.2

drain

Strips removed one at a time, and placed in center of top ring in the normal manner.

Water Alt = 21.6 cm
3 + Res
τ = 95.6 ms = 10.2 ϕ

Water Temp °C
#1 = 23.5
2 = 23.5

1132 Water Alt = 14.5 cm
System just critical
Drain.

240.0 − 57.8 − 10.2
Core = 172.0 ϕ
1-25-67 (P-80) core = 172.3 ϕ
± 9.9

Removed natural strip #4.

Water Alt = 14.5 cm
4 + Res
τ = 67.1 ms = 13.3 ϕ

Water Temp °C
#1 = 23.5
2 = 23.7

1345 Water Alt = 12.30 cm
System just critical.
Drain to ~ 0.0 cm

Removed natural strip #2

Water Alt = 12.30 cm
5 + Res
τ = 67.1 ms = 13.3 ϕ

1400 Water lvl = 11.10 cm
Lysten just critical
Drain to ~ 0.0 cm

Installed enriched strip # 2;

Water lvl = 21.6
6 + Per
t = 78.2 sec = 11.9 ℄

Water Temp °C
#1 = 23.5
2 = 23.7

1515 Water lvl = 14.10 cm
Lysten just critical
Drain to ~ 0.0 cm.

Removed natural strip # 5.

Water lvl = 14.10 cm
7 ~~+~~ Per
t = 69.5 sec = 13.0 ℄

1528 Water lvl = 12.10 cm
Lysten just critical
Drain to ~ 0.0 cm

acm.

Removed natural strip #3.

Water Temp °C
#1 = 23.5
2 = 23.7

Water Lvl = 12,10 cm.
8 + Rip
E = 82.16 cm = 11.3 ℄

1543 Water Lvl = 11,20 cm
Lysteria just critical
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	1.5	✓	3×10^{-12}
	"	Set ✓	"	—	"
K-2	"	Meter ✓	"	—	"
	"	Set ✓	"	✓	"
R-1					
R-2					
PM-1	700 V	Alarm ✓	Cart	✓	500 V
PM-2	1200 V	Low ✓	12"	✓	900 V
	"	Alarm ✓	3"	✓	"

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

DUMP WELL PROBE LIGHT ✓

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AHH

Source in checked by AHH Source No. M-43

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

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

Red light on by AHH Time 0810

Start-up OK'd by F.D.C. AHH Date 2-8-67

ovm.

Core 17-0 & 17-1

Have Spent element with 2 fuel plates, and removed strips (#2). 2 natural strips (#3) and 2 stainless steel strips. Purpose is to remove wants of natural strip #3.

Water Lvl = 21.6 cm
+ Ps
t = 86.9 sec = 11.0 ¢

Water temp °C
#1 = 23.0
2 = 23.0

0905 Water Lvl = 14.3 cm
Lysten just critical
Drain to = 0.0 cm.

Removed natural strip #3.

Water Lvl = 14.3 cm
+ Ps
t = 69.5 sec = 13.0

Water Lvl = 12.25
Lysten just critical
Drain.

Words of natural boron
strips #2.3.4.5. avg = 13.15¢
#2 = 13.3 #4 = 13.3
#3 = 13.0 #5 = 13.0

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	1"	✓	3×10^{-12}
	"	Fist ✓	"	✓	"
K-2	"	Meter ✓	"	✓	"
	"	Fist ✓	"	✓	"
R-1					
R-2					
PM-1	700 V	Alarm ✓	Con't	✓	500 V
PM-2	1200 V	Low ✓	12"	✓	900 V
		Alarm ✓	3"	✓	"

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

DUMP WELL PROBE LIGHT _____

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RHH

Source in checked by RHH Source No. M-43

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

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

Red light on by RHH Time 0820

Start-up OK'd by F.D.C RHH Date 2-9-67

cont.

Cores 17-0 & 17-1

Have spent element with 2 fuel plates. 1 enriched strip (#2) and 1 natural strip (#5). Have removed the 2 stainless steel strips. (See page 124.)

