

BOOK57R

Notes:

"HFIR # 3" on spine

Blank pages: inside front cover sheets, 1, 70, 167, 168, inside back cover sheets

-pages 18/19, 74/75, and 138/139 each have 1 green half sheet and smaller sheet stapled together
between the pages

-page 147 has small card glued to top (will staple down after scan)



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.

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

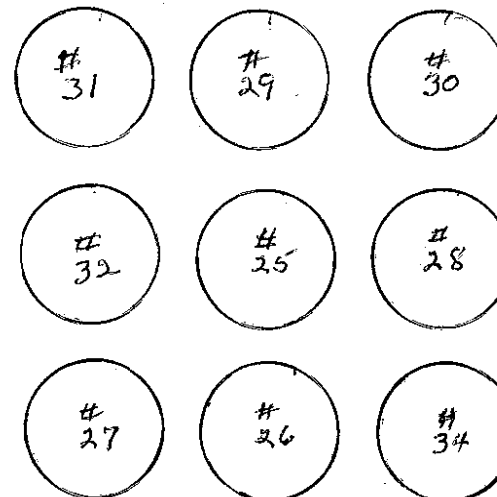
DUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by F.P.C. Personnel check by F.P.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 F.P.C.
 Instruments in trip circuit: K-1-2 PM-1-2
 Red light on by A.K.H. Time 1050
 Start-up OK'd by F.P.C. A.K.H. Date 9-5-67

See page's 149 - 150 in H.F.I.R. Log book #2.

Now have on 3x3 array as shown below.
 Element separation = .50" (between wires & surfaces)



1128 Water ht = 74.0 cm
 System sub critical.
 $\rho_{\text{max}} = \frac{1}{m} = 2.10$

1350 Now have the above array separated 1.0" *as shown*
 1417 Water ht = 74.0 cm
 System sub critical
 $\rho_{\text{max}} = \frac{1}{m} = 2.05$

9-6-67 Water sample from H.F.I.R. dump tank.

Reg # 684520

Obs for:

1 - 9/9

2 - Rego 40

INSTRUMENT CHECK

INSTRUMENT	RANGE	SET	STARTUP RANGE
K-11	3.810-12	✓	3.810-12
"	"	✓	"
K-21	"	✓	"
"	"	✓	"
R-1		✓	
R-2			
PM-1	700V	✓	5000
PM-2	1200V	✓	9000
"	"	✓	"
LOGS - CALIB. VC		✓	B-80
DUMP WELL PULSE LIGHT			

START-UP CHECK LIST

Equipment checked by 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 F.D.C.
 Instruments in trip circuit: K-1-2 DMA-1-2
 Red light on by AKM Time 0815
 Start-up OK'd by F.D.C. AKM Date 9-7-67

Fuel rate = 3.1 ^{cm}/min

3/4" Inlet rate = 9.8 ^{cm}/min

3" dump rate = 40.6 ^{cm}/15 sec.

1.20 lit. on scale.

9.9 cm outer element fuel plate covered.

10.6 cm inner element fuel plate covered.

Have cones #^s 26-0 & 26-1 accessible in small reflector tank, inner cone spaced 1.375" with plastic spacers.

1000 Water ht = 21.7 cm

System sub critical
 Drain

Temp °C

22.9 °C

1500 Core #26-0 - 26-1

Have spent fuel element with 4 fuel plates
D-3224 D-5495 + D-3242 D-2870. + 6
enriched strips #^s 2,3,7,8,9,10. and 3 natural
strips #^s 2,3,4.

Water ht = 22.0 cm $\Delta h = 5.5 \text{ cm}$ water
Temp $^{\circ}\text{C} = 23.1^{\circ}\text{C}$
(1) + Pen
 $E = 273.8 \text{ cm} = 4.24 = .764/\text{cm}$

1540 Water ht = 16.5 cm Core = 391 - 155.9 - 39.6 - 4.2
System just critical = 191.34 \pm 20.14
Drain

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE	START-UP RANGE
K-1	3 K10 ⁻¹²	Met	2"	3 K10 ⁻¹²
"	"	Exp	"	"
K-2	"	Met	"	"
"	"	Exp	"	"
R-1				
R-2				
PM-1	700V	Alarm	Cent	500V
PM-2	1200V	Low	18	900V
"	"	Alarm	9	"

LOG N CALIBRATE OPERATE SOURCE No. 13-80
DUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by AKM Personnel check by FIDC
Instruments and safeties checked and reset by AKM
Source in checked by AKM Source No. M-43
Emergency equipment in control room checked by FIDC
Instruments in trip circuit: K-1-2 PM-1-2
Red light on by AKM Time 0825
Start-up OK'd by FIDC AKM Date 9-8-67

0830 Core #26-0 - 26-1.

Have spent fuel element with 2 fuel plates
D-3224 + D-5495 + 4 natural strips #^s 2,3,4,5

0927 Water ht = 22.0 cm Temp $^{\circ}\text{C} = 23.3^{\circ}\text{C}$
System sub critical
Drain

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

1000 Water ht = 22.0 cm $\Delta h = 1.90 \text{ cm}$
(1) + Pen
 $E = 1065.0 \text{ cm} = 1.14 = 1.24/\text{cm}$
Core = 240 - 39.6 - 8.04 - 1.1

1020 Water ht = 19.10 cm
System just critical
Drain
= 191.26 \pm 9.24

CE-2 - Core.
Standard.

Have CE-2 core with spent fuel element with
4 fuel plates, #s D-3224, D-5495, D-3242, D-2870.
Also have 3 enriched strips #s 4, 8, 10, and 1
natural strip # 2.

1255 Water ht = 22.3 cm $\Delta L = 9.6 \text{ cm}$ Temp $^{\circ}\text{C}$
+ Per 23.2 $^{\circ}\text{C}$
 $\tau = 89.09 \text{ sec} = 10.8 \text{ } \phi = 1.11 \text{ } \mu\text{m}$

1304 Water ht = 12.7 cm 391 - 92.20 - 10.80
System just critical Core = 288.0 ϕ
Drain.

Core 27-0 & 27-1

1355 Core 27-0 & 27-1 overable in small reflection
tank. Lower core spaced .375" with plastic
spacers.

1421 Water ht = 22.0 cm Temp $^{\circ}\text{C}$
System sub critical 23.5 $^{\circ}\text{C}$
Drain.

Core 27-0 - 27-1

Have spent fuel element with 4 fuel plates
#s D-3224, D-5495, D-3242, D-2870, +
6 enriched strips #s 2, 3, 7, 8, 9, 10, and 3 natural
strips #s 2, 3, 4.

1522 Water ht = 22.1 cm Temp $^{\circ}\text{C}$
System slightly sub critical 23.5 $^{\circ}\text{C}$
Drain.

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

1535 Water ht = 22.1 cm $\Delta L = 7.18 \text{ cm}$ Temp $^{\circ}\text{C}$
+ Per 3 23.5 $^{\circ}\text{C}$
 $\tau = 140.16 \text{ sec} = 7.5 \text{ } \phi = 1.11 \text{ } \mu\text{m}$

1545 Water ht = 15.0 cm Core = 391.00 - 186.32 - 7.5
System just critical = 196.98 $\phi \pm 19.5 \text{ } \phi$
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE D. RANGE	SET	START-UP RANGE
K-1	3 x 10 ⁻¹²	Meter	2"	✓	3 x 10 ⁻¹²
"	"	"	"	✓	"
K-2	"	Meter	"	✓	"
"	"	"	"	✓	"
R-1					
R-2	700 V				
PM-1	500 V	Alarm	cont.	✓	500 V
PM-2	200 V		18"	✓	200 V
"	"	Alarm	4"	✓	"

LOG N CALIBRATE OPERATE SOURCE No. B-80

DUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by AKK Personnel check by FID.C
 Instruments and safety checked and reset by AKK
 Source in checked by AKK Source No. M-23
 Emergency equipment checked by FID.C
 Instruments in trip set at: K-1-2 PM-1-2
 Red light on by AKK Time 0820
 Start-up OK'd by FID.C AKK Date 9-1-67

Core 27-0-27-1

Have spent fuel element with 2 fuel plates
 #³P-3224 + 0-5495, + 3 natural atypoc #³2.3.4.