Water ht = 14.3 cm
+Per
C = 56.5 mm = 15.0 ¢

Water Temp °C
#1 = 22.0
#2 = 22.0

0900 Water ht = 12.1 cm Key = 24.8 ¢
Keyten just critical.

Now have 2 fuel plates, and 4 natural strips (#2, 3, 4, 5).

Water ht = 21.6 cm
2 +Per
C = 89.1 mm = 10.8 ¢

Water Temp °C
#1 = 22.0
#2 = 22.0

1010 Water ht = 14.4 cm
Keyten just critical
Drain to 20.0 cm,
Natural strips 2, 3, 4 = 35.6 ¢
4 Key = 14.0 ∴ 35.6 - 14.0 = 21.6 ¢ = #2 existing

Removed natural strip #3 & 4 and added #1 enriched strip.

Water ht = 21.6 cm
3 + Pr
C = 80.4 cm = 11.7 f

1040 Water ht = 14.30 cm
Lysten just critical
Drain to 20.0 cm. #1 = 27.2 f
10.8 - 26.3 + #1 = 11.7 #1 = 27.2

Removed enriched strip #1. and added enriched strip #2.

Water ht = 21.6 Water temp °C
4 + Pr #1. 22.0
C = 97.8 cm = 10.1 f #2. 22.2

2.0 1106 Water ht = 14.80 cm
2.0 Lysten just critical #2 = 25.6 f
Drain.

Removed enriched strip #2, and added enriched strip #3.

Water lvl = 21.6 cm
5 + Pos
σ = 78.2 mv = 11.9 ¢

Water temp °C
#1 = 21.8
2 = 22.0

1310 Water lvl = 14.10 cm. #3 = 27.4 ¢ ✓
System just critical
Drain to ~ 0-0 cm

Removed enriched strip #3. and added enriched strip #4.

Water lvl = 21.6
6 + Pos
σ = 91.3 mv = 10.6 ¢ #4 = 26.1 ¢ ✓

1328 Water lvl = 14.4 cm
System just critical
Drain.

Removed enriched strip #4, and added enriched strip #5.

Water lvl = 21.6 cm
7 +Per.
τ = 123.9 sec = 8.3 ¢

Temp °C
#1 = 21.5
2 = 21.7

1403 Water lvl = 15.5 cm
Lysteo just critical
Drain to ~0.0 cm.

#5 = 23.8 ¢ ✓

Removed enriched strip #5 and added enriched strip #6.

Water lvl = 21.6 cm
8 +Per
123.9 sec = 8.3 ¢

#6 = 23.8 ¢ ✓

1425 Water lvl = 15.5 cm.
Lysteo just critical
Drain to ~0.0

Water temp °C
#1 = 21.5
2 = 21.7

Removed enriched strip #6 and added enriched strip #7.

Water lvl = 21.6 cm
9 +Per
τ = 123.9 sec = 8.3 ¢
1500 Water lvl = 14.8 cm.
Lysteo just critical
Drain to ~0-0 cm

#7 = 23.8 ¢ ✓

Water temp °C
#1 = 21.5
2 = 21.7

over.

Removed enriched strip # 7 and added enriched strip # 8.

Water lvl = 21.6 cm.

10 + Per
$\bar{c}$ = 89.1 mv = 10.8 ¢

Water Temp °C
1 = 21.5
8 = 26.3 ¢ / 2 = 21.7

1517 Water lvl = 14.4 cm
System just critical
Drain to — 0.0 cm

Removed enriched strip # 8, and added enriched strip # 9.

Water lvl = 21.6 cm

11 + Per
$\bar{c}$ = 89.1 = 10.8 ¢

9 = 26.3 ¢ ✓

1530 Water lvl = 14.3 cm
System just critical
Drain to — 0.0 cm.

Removed enriched strip # 9, and added enriched strip # 10.

Water ht = 21.6

12 + Per
C = 80.9 cm = 11.0 ℄

II 10 = 26.5 ℄ ✓

1548 Water ht = 14.4 cm
Lysten just critical
Drain to — 0.0 cm

10 enriched avg = 25.7 ℄

Removed enriched strip #10. and added natural strips #3 & 4. Purpose is to check runs shown on page 126, with 2 fuel plate and 4 natural strips.

Water ht = 21.6 cm

Water temp °C
#1 = 22.7
2 = 22.0

13 + Per.
C = 104.3 = 9.6 ℄

14.5 cm.

1610 Water ht = ~~14.6~~
Lysten just critical
Drains.
Δ h = 0.1 cm = 0.3 ℄ at this height

132

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	1"	✓	3×10^{-12}
	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	"	✓	"
	"	Fast ✓	"	✓	"
R-1					
R-2					
PM-1	700 V	Alarm ✓	Count	✓	500 V
PM-2	1200 V	Low ✓	12"	✓	900 V
	"	Alarm ✓	3"	✓	"

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

DUMP WELL PROBE LIGHT ✓

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKH

Source in checked by RKH Source No. M-93

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

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

Rod light on by RKH Time 0920

Start-up OK'd by F.D.C RKH Date 2-10-67

2-10-67 CE-2

Repeat of expt with CE-2 as described on page 60.

Water lvl = 21.6 cm

+ Pen
E = 193.4 = 5.7 f

Temp °C
#1 = 21.5
2 = 21.5

1010 Water lvl = 14.0 cm
Leyden jar critical
Drain. 391.0 - 99.6
core = 291.4 f

Mould the 4 poison strips toward the outter edge of element as possible.

Water lvl = 21.6 cm
2 - Pen
E = -217.3 cc = -7.3 f

1115 Drain.

cer.

2-10-67

Cores 14-0 & 14-1

Have Cores 14-0 & 14-1 assembly in small reflector tank. Lower core spaced .375" with plastic spacers.
(See page 152 for new value on poison strips.)

1505 Water ht = 21.6 cm
System sub critical.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP		SOURCE Distance	SET	START-UP RANGE
K-1	3×10^{-12}	Meter	~	1"	~	3×10^{-12}
	"	Fast	~	"	~	"
K-2	"	Meter	~	"	~	"
	"	Fast	~	"	~	"
R-1						
R-2						
PM-1	700 V	Alarm	~	cont.	~	500 V
PM-2	1200 V	Low	~	12"	~	900 V
	"	Alarm	~	3"	~	"

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

DUMP WELL PROBE LIGHT

Cores 18-0 & 18-1

START-UP CHECK LIST

Equipment checked by RKK/EDC Personnel check by EDC

Instruments and safeties checked and reset by RKK

Source in checked by RKK Source No. M-43

Emergency equipment in control room checked by EDC

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

Red light on by RKK Time 0815

Start-up OK'd by EDC RKK Date 2-13-67

Have 4 fuel plates. 6 enriched strips (#s 2,3,7,8,9, & 10.) and 3 natural strips (#s 2,3 & 4).

Power = 195.5 201.3 ± 20.1

Water ht = 21.6 cm

+ Per

τ = 91.3 sec = 10.6 ¢

0858 Water ht = 14.20

Water first critical

Drain.

Water temp °C

#1 = 21.5

2 = 21.5

155.5

391.0 - 193.8 - 10.6

Core = 186.6 & 174.5

179.1 ± 20.1

Now have 2 fuel plates, and 4 natural strips (#s 2,3,4, & 5). Power 52.6

55.1 ± 5.8

over

2-13-67

Cores 14-0 & 14-1

Water ht = 21.6 cm.
+Refl.
τ = 319.4 sec = 3.7¢

1015 Water ht = 17.0 cm
System just critical
Drain.

240.0 - 52.8¢ - 3.7¢
one = 183.5¢.

240 - 55.1 - 3.7 = 181.2 ÷ 9.8

Cores 15-0 & 15-1

Have cores 15-0 & 15-1 assemble in small reflector tank, Inner one spaced .375" with plastic spacers.

Water temp °C

1110 Water ht = 21.6 cm — #1 = 21.5
System sub critical — 2 = 21.7

Have 2 fuel plates, and 4 natural strips (# 2, 3, 4, & 5.)

1315 Water ht = 21.6 cm — Water temp °C
System sub critical — #1 = 22.0
Drain to ~ 20.0 cm. — 2 = 22.7

Cores 15-0 & 15-1

2-13-67

Removed natural strip #3. Power: 41.3 ± 9.1

Water ht = 21.6 cm

3 + Per.