0930 Water ht = 22.10 cm ^{2.5 = 5.7 cm} Temp °C
 + Pres
 C = 249.90 mm = 4.64 = .914 cm 23.3 °C

0945 Water ht = 16.40 cm core = 240.00 - 39.60 - 4.6
 System just critical = 195.80 f ± 9.1
 Drain.

Repeat of + Pres + critical ht

10.00 Water ht = 22.20 cm ^{2.6 = 5.5 cm} Temp °C
 + Pres
 C = 262.93 mm = 4.44 = .804 cm 23.2 °C

10.18 Water ht = 16.70 cm core = 240.00 - 39.60 - 4.4
 System just critical = 196.00 f ± 9.1
 Drain.

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	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 AKW Personnel check by F.P.C.
 Instruments and safeties checked and reset by AKW
 Source in checked by AKW Source No. 10-43
 Emergency equipment in control room checked by F.P.C.
 Instruments in trip circuit: K-1-2 PM-1-2
 Red light on by AKW Time 1330
 Start-up OK'd by F.P.C. AKW Date 9-15-67

Note

Cones 34-0 + 34-1 are with-out "Combs", all absorbing strips are will be centered at top and bottom of outer element.
 Cones 34-0 + 34-1 assemble in small reflector tanks. Inner core spaced .375" with plastic spacers.

1415 Water ht = 22.20 cm. Temp °C
 System not critical 23.0°C

Have spent fuel element with 2 fuel plates #S D-3224 + D-5495 + 3 natural strips #S 2,3,4.

1511 Water ht = 22.20 cm. Temp °C
 dh = 9.20 cm
 + Per = 23.2°C
 S = 33.6 g/sec = 21.14 g = 2.34 g/cm.

1525 Water ht = 13.00 cm. Core = 240.00 - 39.60 - 21.14
 System just critical = 179.26 g ± 9.1 g
 Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-13	X10 ⁻¹²	Meter ✓	1"	3 X10 ⁻¹²	"
"	"	" ✓	"	"	"
K-2	"	Meter ✓	2"	"	"
"	"	" ✓	"	"	"
R-1					
R-2					
PM-1	700V	Alarm ✓	cont	500V	
PM-2	1200V	Low ✓	18"	900V	
"	"	Alarm ✓	3"	"	

LOG N CALIBRATE OPERATE SOURCE No. 13-80
 DUMP WELL PROBE LIGHT

START-UP CHECK LIST
 Equipment checked by MMH Personnel check by LTC
 Instruments and safeties checked and reset by MMH
 Source in checked by MMH Source No. M-43
 Emergency equipment in control room checked by LTC
 Instruments in trip element: K-1-2 M-1-2
 Rod light on by MMH Time 0825
 Start-up OK'd by LTC Date 9-18-57

Cover 34-0 + 34-1

Have spent element with 2 fuel plates #
 D-3224 + D-5495 + 4 natural strips # 5
 2, 3, 4, 5.

Water ht = 22.30 cm, $\Delta h = 7.0$ cm Temp °C
 + Per $C = 130.38 \mu\text{m} = 4.0 \mu\text{m} = 1.1 \mu\text{m/cm}$ 23.2 °C

0918 Water ht = 15.30 cm Temp = 240.0 - 52.6 - 9.0
 System just critical = 179.40 ± 9.84
 Drain to ~10.0 cm. Repeat + Per.

Water ht = 22.50 cm
 + Per $C = 131.47 \mu\text{m} = 4.0 \mu\text{m} = 1.1 \mu\text{m/cm}$

0934 Water ht = 15.35 cm Temp °C
 System just critical 23.2 °C
 Drain. $C = 240.00 - 52.6 - 9.0$
 = 179.40 ± 9.84

1025 Have spent element with 4 fuel plates # 5
 D-3224 + D-5495 + D-3242 + D-2870. +
 6 enriched strips # 2, 3, 7, 8, 9, 10, and 3 natural
 strips # 2, 3, 4.

over

Water ht = 22.20 cm $OD = 8.45 \text{ cm}$
³+Per Temp °C
 $T = 67.36 \text{ sec} = 13.3 \phi = 1.6 \phi/\text{cm}$ 23.2 °C

1100 Water ht = 13.75 cm Core = 391.00 - 155.90 - 39.60 - 13.30
 System just critical = 182.20 ϕ \pm 20.1 ϕ
 Drain.

1300 added 4 stainless steel strips:

Water ht = 22.30 cm Temp °C
⁴+Per 23.2 °C
 $T = 132.55 \text{ sec} = 7.9 \phi = 2.1 \phi/\text{cm}$

1345 Water ht = 15.10 cm.
 System just critical
 Drain. Core = 391.00 - 155.90 - 39.60 - 5.06 - 7.90
 = 182.24 ϕ \pm 20.3 ϕ

(Check on core with 2 fuel plates.)

1425 Have spent fuel element with 2 fuel plates #^s
 D-3224, D-5445 + 3 natural strips #^s 2, 3, 4, + 4
 stainless steel strips,

Water ht = 22.30 cm $OD = 8.85 \text{ cm}$
⁵+Per
 $T = 52.15 \text{ sec} = 15.9 \phi = 1.8 \phi/\text{cm}$

1508 Water ht = 13.45 cm
 System just critical
 Drain.

Core = 240.00 - 39.60 - 5.36 - 15.90
 = 179.14 ϕ \pm 9.8

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1.3	110 ⁻¹²	Meter ✓	1"	-	3 x 10 ⁻²
"	"	Fast ✓	"	-	"
K-2	"	Meter ✓	2"	-	"
"	"	Fast ✓	"	-	"
R-1					
R-2					
PIA-1	700V	Alarm ✓	cont	-	500V
PIA-2	1200V	Low -	18"	-	800V
		Alarm ✓	3"	-	"

LOG N CALIBRATE OPERATE SOURCE No. 13-8

DUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by F.V.C. AKK Personnel check by F.I.D.S.
 Instruments and safeties checked and reset by AKK
 Source in checked by AKK Source No. M-43
 Emergency equipment in control room checked by F.I.D.S.
 Instruments in trip circuit: K-1-2 PIA-1-2
 Red light on by AKK Time 0835
 Start-up OK'd by F.I.D.S. AKK Date 9-19-67

Conds 25-0 & 25-1

Conds 25-0 & 25-1 ensemble in small reflector tank. Inner core spaced .375" with plastic spacers.

0914 Water ht = 22.30cm Temp °C
 System sub critical
 Drain. 23.2°C

Have spent fuel element with 2 fuel plates #^SD-3224 & D-5495 + 4 natural strips #^S2,3,4,5.

Water ht = 22.30cm Temp °C
 + Res 23.5°C
 S = 136.90 cm = 7.7¢ = 1.1¢/cm.

1040 Water ht = 15.40cm
 System just critical Cond = 299.00 - 52.60 - 7.70
 Drain. = 179.70¢ = 9.8¢

1330 Have spent fuel element with 4 fuel plates #^SD-3224, D-5495, D-3242, D-2870. + 6 enriched strips # 2,3,7,8,9,10. and 3 natural strips #^S2,3,4,4.