τ = 319.4 sec = 3.7 ¢

1345 Water ht = 17.1 cm

System just critical

Drain.

240.0 ¢ - 39.6 ¢ - 3.7 ¢

core = 196.7 ¢

240 - 41.3 - 3.7 = 195.0 ± 9.1

now have 4 fuel plates. 6 enriched strips (#'s 2. 3. 7. 8. 9. & 10) and 2 natural strips (#'s 2. & 4.) Power = 182.5

182.5 ± 15.4

11

Water ht = 21.6 cm

4 + Per.

τ = 93.4 sec = 10.4 ¢

Water Temp °C

#1 = 22.2

2 = 22.5

5

7

1445 Water ht = 14.35 cm.

System just critical

Drain.

182.5

391.0 - 154.2 - 26.4 - 10.8

core = 199.6

391 - 182.5 - 10.4 = 193.1 ± 15.4

1,8

2,0

2.2

138

7-13-67

Cores 13-0 & 13-1

Have have cores 13-0 & 13-1 assembled in small infiltrator tanks. Inner core spaced .375" with plastic spacers.

1553 Water lvl = 21.6 cm
Hydrostatic with artificial Marais.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP		SOURCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter	—	1"	✓	3×10^{-12}
	"	Fast	—	"	✓	"
K-2	"	Meter	✓	"	✓	"
	"	Fast	✓	"	✓	"
R-1						
R-2						
PM-1	700 v	Alarm	✓	cent	✓	600 v
PM-2	1200 v	Low	✓	12"	✓	900 v
	"	Alarm	—	3"	✓	"

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

DUMP WELL PROBE LIGHT _____

Cores 13-0 & 13-1

START-UP CHECK LIST

Equipment checked by RKK FIDC Personnel check by F.I.D.C

Instruments and safeties checked and reset by RKK

Source in checked by RKK Source No. M-93

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

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

Red light on by RKK Time 0815

Start-up OK'd by F.I.D.C RKK Date 2-14-67

New bare & fuel plates. 6 enriched strips (#s 2.3.7.8.9.10.) and ~~3~~ 3 natural strips (# 2, 3. 4).

Water ht = 17.2 cm
+ Per
τ = 52.2 sec = 15.9 ¢
0856 Water ht = ~~17.8 cm~~ 12.8 cm
System just critical
Drain to ~0.0 cm.

Water temp °C
T_1 = 22.5
T_2 = 22.7

added natural strip # 5. Total fission
Water ht = 21.6 cm = 20.2¢
2 + Per -5.5
τ = 204.3 sec = 5.5 ¢ = 15.1 ± 2.8

over.

Core 13-0 & 13-1

0928 Water ht = 16.0 cm
Lyster just critical
Drain.

391.0 − 207.0 − 5.5
Core = 178.5 ¢

391 − 215.1 − 5.5 = 170.4 ± 0.8

Now have 2 fuel plates and 2 unirradiated strips (#2 & 9).

Water ht = 21.6 cm.
3 + per
τ = 69.5 sec = 13.0 ¢

Water Temp °C
#1 = 22.7
2 = 22.7

1041. Water ht = 13.65 cm
Lyster just critical
Drain.

240.0 − 51.9 − 13.0
Core = 175.6

240 − 53.3 − 13.0 = 173.7 ± 8

Core 12-0 & 12-1

Now have core 12-0 & 12-1 assembled in small reflector tank. Inner core spaced .375" with plastic spacers.

Water ht = 21.6 cm
Lyster sub critical
Drain.

Cores 12-0 & 12-1

Now have 2 fuel plates and 2 enriched strips (#2 2 9) Pcrit = 53.3 ± 8

Water ht = 21.6 cm
4 + Per
T = 95.6 cm = 10.2 ¢

Water Temp °C
#1 = 23.0
2 = 23.0

1345 Water ht = 14.5 cm
System just critical
Drain.

240.0 - 51.9 - 10.2
Core = ~~178.4 ¢~~ 177.9
176.5 ± 8

Now have 9 fuel plates. 6 enriched strips (#s 2.3.7.8.9.10.) and 4 natural strips (#s 2 3.4.5). Pcrit = 215.1 ± 20.8

Water ht = 21.6 cm.
5 + Per
T = 521.5 cm = 2.3

Water Temp °C
#1 = 23.2
2 = 23.5

1451 Water ht = 17.40 cm.
System just critical
Drain

391.0 - 154.2 - 52.8 - 2.3
Core = 181.7 ¢ 182.2

391 - 215.1 - 2.3 = 173.6 ± 20.8

142

Cores 23-0 & 23-1

Now have cores 23-0 & 23-1 assembly in small reflector tank. Inner core spaced .375" with plastic spacers.

1600 Water ht = 21.6 cm
System sub-critical
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE RANGE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter	1"	✓	3×10^{-12}
	"	Fast	"	✓	"
K-2	"	Meter ✓	"	✓	"
	"	Fast ✓	"	✓	"
R-1					
R-2					
PM-1	700 V	Alarm ✓	cent	✓	500 V
PM-2	1200 V	Low ✓	12"	✓	900 V
	"	Alarm ✓	3"	✓	"

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

DUMP WELL PROBE LIGHT

Cores 23-0 & 23-1

START-UP CHECK LIST

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

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.D.C

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

Red light on by AKH Time 0945

Start-up OK'd by F.D.C AKH Date 2-15-67

Now have 4 fuel plates. 6 enriched strips (#s 2, 3, 7, 8, 9, 10.) and 4 natural strips (#s 2, 3, 4, 5). ~0 F.S
= 15.1 ± 20%

1022 Water ht = 21.6 cm. Water Temp °C

Lupton sub critical #1 = 23.7

Drain to ~20.0 cm. #2 = 24.0

~~For~~ Instrument removed: K-2. (Cable unaverse)

Removed natural strip #4. 155.2
~0 1.3 ± ~0.1

Water ht = 21.6 cm

+ Per.

ρ = 119.5 mm = 8.6 ¢

over.

Core 23-0 & 23-1

1118 Water ht = 15.05 Cm
System just critical
Drain.

Water Temp °C
#1 = 23.7
2 = 24.0

391.0 - 154.2 - 39.6 - 8.6
Core = 188.6 ¢

X

391 - 201.3 - 5.6 = 184.1 = 29.1

Now have 2 fuel plates. 3 natural strips (#s 2.3.5).

Water ht = 21.6 cm
+Pen,
5 = 54.3 cm = 15.5 ¢

1313 Water ht = 13.50 cm.
System just critical
Drain.

240.0 - 39.6 - 15.5
Core = 184.9 ¢

240 - 41.3 - 15.5 = 183.2 = 29.1

Core 24-0 & 24-1

Now have cores 24-0 & 24-1 assemble in small reflector tank. Inner core spaced .375" with plastic spacers.

1445 Water ht = 21.6 cm.
System sub critical.
Drain.

Core 24-0 & 24-1

Now have 2 fuel plates. 4 natural strips (#s 2, 3, 4, 5)

Water ht = ~~21.6~~ 21.6 cm
3 + Pen
t = 34.8 sec = 20.7 ¢

Water temp °C
#1 = 24.5 } 24.5
22.0 Room.

1520 Water ht = 12.8 cm
Kyoto just initial. 240 - ~~52.1~~ 52.8 - 20.7
240 - 55.1 - 20.7 = 164.2 ± 7.7 Core = 166.5 ¢ LL-.7

Removed natural strip #4 and called
Enriched strip #9. Power = 68.0 ± 5.6

Water ht = 21.6 cm
1535 + Pen
t = 136.9 sec = 7.7 ¢

1549 Water ht = 15.2 cm
Kyoto just initial 240 - ~~39.6~~ 65.6 - 25.7 - 7.7
Power Core = 167.0 ¢ LL-.7
240 - 68 - 7.7 = 164.3 ± 5.6

146

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	1"	✓	3×10^{-12}
	"	Fast ✓	"	✓	"
K-2		Meter			
		Fast			
R-1					
R-2					
PM-1	700 V	Alarm ✓	cont	✓	500 V
PM-2	1200 V	Low ✓	12"	✓	900 V
	"	Alarm ✓	3"	✓	"

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

DUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by ~~F.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-93

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

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

Red light on by AKM Time 0815

Start-up OK'd by F.D.C AKM Date 2-16-67

Cores 24-0 & 24-1

Now have 4 full plates. 7 enriched stripes (#s 2.3.4.7.8.9.10.) and 3 natural stripes (#s 2.3.5).