REQUISITION 684520

Ⓢ

100 000 0 01 01 00

REPORT TO A.K. Ready
 BUILDING NO. 9213
 PHONE NO. 3-5237

SPECTROGRAPHIC REPORT

MATERIAL TYPE		DATE		BATCH NUMBER		PLATE SHEET NO.		REQUISITION NO.	
Reflector H20		9/15/67		#1		17038		684520	
TYPE SPEC.		REPORTING BASIS							
<input type="checkbox"/> N. C.		<input type="checkbox"/> ppm as received		<input type="checkbox"/> ppm metal basis		<input type="checkbox"/> µg/ml as received			
<input type="checkbox"/> PYRO		<input type="checkbox"/> ppm - U ₃ O ₈ basis		<input type="checkbox"/> % metal basis		<input checked="" type="checkbox"/> other <u>µg/g</u>			
1	Ag	<.1	Al	<.1	B	<.1	Ba	<.1	
	Be	<.10	Ca	.3	Cd	<.1	Co	<.2	
	Cr	<.1	Cu	<.1	Fe	<.1	K	<.2	
2	Li	<.1	Mg	<.1	Mn	<.1	Na	1	
	Ni	<.4	P	<.10	Pb	<.1	Si	<.1	
	Sn	<.1	Ti	<.6	V	<.1			
3	As	<.1	Au	<.1	Bi	<.1	Cs	<.6	Hg
	Ga	<.1	Ge	<.1	Hf	<.1	In	<.1	Re
			Nb	<.1	Pd	<.6	Rb	<.2	Ta
4	Sb	<.1	Sr		Th	<.4	Tl	<.1	U
	W	<.1	Zn	<.6	Zr	<.2			
5	C ¹		Mo	<.1	F*		O*		
	C/Q		Mo ¹						

1 ppm as received basis
 * factor, not actual analysis

0	0	0	0	0	0	0	0	0	8	g U/g
										g Ay/g
										g D/g
										g H/g
										g Mo/g
										g F/g
										SPEC.
										ASSAY

<i>Jh</i>	REPT. BY
9-11-67	DATE
	DEPT.

7

Core 25-0 & 25-1

Water ht = 22.30 cm
 + Res
 $T = 58.67 \text{ mm} = 14.7 \text{ f} = 1.7 \text{ H/cm}$

$\Delta L = 8.8 \text{ cm}$
 Temp $^{\circ}\text{C}$
 23.7 $^{\circ}\text{C}$

1403 Water ht = 13.50 cm

System just critical
 Drain.

$\text{Core} = 391.00 - 155.90 = 39.60 - 14.70$
 $= 180.80 \text{ f} \pm 20.1 \text{ f}$

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 ✓	2"	✓	"
"	"	Fast ✓	"	✓	"
R-1					
R-2					
PM-1	700V	Alarm ✓	cont	✓	500V
PM-2	1200V	Low ✓	18"	✓	900V
"	"	Alarm ✓	3"	✓	"

LOG N CALIBRATE OPERATE SOURCE No. B-80

DUMP WELL FREE LIGHT

START-UP CHECK LIST

Equipment checked by AKK Personnel check by AKK
 Instruments and safeties checked and reset by AKK
 Source in checked by AKK 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 AKK Time 0810
 Start-up OK'd by F.D.C AKK Date 9-20-67

Cores 28-0 + 28-1

Cores 28-0 + 28-1 assemble in small reflector tank. Inner core spaced .375" with plastic spacers.

0948 Water ht = 22.30 cm Temp °C
System sub critical
Chain: 23.3 °C

Have spent fuel element with 4 fuel plates # D-3224, D-5495, D-3242, D-2870. + 6 enriched strips # 2, 3, 7, 8, 9, 10. and 3 natural strips # 5, 2, 3, 4.

0930 Water ht = 22.30 cm $\Delta L = 3.70 \text{ cm}$ Temp °C
+ Per 23.5 °C
 $\epsilon = 706.23 \text{ sec} = 1.84 = .494/\text{cm}.$

0950 Water ht = 18.60 cm
System just critical
Chain: Core = 391.00 - 153.90 - 39.60 - 1.80
= 193.70 f ± 20.1 f

Have spent fuel element with 2 fuel plates # 3 D-3220 + D-5495. + 3 natural strips # 2, 3, 4.

1046 Water ht = 22.30 cm $\Delta L = 6.90 \text{ cm}$ Temp °C
+ Per 23.5 °C
 $\epsilon = 142.38 \text{ sec} = 7.44 = 1.17/\text{cm}$

Cores 28-0 + 28-1

1058 Water ht = 15.40 cm
System just critical
Chain: Core = 240.00 - 39.60 - 7.40
= 193.00 f ± 9.1 f

" Cores 32-0 + 32-1 "

1300 Now have cores 32-0 + 32-1 assemble in small reflector tank. Inner core spaced .375" with plastic spacers.

Water ht = 22.40 cm Temp °C
System sub critical 23.6 °C
Chain:

Have spent fuel element with 2 fuel plates # 3 D-3224, D-5495. + 4 natural strips # 2, 3, 4, 5.

1415 Water ht = 22.40 cm Temp °C
System sub critical 24.0 °C
Chain:

avr:

Cone 32-0 + 32-1

Removed natural strip #2.

1443 Water ht = 22.30 cm
 - Per
 $t = -782.28 \text{ sec} = -1.74$

Temp °C
 24.0°C

$$\text{Cone} = 240.00 + 1.70 = 39.30$$

$$= 202.40 \text{ f}$$

1455 Removed natural strip #3. And added 4 stainless steel strips. Now have 2 fuel plates. 2 natural strips #4, + 5. + 9 stainless steel strips.

1520 Water ht = 22.30 cm
 + Per.
 $t = 199.92 \text{ sec} = 5.6 \text{ f}$

Temp °C
 24.0°C

1530 Water ht = 16.10 cm
 System just critical
 Drain

$$\text{Cone} = 240.00 - 26.30 - 5.36 - 5.60$$

$$= 202.74 \text{ f} \pm 8.5 \text{ f}$$

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	5×10^{-12}	Meter ✓	50"	✓	3×10^{-12}
"	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	2.0"	✓	"
"	"	Fast ✓	"	✓	"
R-1					
R-2					
PM-1	700V	Alarm ✓	cont.	✓	500V
PM-2	1200V	Low ✓	18"	✓	900V
"	"	Alarm ✓	3"	✓	"

LOG N CALIBRATE OPERATE SOURCE No. D-80

DUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by AKM Personnel check by F.P.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.P.C.
 Instruments in trip circuit: K-1-2 PM-1-2
 Red light on by AKM Time 0810
 Start-up OK'd by F.P.C. AKM Date 9-21-67

Cores 32-0 + 32-1

Have spent fuel element with 2 fuel plates #^s D-3224, D-5495. + 2 natural strips # 4 + 5, and 4 stainless steel strips. Repeat of last experiment shown on bottom of page 24.

Water hts = 22.60 cm $\Delta h = 6.30$ cm Temp °C 23.5°C
+ Per
 $\tau = 228.17 \text{ sec} = 5.0 \text{ } \phi = 1.3 \text{ } \phi/\text{cm}$

0903 Water hts = 16.30 cm
System just critical
Drain. Core = 240.00 - 26.30 = 5.36 - 5.04
= 2.03, 34 ϕ ± 8.54

Have spent fuel element with 4 fuel plates # D-3224, D-5495, D-2870, D-3242. + 6 enriched strips #^s 2, 3, 7, 8, 9, 10 + 2 natural strips #^s 4 + 5.

0955 Water hts = 22.40 cm $\Delta h = 6.10$ cm Temp °C 23.5°C
+ Per
 $\tau = 247.79 \text{ sec} = 4.6 \text{ } \phi = 1.3 \text{ } \phi/\text{cm}$

1012 Water hts = 16.30 cm
System just critical
Drain. Core = 2391.00 - 155.90 - 26.30 - 4.60
= 204.20 ϕ ± 19.44

Cores 30-0 + 30-1

Now have cores # 30-0 + 30-1 assembled in small reflector tank. Inner core spaced .375" with plastic spacers.

1116 Water hts = 22.40 cm Temp °C 23.5°C
System sub critical
Drain.

Have spent fuel element with 4 fuel plates # D-3224, D-5495, D-3242, D-2870. + 6 enriched strips # 2, 3, 7, 8, 9, 10 + 3 natural #^s 2, 3, 4.

1410 Water hts = 22.40 cm Temp °C 24.0°C
System sub critical

Removed natural strip # 3.

1440 Water hts = 22.40 cm Temp °C 24.0°C
+ Per
 $\tau = 956.12 \text{ sec} = 1.3 \text{ } \phi$

1456 Water hts = 19.20 cm
System just critical
Drain. Core = 391.00 - 155.90 - 26.60 - 1.30
= 207.20 ϕ ± 19.44

Cone 30-0 + 30-1

Have spent fuel element with 2 fuel plates
D-3 229, P-5495 + 2 natural strip # 2.4.

1529 Water ht = 22.40 cm
+ Pres.
 $\tau = 130.38 \text{ sec} = 8.0 \text{ f}$

1540 Water ht = 15.30 cm.
System just critical
Drain -
 $\text{Cone} = 290.00 - 26.6 - 8.0$
 $= 205.40 \text{ f} = 8.4 \text{ f}$

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	-Meter <input checked="" type="checkbox"/>	50"	<input checked="" type="checkbox"/>	3×10^{-12}
"	"	Fast <input checked="" type="checkbox"/>	"	<input checked="" type="checkbox"/>	"
K-2	"	Meter <input checked="" type="checkbox"/>	2.0"	<input checked="" type="checkbox"/>	"
"	"	Fast <input checked="" type="checkbox"/>	"	<input checked="" type="checkbox"/>	"
R-1					
R-2					
PM-1	700V	Alarm <input checked="" type="checkbox"/>	cont	<input checked="" type="checkbox"/>	500V
PM-2	1200V	Low <input checked="" type="checkbox"/>	18"	<input checked="" type="checkbox"/>	900V
"	"	Alarm <input checked="" type="checkbox"/>	3"	<input checked="" type="checkbox"/>	"

LOG N CALIBRATE OPERATE SOURCE No. D-80

DUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by AKH Personnel check by FID.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 FID.C
 Instruments in trip circuit: K-1-2 PM-1-2
 Red light on by AKH Time 0825
 Start-up OK'd by FID.C AKH Date 9-22-67

Cores 31-0 + 31-1

Have cores 31-0 & 31-1 assemble in small reflector tank. Inner core spaced .375" with plastic spacers.

0907 Water ht = 23.00 cm, Temp °C
System sub critical
Drain: 23.5°C

Have spent fuel element with 2 fuel plates # 6 - 3224, D-5495. + 3 natural strips # 2, 3, 4.

0930 Shut down: trouble with feed ~~switch~~ ^{switch}.

1017 Water ht = 22.60 cm.
+ Per:
C = 999.58 cm = 1.3¢

1040 Water ht = 19.70 cm
System just critical
Drain: C = 240.00 - 39.60 - 1.30
= 199.10 ± 9.1¢

Cores 31-0 + 31-1

Have spent fuel element with 4 fuel plates # 0-3224, D-5495, D-3242, D-2870. + 6 enriched strips # 2, 3, 7, 8, 9, 10. + 2 natural strips # 3, 4.

1126 Water ht = 22.60 cm, Temp °C
+ Per: 24.0°C
C = 165.15 cm = 6.6¢

1140 Water ht = 15.60 cm
System just critical
Drain: C = 391.00 - 155.90 - 20.70 - 6.6
= 202.20¢ ± 19.4¢

Cores 29-0 + 29-1

1300 Have cores 29-0 + 29-1 assemble in small reflector tank. Inner core spaced .375" with plastic spacers.

1340 Water ht = 22.40 cm
System sub critical
Drain:

Cows 29-0 + 29-1

Have spent fuel element with 4 fuel plate.
 # D-3224, D-5495, D-3242, D-2572, + 6
 enriched strips #^s 2, 3, 7, 8, 9, 10, + 2 natural
 strips #^s 3, 4, and 4 stainless steel strip.

1438 Water ht = 22.40cm
 + Per. Temp °C
 t = 120.60mm 8.5¢ = 27.0°C

1445 Water ht = 14.90cm
 System just critical
 Chain. Conc = 391.00 - 155.90 - 26.30 - 5.26 - 8.5
 = 194.94¢

Have spent fuel element with 2 fuel plate
 #^s D-3224, D-5495, + 2 ^{#304} natural strips and
 4 stainless steel strips.

1525 Water ht = 22.30cm
 + Per. Temp °C
 t = 51.07mm = 16.2¢ = 29.2°C

1531 Water ht = 13.40cm
 System just critical
 Chain. Conc = 240.00 - 26.30 - 5.26 - 16.2
 = 792.14¢

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3X10 ⁻¹²	Meter -	1.50"	-	3X10 ⁻¹²
"	"	Fast -	"	-	"
K-2	"	Meter -	2"	-	3X10 ⁻¹²
"	"	Fast -	"	-	"
R-1					
R-2					
PM-1	700V	Alarm -	cont.		500V
PM-2	1200V	Low -	18"		900V
"	"	Alarm -	3"		"

LOG N CALIBRATE OPERATE SOURCE No. B-80

DUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by AKM Personnel check by FIDC
 Instruments and safeties checked and reset by AKM
 Source in checked by AKM Source No. M-43
 Emergency equipment in control room checked by FIDC
 Instruments in trip circuit: K-1-2 PM-1-2
 Red light on by AKM Time 0830
 Start-up OK'd by FIDC AKM Date 9-24-67

Have core 39-0 + 39-1 assembled in small reflector tank. Inner element spaced .375" with plastic spacers.

0928 Water ht = 22.50 cm Temp °C
 System sub critical 22.5°C
 Drain

Have spent fuel element with 2 fuel plate #5
 D-3224 D-5495. + 2 natural strips #2, 4, 5.

Water ht = 22.50 cm
 + Per
 $T = 152.11 \text{ cm} = 7.0\phi$

1023 Water ht = 15.60 cm Temp °C
 System just critical 22.7°C
 Drain core = 240.00 - 26.30 - 7.0
 = 206.70 ± 8.4φ

Have spent fuel element with 4 fuel plate #5
 D-3224, D-5495, D-3242, D-~~5495~~²³⁷⁰, + 6 enriched strips # 2, 3, 7, 8, 9, 10 and 3 natural strips #2, 4, 5

1312 Water ht = 22.30 cm Temp °C
 2-Per $T = 221.65 \text{ cm} = 7.2\phi$ 23.0°C
 Drain: to 0.0 cm core = 391.00 + 7.20 - 155.90 - 39.60
 = 202.70 ± 20.10φ

Removed natural strip #5. and added 3 stainless steel strips.

1338 Water ht = 22.30 cm
 3-Per $T = 402.01 \text{ cm} = -3.6\phi$
 Drain: to 0.0 cm core = 391.00 + 3.60 - 155.90 - 26.60 - 4.02
 = 208.08 ± 19.50φ

Removed the 3 stainless steel strips.
 Now have 4 fuel plates, 6 enriched strips #2, 3, 7, 8, 9, 10 + 7 natural strips #2, 4.

1411 Water ht = 22.40 cm
 4-Per.
 $T = 2151.27 \text{ cm} = .60\phi$

1424 Water ht = 19.70 cm core = 391.00 - 155.90 - 26.60 - .60
 System just critical = 207.90 ± 19.4φ
 Drain

Cores 38-0 + 38-1

Have Cores 38-0 + 38-1 assembled in small
reflected tank, inner element spaced 375"
with plastic spacers.

1554 Water ht = 22.50 cm
System sub critical
Drain.

Temp °C
23.50 °C

INSTRUMENT CHECK

INSTRUMENT	RANGE	TAP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3x10 ⁻¹²	✓	.50"	✓	3x10 ⁻¹²
"	"	✓	"	✓	"
K-2	"	✓	2.0"	✓	"
"	"	✓	"	✓	"
R-1					
R-2					
PM-1	700V	Alarm ✓	cont	-	500V
PM-2	1200V	Low ✓	18"	-	900V
"	"	Alarm ✓	3"	-	"

LOG N CALIBRATE OPERATE SOURCE No. B-80

DUMP WELL PROBE LIGHT

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-43
 Emergency equipment in control room checked by F.D.C.
 Instruments in trip circuit: K-2 PM-1-2
 Red light on by AKH Time 0818
 Start-up OK'd by F.D.C. AKH Date 9-26-67

Cores 38-0 + 38-1

Have spent fuel element with 4 fuel plates #5
 D-3224, D-5495, D-3242, D-~~5495~~²⁸⁷⁰ + 6
 enriched strips # 2, 3, 7, 8, 9, 10, and 3 natural
 strips # 2, 4, 5.

0905 Water ht = 22.40 cm
System sub critical
Drain.

Temp °C
23.5 °C

Removed natural strip # 5.