0900 Water lvl = 21.6 cm.
Lysten just critical.
Drain. 391.0 - 179.9 - 39.6
Core = 171.5 & 169.7
391 - 228. = 163.0 ± 20.6

Cores 15-0 & 15-1

Purpose is to check run made on 2-13-67 see page 137. Have 4 full plates. 6 enriched stripes (#s 2.3.7.8.9.10.) and 2 natural stripes (#s 2 & 4). ~~182.5~~ 187.5 ± 19.4

Water lvl = 21.6 cm
+ Per.
τ - 56.5 cm = 15.1 &

1015 Water lvl = 13.35 cm
Lysten just critical
Drain. 391.0 - 154.2 - 26.4 - 15.1
Core = 195.3
391 - 187.5 - 15.1 = 188.4 ± 19.4

water temp °C
wet/dam
~~182.5~~ = 22.2°C
Stop

148

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	–	Meter			
	–	Fast			
K-2	3 X 10 -12	Meter ~	30	~	3 x 10 -12
	"	Fast ~	"	~	"
R-1					
R-2					
PM-1	700 ~	Alarm ~	out	~	500 ~
PM-2	1200 ~	Low ~	10"	~	900 ~
	"	Alarm ~	3"	~	"

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

DUMP WELL PROBE LIGHT ———

START-UP CHECK LIST

Equipment checked by AHH. FIDC Personnel check by F.I.D.C

Instruments and safeties checked and reset by AHH C

Source in checked by AHH Source No. M-93

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

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

Red light on by AHH Time 0810

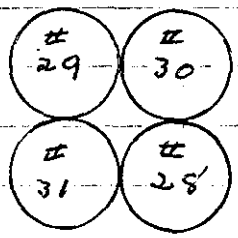
Start-up OK'd by F.I.D.C AHH Date 6-6-67

Cd experiments with H.F.I.R. Cores.

Feed rate = 4.6 cm/min.
Drain rate = 27.6 cm/min.
Dump rate = 39.4 cm/min.

Each element is assemble with the inner element spaced with .375" plastic spacer. (For air release). Cd in inner cores is mounted on 4.5" plexiglass tubing. (4.5" O.D.) The Cd is .060" thick on starts 3" above the bottom of the element and extends upward 20.0". The Cd on the ~~outer~~ outer element is spaced .250" from core with plastic spacers and starts 2.56" from bottom of the elements and extends upward 24.0". (In photos). Cd thickness on outer element = .030".

when H_2O = 56.3 Water is at top of fuel plates.
Have an 2 X 2 array. Elements are in contact.

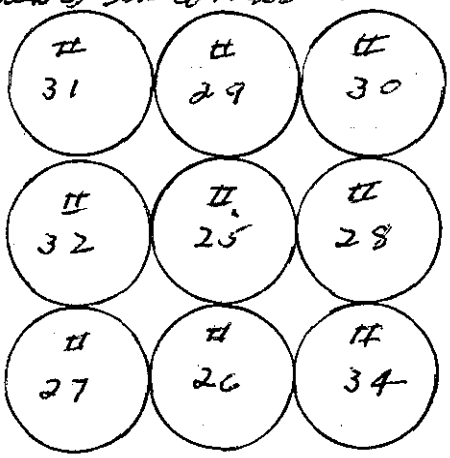


Water ht = 74.0 cm
System sub critical
Drain. Multiplication < 1.0

Water temp. °C
23.5°C

over.

Now have an 3 X 3 array as shown below. element is contact.



Water ht = 74.5 cm
Lupton sub critical
Assm. Multiplication < 1.0

Water temp °C
= 23.5°C

See H.F.I.R. Eq loads # 3.

151 152

Worth of Strips

No.	Natural Boron	No.	Enriched
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
		6	23.8
		7	23.8
		8	26.3
		9	26.3
		10	26.5
		avg.	25.7