0940 Water ht = 22.40 cm.

Temp °C
23.5 °C

-Per = -867.03 m = -1.6 f

ave = 391.00 + 1.60 - 155.90 - 26.60 = 210.10 ± 19.44

0955 Drain.

ave.

Removed enriched strip #3. And added natural strip #5.

New have. 4 fuel plates. 5 enriched strips #2, 7, 8, 9, 10. and 3 natural strips #2, 4, 5.

1014 Water ht = 22.40 cm Temp °C
 2 + Pres 23.5 °C
 t = 121.69 sec = 8.5 f

1023 Water ht = 15.00 cm Conc = 394.00 - 128.50 - 39.60 - 8.50
 System just critical
 Chain = 214.40 ± 19.6 f

New have spent fuel elements with 2 fuel plates #5
 D-3224, D-5445. + 1 enriched strip #4.

1.538 Water ht = 22.40 cm Temp °C
 3 + Pres 23.7 °C
 t = 174.93 sec = 6.3 f

Water ht = 15.90 cm
 System just critical
 Chain = 240.00 - 26.10 - 6.30
 = 207.60 f.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 X 10 ⁻¹²	Meter ✓	50"	-	3 X 10 ⁻¹²
"	"	Fast ✓	"	-	"
K-2	"	Meter ✓	2"	-	"
"	"	Fast ✓	"	-	"
R-1					
R-2					
PM-1	700 V	Alarm ✓	cont	-	500 V
PM-2	1200 V	Low -	18"	-	900 V
"	"	Alarm -	3"	-	"

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

START-UP CHECK LIST

Equipment checked by AKM FIDC Personnel check by FIDC
 Instruments and safeties checked and reset by AKM
 Source in checked by AKM Source No. M-23
 Emergency equipment in control room checked by FIDC
 Instruments in trip circuit: K-2, PM-1-2
 Red light on by AKM Time 0850
 Start-up OK'd by FIDC AKM Date 9-27-67

ack.

Cores 38-0 + 38-1

check

Repeat of last experiment described on page 38. 2 fuel plates and 1 enriched strip #4.

0940 Water ht = 22.40 cm. Temp °C
 + Per 23.5 °C
 C = 171.68 m = 6.4 f

Water ht = 16.00 cm
 System just critical
 Drain: C = 240.00 - 26.10 - 6.4
 = 207.50 m.

Repeat of experiment described on page 38. 4 fuel plates, + 5 enriched strips # 2, 7, 8, 9, 10 and 3 natural strips # 2, 4, 5.

Water ht = 22.40 cm Temp °C
 + Per 23.7 °C
 C = 103.22 m = 9.6 f

1050 Water ht = 14.65 cm
 System just critical
 Drain: C = 391.00 - 128.50 - 39.60 - 9.60
 = 213.30

Cores 25-0 + 25-1

check

9-27-67

Repeat of experiment (9/19/67) described on page 19.

Have spent fuel element with 2 fuel plates, # 1 - 3224, 1 - 5495, + 4 natural strips # 2, 3, 4, 5

Water ht = 22.40 cm Temp °C
 + Per 29.0 °C
 C = 116.26 m = 8.8 f

1536 Water ht = 15.00 cm
 System just critical
 Drain: C = 240.00 - 52.60 - 6.80
 = 176.60 f

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE	SET	START-UP RANGE
K-1	3 X 10 ⁻⁰²	Meter ✓	.50	✓	3 X 10 ⁻¹²
"	"	Dist ✓		✓	"
K-2	"	Meter ✓	3.0"	✓	"
"	"	Dist ✓	3.0"	✓	"
R-1					
R-2					
PM-1	700V	Alarm ✓	Cont		500V
PM-2	1200V	Low ✓	18"		900V
"	"	Alarm ✓	3"		"

LOG IN CALIBRATE OPERATE SOURCE No. B-50

DUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by AKM Personnel check by FID.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 FID.C
 Instruments in trip circuit: K-2 PM-1-2
 Red light on by AKM Time 1015
 Start-up OK'd by FID.C AKM Date 9-28-67

Cones 38-0 + 38-1

Checks

Have cones 38-0 + 38-1 assembled in small reflection tanks, however cone spaced, 375" with plastic spacers.

1045 Water ht = 22.60 cm Temp °C
 System sub critical 23.7 °C
 Drain.

Now have spent fuel element with 2 fuel plates # D-3224, D-5495 + 4 natural strips # 2,3,4,5

1314 Water ht = 22.40 cm Temp °C
 22.40 cm 23.8 °C
 System sub critical
 Drain too below center of cone?

Remained natural strips # 4, + 5. Have 2 fuel plates, natural strips # 2, + 3.

Water ht = 22.35 cm Temp °C
 ① + Per 24.0 °C
 T = 182.53 sec = 6.04

1350 Water ht = 16.10 cm
 System just critical core = 240.00 - 26.30 - 6.0
 Drain. = 207.70 ± 8.4 f

Core 38-0 + 38-1

Sheet

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

1510 Water ht = 22.40 cm Temp °C
 2 + Per = 24.0 °C
 v = 2260 uuv = .60 d

1528 Water ht = 20.20 cm
 System just critical
 Drain - core = 391.00 - 155.90 - 26.3 - .60
 = 208.20 d ± 19.4 d

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE RANGE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter	150"	-	3×10^{-12}
"	"	Fast	"	✓	"
K-2	"	Meter	2.0"	-	"
"	"	Fast	"	✓	"
R-1					
R-2					
PM-1	700 v	Alarm	Cont	-	500 v
PM-2	1200	Low	9"	-	900 v
"	"	Alarm	20"	-	"

LOG N CALIBRATE OPERATE SOURCE No. B-80

DUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by AKH Personnel check by Fidc
 Instruments and safeties checked and reset by AKH
 Source in checked by AKH Source No. M-43
 Emergency equipment in control room checked by Fidc
 Instruments in trip circuit: K-2 PM-1-2
 Red light on by AKH Time 0810
 Start-up OK'd by Fidc AKH Date 9-29-63

Cores 38-0 & 38-1
Under:

Have spent fuel element with 2 fuel plates
 # D-3224, D-5495, + Natural strips # 2, + 3.

Purpose is to check critical conditions. Also
 check the calibration of natural strip # 5.

Water ht = 22.40 cm Temp °C
 + Per 23.7 °C
 t = 195.57 sec = 5.74

0911 Water ht = 16.10 cm
 System just critical
 Drain to 0.0 cm core = 240.00 - 26.3 - 5.70
 = 208.00 ± 8.4 f

Removed natural strip #3, and added natural
 strip #5.

0933 Water ht = 22.50 cm Temp °C
 2 + Per 23.7 °C
 t = 195.57 sec = 5.74

0948 Water ht = 16.10 cm
 System just critical
 Drain: t = 240.00 - 26.3 - 5.70
 = 208.00 ± 8.4 f

Cores 38-0 - 38-1

Removed natural strips #2, + 5, and
 added enriched strip #3.

Water ht = 22.60 cm Temp °C
 3 + Per 23.8 °C
 t = 140.16 sec = 7.54

1018 Water ht = 15.60 cm
 System just critical
 Drain: core = 240.00 - 27.4 - 7.50
 = 205.10 ± 7.5 f

Cores 36-0 & 36-1

Have cores 36-0 & 36-1 ensemble in small
 reflector tank. Lower core speed .375"
 with plates spaced.

1337 Water ht = 22.40 cm Temp °C
 System sub critical 24.0 °C
 Drain:

over.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	110-12	Water ✓	cont	✓	3×10^{-12}
"	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	3"	✓	"
"	"	Fast ✓	"	-	"
R-1					
R-2					
PM-1	700V	Alarm ✓	150"	-	500V
PM-2	1200V	Low ✓	8"	-	900V
"	"	Alarm ✓	3"	✓	"
LOG N CALIBRATE ✓		OPERATE ✓		SOURCE No. <u>D-80</u>	
DUMP WELL FROBE LIGHT _____					

START-UP CHECK LIST

Equipment checked by AKM Personnel check by AKM
 Instruments and safeties checked and reset by AKM
 Source in checked by D.C. Source No. M-43
 Emergency equipment in control room checked by R.K.H.
 Instruments in trip circuit: K-2 - PM-1-2
 Red light on by AKM Time 0820
 Start-up OK'd by D.C. AKM Date 10-2-67

36-0 & 30-1

Have spent fuel element with 9 fuel plates #. D-3224, D-5495, D-3242, D-2870, + 6 enriched strips #. 2, 3, 7, 8, 9, 10, and 2 natural strips #. 2, 4, 5.

Water ht = 22.40 cm

+ Per.

$T = 1434.2 \text{ sec} = .89 \text{ f}$

Water ht = 19.90 cm

System just critical
 Chain.

Temp °C
 23.45°C

Core = $391.00 - 155.90 - 26.3 - .89$
 $= 207.91 \text{ f} \pm 19.4 \text{ f}$

Core 37-0 & 37-1

Have core 37-0 & 37-1 assembled in small reflector tank. Drive core spaced .375" with plastic spacers.

1230 Water ht = 22.50 cm
 System sub-critical
 Chain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DRAINAGE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	50"	✓	3×10^{-12}
"	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	2"	✓	"
"	"	Fast ✓	"	✓	"
R-1					
PM-1	700V	Alarm ✓	Cont	✓	500V
PM-2	1200V	Low ✓	18"	✓	900V
"	"	Alarm ✓	3"	✓	"

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

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-43
 Emergency equipment in control room checked by F.D.C.
 Instruments in trip circuit: K-2 PM-1-2
 Red light on by AKH Time 0815
 Start-up OK'd by F.D.C. AKH Date 10-3-67

Have spent fuel element with 2 fuel plates
 # 0-3224, 0-5895, + 4 natural strips
 # 2, 3, 4, 5. Outer core # 37-0. Inner core 25-1

Water ht = 22.50 cm Water Temp =
 1 - Per 23.5°C
 $T = -443.29 \text{ sec} = -3.24$

0904 Drain to 0.0 cm Core = $240.00 + 3.2 = 52.60$
 $= 190.604$

Removed natural strip #5, and added 1
 stainless-steel strip. Now have 2 fuel
 plates, 3 natural strips # 2, 3, 4, and 1
 stainless-steel strip.

Water ht = 22.40 cm Temp =
 2 - Per 23.5°C
 $T = 140.16 \text{ sec} = 7.54$

0938 Water ht = 15.40 cm.
 System just critical
 Over.
 Core = $240.00 - 39.60 - 1.34 = 7.50$
 $= 191.564$

avg:

Cover 25-0 + 37-1

Have spent fuel element with 2 fuel plates
D-3224, D-5495, + 1 natural strip # 2.
and 3 stainless steel strips. Outer end # 25-0
Inner end # 37-1.

Water ht = 22.60 cm
+ Per
T = 36.94 sec = 20.0 f

10 43 Water ht = 13.05 cm
System just critical
Drain.

$$\text{Count} = 240.00 - 13.3 - 4.02 - 20.00$$

$$= 202.68 \pm 7.7 \text{ f}$$

Cover 25-0 + 25-1 Check

Have spent fuel element with 2 fuel plates
D-3224, D-5495, + 9 natural strips # 5
2, 3, 4, 5.

Water ht = 22.40 cm
+ Per
T = 121.69 sec = 8.5 f
Temp °C = 23.7°C

Water ht = 15.05 cm
System just critical
Drain.

$$\text{Count} = 240.00 - 52.60 - 8.50$$

$$= 178.90 \pm 9.8 \text{ f}$$

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3X10 ⁻¹²	Meter -	1.0"	-	3X10 ⁻¹²
"	"	Fast -	"	-	"
K-2	"	Meter -	1.5"	-	"
"	"	Fast -	"	-	"
R-1					
R-2					
PM-1	700V	Alarm -	1"	✓	500V
PM-2	1200V	Low -	8"	-	900V
"	"	Alarm -	3"	✓	"

LOG IN CALIBRA.E OPERATE SOURCE No. 0-80
DUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by D.C. A.H.H. Personnel check by D.C.
Instruments and safeties checked and reset by A.H.H.
Source in checked by A.H.H. Source No. M-43
Emergency equipment in control room checked by D.C.
Instruments in trip circuit: ~~K-2~~ PM-1-2
Red light on by A.H.H. Time 0835
Start-up OK'd by D.C., A.H.H. Date 10-4-67

Now have cones 40-0 & 40-1 assembled in small reflector tanks. Inner cone spaced 3.75" with plastic spacers.

0915 Water ht = 22.40 cm Temp °C
 System sub critical 23.5°C
 Drain.

Have spent fuel element with 2 fuel plates # D-3224, D-5495, + 3 natural strips # 2, 3, 4.

Water ht = 22.60 cm Temp °C
 1-Per 23.7°C
 T = -734.37 m = -1.9 f

1006 Drain to 0.0 cm. Core = 240.00 + 1.9 = 241.9
 = 202.50 f

Removed natural strip #2, and added 1 stainless-steel strip. Now have 2 fuel plates, 2 natural strips # 3, 4, + 1 stainless-steel strip.

Water ht = 22.60 cm.
 2-Per
 T = 227.96 m = 5.0 f

1039 Water ht = 16.05 cm
 System just critical
 Drain. Core = 240.00 - 26.30 - 1.14 = 212.56
 = 207.36 f ± 8.4 f

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

1108 Water ht = 22.50 cm
 3-Per

Source in; Source out
 11038 Critical Water height 19.40 cm

Dump
 Core = 391 - 182.2 - 0.8 = 208.0 ± 19.4 f

Core 33-0 + 33-1

Have core 33-0 + 33-1 assemble in small reflector tank. Inner core spool .375" with plastic spacers.

1545 Water ht = 22.60 cm
System sub critical
Chain -

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1		Meter			
		Fast			
K-2		Meter			
		Fast			
R-1					
R-2					
PA-1		Alarm			
PA-2		Low			
		Alarm			

LOSEN CALIBRATE OPERATE SOURCE No. 13-80

DUMP-WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by _____ Personnel check by _____

Instruments and safeties checked and reset by _____

Source in checked by _____ Source No. _____

Emergency equipment in control room checked by _____

Instruments in trip circuit: _____

Red light on by _____ Time _____

Start-up OK'd by _____ Date _____

Core 33-0 + 33-1

Have spent fuel element with 4 fuel plates # D-3224, D-5495, D-3242, D-2870, + 6 enriched strips # 2, 3, 7, 8, 9, 10 and 2 natural strips # 3, 4.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 x 10 ⁻¹²	Motor ✓ F-1 ✓	Contact	✓	3 x 10 ⁻¹²
K-2	3 x 10 ⁻¹²	Motor ✓ F-1 ✓	1.5"	✓	3 x 10 ⁻¹²
R-1	—	—	—	—	—
R-2	—	—	—	—	—
PM-1	700 ✓	Alarm ✓	Contact	✓	500 ✓
PM-2	1200 ✓	Low ✓ Alarm ✓	1.5" 3"	✓ ✓	900 ✓

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 EG
 Source in checked by RKR Source No. M-40
 Emergency equipment in control room checked by EG
 Instruments in trip circuit: K-2 PM-1-2
 Red light on by RKR Time 0930
 Start-up OK'd by E.O.T. R. O. J. Date 10/5/67

1010 Water ht = 22.60 cm
+ Per

1028 Water ht = 19.90 cm Temp °C
 System just critical 23.6 °C
 core = 391.00 - 155.9 - 26.30 - 99 = 207.81 ± 19.4

1029 System scoured with scrom button. For O.P. W.C. ~~at~~ C.A. committee.

Have spent fuel element with 2 fuel plates # D-3224, D-5495, + 2 natural strips # 3, 4.

Water ht = 22.60 cm.
+ Per
C = 129.79 sec = 8.0 f

1030 Water ht = 15.40 cm. Temp °C
 System just critical 23.8 °C
 Drain. core = 240.00 - 26.30 - 9.0
 = 205.70 ± 8.4 f
 avg = 206.75 f ± 8.4 f

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3X10 ⁻¹²	Meter ✓	0.5"	✓	3X10 ⁻¹²
"	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	2"	✓	"
"	"	Fast ✓	"	✓	"
R-1					
R-2					
PM-1	7000	Alarm	Contact	-	5000
PM-2	12000	Low ✓	14"	✓	9000
"	"	Alarm ✓	3"	✓	"

LOG N CALIBRATE OPERATE SOURCE No. A-80

DUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by AKM Personnel check by AKM

Instruments and safeties checked and reset by EJ

Source in checked by AKM Source No. M-93

Emergency equipment in control room checked by AKM

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

Red light on by EJ Time 0900

Start-up OK'd by F. C. AKM Date 10/6/67

Cores 35-0 + 35-1

Have cores 35-0 + 35-1 assembled in small reflector tanks. Inner core spread .375" with plastic spacers.

1010 Water ht = 22.60 cm
System sub critical
Drain.

Now have fast fuel element with 2 fuel plates # D-3224, D-5495. + 2 natural strips # 3,4.

1105 Water ht = 22.50 cm Temp °C
+ PM
C = 59.76 new = 19.5¢
23.5°

1113 Water ht = 13.70 cm
System just critical
Drain.
C = 240.00 - 26.30 - 19.5¢
= 199.20¢ ± 8.4¢

over.

Cores 35-0 & 35-1

Now have spent element with 4 fuel plates # D-3224, D-5495, D-3242, D-2870, + 6 enriched strips # 2, 3, 7, 8, 9, 10, and 2 natural strips # 3, 4

Water ht = 22.70 cm
 27 per
 T = 159.72 sec = 6.6 f

1328

Water ht = 15.50 cm. Temp °C = 23.7°
 System just critical
 Drain.

Cores = 391.00 - 155.90 = 235.10 ± 6.80
 = 202.00 ± 19.4 f
 avg = 200.60 f

Cores 41-0 & 41-1

Have core ~~41-0~~ 41-0 & 41-1 assembly in small regulator tank, inner core spaced, 3.75" with plastic spacers.

Water ht = 22.60 cm Temp °C = 23.8°
 System sub critical
 Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	1.50"	✓	3×10^{-12}
"	"	Dist ✓	"	✓	"
K-2	"	Meter ✓	2.0"	✓	"
"	"	Dist ✓	"	✓	"
R-1					
R-2					
PM-1	700V	Alarm ✓	Cont	✓	500V
PM-2	1200V	Low ✓	12"	✓	900V
"	"	Alarm ✓	2"	✓	"

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

START-UP CHECK LIST

Equipment checked by AMV FIDC Personnel check by FIDC
 Instruments and safeties checked and reset by AMV
 Source in checked by AMV Source No. M-43
 Emergency equipment in control room checked by FIDC
 Instruments in trip circuit: K-2 PM-1-2
 Red light on by P.K.P. Time 0830
 Start-up OK'd by FIDC AMV Date 10-9-67

Cones 41-0 + 41-1

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

Water ht = 22.50 cm Temp °C
+ Pres. 23.5 °C
C = 116.26 ues = 8.8 f

0920 Water ht = 14.90 cm
System just critical
Crown. Core = 391.00 - 155.90 - 39.60 - 8.8
= 186.70 f ± 30.1 f

Now have spent fuel element with 2 fuel plates # D-3224, D-5495, + 2 enriched strips # 7,8.

Water ht = 22.50 cm Temp °C
+ Pres. 23.5 °C

1037 Water ht = 16.50 cm
System just critical
Crown. Core = 240.00 - 50.10 - 5.1
= 184.80 f ± 8.0 f

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-13	10 ⁻¹²	Alarm -	1"	-	3 x 10 ⁻¹²
"	"	Low -	"	-	"
K-2	"	Alarm -	"	-	"
"	"	Low -	"	-	"
R-1					
R-2					
PM-1	700 V	Alarm -	Cont	-	5000
PM-2	1200 V	Low -	12"	-	900 V
"	"	Alarm -	3"	-	"
LOG N CALIBRATE <input checked="" type="checkbox"/>		OPERATE <input checked="" type="checkbox"/>		SOURCE No. <u>B-80</u>	
DUMP WELL PROBE LIGHT <input type="checkbox"/>					

START-UP CHECK LIST

Equipment checked by F.D.C. Personnel check by F.D.C.
 Instruments and safeties checked and reset by AKLL
 Source in checked by AKLL 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 AKLL Time 1300
 Start-up OK'd by F.D.C. AKLL Date 4-16-68

CE-2 Core
Standard

4-16-68

Have CE-2 core in small refueling tank.
Purpose is to check water ht to top of fuel
plates for roding moment. Also feed and
Drain rates.

~~Feed rate~~ ~~Flow~~

Feed rate = 3.2 cm/min.

3/4" Drain rate = 10.2 cm/min.

3" dump rate = 21.8 cm/10 sec.

10 sec Water ht = 47.9 cm. Water even with
top of CE-2 fuel plates.

Have CE-2 with spent fuel element
installed. (Plates # D-3224, D-5495, D-3242
and D-2870. Have enriched strips # 9, 8, 10,
and 1 natural strip # 2.

Water ht = 60.60 cm
+ Rev.Temp °C
23.5 °C

C = 134.73 sec = 7.8 f

CWA = 391 - 92.20 - 7.8

1540 Water ht = 51.90 cm

= -291.0 f

System just critical
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1, 2	3×10^{-12}	—	1"	✓	3×10^{-12}
"	"	—	"	✓	"
K-2	"	—	"	—	"
"	"	—	"	—	"
R-1					
R-2					
PM-1	700V	Alarm —	Cont	—	500V
PM-2	1200V	Low —	12"	—	900V
"	"	Alarm —	3"	—	"
LOG IN CALIBRATE <input checked="" type="checkbox"/>		OPERATE <input checked="" type="checkbox"/>		SOURCE No. <u>B-80</u>	
DUMP WELL PROBE LIGHT <input type="checkbox"/>					

START-UP CHECK LIST

Equipment checked by F.D.C. Personnel check by F.D.C.
AKK
 Instruments and safeties checked and reset by AKK
 Sources in checked by AKK 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 AKK Time 0930
 Start-up OK'd by F.D.C. AKK Date 9-17-68

Cores # 47-0 & 47-1

Have core 47-0 & 1 ensemble in small reflector
 cans. Inner core spaced with .375" plastic
 spacers.

1030. Water ht = 59.75 cm
 System sub critical
 Over.

on back scale. { Top of outer element fuel plates = 48.3 cm
 " " inner " " " = 48.9 cm
 Top of spent fuel plates even with top of
 inner element fuel plates

Now have spent fuel element installed with
 4 fuel plates. # 0-3224, D-5495, D-3242
 & D-2870. Plus 6 enriched strips # 2, 3, 7, 8
 9, 10. And 2 natural strips # 3 & 4.

Total
 Water ht = 52.70 cm Temp °C
 + Per. 24.0 °C
 T = 41.29 sec = 18.6 °C

1114 Water ht = 50.15 cm
 System just critical
 Over.

over!

Cone 47-0 47-1

Added natural strips # 2.

Water ht = 60.30 cm
 + Per.
 $\bar{c} = 45.63 \mu = 17.4 \mu$ Temp °C
 24.0 °C

1131 Water ht = 51.50
 System just critical
 Drain. $\bar{c} = 391.00 - 155.90 - 39.60 - 17.40$
 $= 178.14 \pm 20.84 \mu$

Cone 47-0 47-1

Now have spent fuel element installed with
 2 fuel plates # D-3224; D-5495. Plus 4
 natural strips # 2, 3, 4, 5. and 4 stainless steel
 strips.

Water ht = 60.10 cm
 + Per
 $\bar{c} = 243.38 \mu = 4.7 \mu$ Temp °C
 24.1 °C

1452 Water ht = 55.00 cm
 System just critical
 Drain. $\bar{c} = 240.0 - 52.60 - 5.36 - 4.7$
 $= 177.34 \pm 9.88 \mu$

1500 Water sample taken.
 Rep # 684542.

ask for 779 -
 Repro 40 =

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-20
 DUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by AMM Personnel check by AMM
 Instruments and safeties checked and reset by AMM
 Source in checked by AMM Source No. M-93
 Emergency equipment in control room checked by FIO, C
 Instruments in trip circuit: K-1-2 PM-1-2
 Red light on by AMM Time 0805
 Start-up OK'd by FIO, C AMM Date 9-19-68

REQUISITION **684542**

6C

APR 24 1968

sent

REPORT TO A. K. Reed
 BUILDING NO. 2213
 PHONE NO. 3-5237

SPECTROGRAPHIC REPORT

MATERIAL TYPE <u>1/20</u>	DATE <u>4/22/68</u>	BATCH NUMBER	PLATE SHEET NO. <u>A-0338</u>	REQUISITION NO. <u>684542</u>
SPECTROCHEMICAL METHOD		REPORTING UNIT		REPORTING BASIS
<input type="checkbox"/> CARRIER (PYRO)	<input type="checkbox"/> COMPLETE BURN	<input type="checkbox"/> RARE EARTH	<input type="checkbox"/> $\mu\text{g/g}$ (ppm)	<input type="checkbox"/> AS-RECEIVED
<input type="checkbox"/> NO CARRIER	<input type="checkbox"/> SEMI-QUANT	<input type="checkbox"/> HIGH VOLTAGE SPARK	<input checked="" type="checkbox"/> $\mu\text{g/ml}$	<input type="checkbox"/> DRY
			<input type="checkbox"/> TOTAL μg	<input type="checkbox"/> METAL
<input type="checkbox"/> METAL				

* SPARK SOURCE MASS SPECTROGRAPH

Ag	<.01	Al	<.1	As	<.1	Au	<.01	B	.01	Ba	<.01
Be	<.01	Bi	<.1	Br		Co	.3	Cd	<.01	Co	<.2
Cr	<.01	Cs	<.6	Cu	<.1	Fe	<.1	Ga	<.01	Ge	<.01
Hf	<.1	Hg		In	<.01	Ir		K	<.2	Li	<.1
Mg	<.1	Mn	<.01	Mo	<.01	Na	2	Nb	<.01	Ni	<.04
Np		Os		P	<.1	Pb	<.01	Pd	<.06	Pt	
Pu		Rb	<.2	Re		Rh		Ru		S	
Sb	<.01	Sc		Se		Si	.2	Sn		Sr	
Ta		Te		Th	<.04	Ti	<.06	Tl		U	
V	<.01	W	<.1	Y		Zn	<.6	Zr	<.02		
Ce		Dy		Er		Eu		Gd		Ho	
La		Lu		Nd		Pr		Sm		Tb	
Tm		Yb									

UCN-260
(2-10-67)

Cores 42-0 - 42-1

Have cores 42-0 - 1 assembled in small
reflector tanks.

0853 Water ht = 60.50 cm Temp °C
System sub-critical 24.2°C
Drain.

Have spent fuel element installed with
2 fuel plates # D-3224, D-5495, plus 4
natural strips # 2, 3, 4, 5.

Water ht = 55.40 cm Temp °C
+Per 24.3°C
 $\bar{U} = 54.32 \text{ m} = 14.5 \phi$

0958 Water ht = 51.40 cm
System just critical
Drain.

Added 4 stainless steel strips.

Water ht = 60.20 cm Temp °C
+Per 24.3°C
 $\bar{U} = 65.19 \text{ m} = 13.60 \phi$

$$\begin{aligned} \text{Cores} &= 240.00 - 52.60 - 5.36 - 13.60 \\ &= 168.44 \end{aligned}$$

Water ht = 52.30 cm
System just critical
Drain.

Cores 42-0 - 42-1

Now have spent fuel element installed with
4 fuel plates, #s D-3224, D-5495, D-3242
D-2870. Plus 6 enriched strips #s 2, 3, 7, 8, 9, 10,
4 natural strips #s 2, 3, 4, 5, and 4 stainless
steel strips.

Water ht = 60.40 cm, $\bar{U} = 5.5 \text{ cm}$ Temp °C
+Per 24.5°C
 $\bar{U} = 245.55 = 4.7 \phi = .90 \phi/\text{cm}$

1343 Water ht = 54.85 cm
System just critical
Drain.

$$\begin{aligned} \text{Cores} &= 391.00 - 155.90 - 52.60 - 5.36 - 9.7 \\ &= 172.42 \text{ f} \end{aligned}$$

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 K10 ⁻¹²	Master ✓	1"	-	3 K10 ⁻¹²
"	"	Fast ✓	"	-	"
K-2	"	Meter ✓	"	-	"
"	"	Fast ✓	"	-	"
R-1					
R-2					
PM-1	700 V	Alarm -	cut	-	500 V
PM-2	1200 V	Low -	12"	-	900 V
"	"	Alarm ✓	3"	-	"

LOG N CALIBRATE OPERATE SOURCE B-80
 DUMP WELL PRG3E LIGHT

START-UP CHECK LIST

Equipment checked by F.D.C. Personnel check by F.D.C.
AKM
 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-1-2 PM-1-2
 Red light on by AKM Time 1505
 Start-up OK'd by F.D.C. AKM Date 4-23-68

Case 42-0-42-1

Have spent fuel element box installed. (No fuel plates). Have 6 enriched strips #2,3,7,8,9,10 & natural strips #2,3,4,5, and 4 stainless steel strips.

Response of man is to check for air or voids when fuel element is removed by remote control. (Fuel element box is attached to 1/8 ton hoist. Rate of travel = 32 ft/min.)

1535 Water ht = 60.60 cm
 System sub critical
 Drain.

1537 same back in.
 Fuel box removed.
 Water ht = 60.40 cm.
 System sub critical

1450 Drain:

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE D	SET	START UP
K-1	3×10^{-12}	Meter ✓	1"	✓	3×10^{-12}
"	"	Fst ✓	"	✓	"
K-2	"	Meter ✓	"	✓	Rhett Chamber
"	"	Fst ✓	"	✓	"
PM-1	300V	Alarm ✓	cont	✓	500V
PM-2	1200V	Fst ✓	12"	✓	900V
"	"	Alarm ✓	3"	✓	"
LOG IN CALIBRATE		OPERATE	SOURCE	NO.	12-80
DUMP WELL PROBE LIGHT					

START-UP CHECK LIST

Equipment checked by F.I.D.C. Personnel check by AKK
 Instruments and safeties checked and reset by AKK
 Sources in checked by AKK Source No. M-93
 Emergency equipment in control room checked by F.I.D.C.
 Instruments in trip circuit: K-1 PM-1-2
 Red light on by AKK Time 1230
 Start-up OK'd by F.I.D.C. AKK Date 4-24-68

Have spent fuel element installed with 4 fuel plates # D-3229, D-5495, D-3242, D-2870. Plus 6 enriched strips # 2,3,7,8,9,10. 4 natural strips # 2,3,4,5. and 4 stainless steel strips. (Top of spent fuel plates even with top of inner cone plate.) The spent fuel element is attached to 1/8 ton hoist. (Rate of travel = 32 ft/min.) Purpose of the following experiments is to check worth of spent fuel element when removed from H.F.I.R. cone, by measuring β per with Rhett instrument. The fuel box has 1/4" x 1" x 30 3/4" plastic strip taped on to act as guide in inner element. (2 on each corner)

Water ht = 60.65 cm $dL = 7.25$ cm Temp °C
 + Per 24.2 °C
 $\tau = 119.51 \mu = 8.6 \mu = 1.24$ /cm.

1322 Water ht = 53.40 cm
 System just critical
 Drain. $dL = 391.00 - 155.90 - 39.60 - 5.36 - 8.6 = 168.54$

Water ht = ^{60.70} 60.65 cm Temp °C
 + Per 24.2 °C
 $\tau = 118.43 \mu = 8.6 \mu$

1356 Drain:

Moved K-2 (Rohette) inside small reflector
tanks. ~ 5.5" from H.F.I.R. Core.

Water ht = 60.70 cm
³ + Per Log = 119.51 sec = 8.6¢

Temp °C
24.2°C

Rohette + Per = 9.1¢

1445 Spent fuel element removed: - Per
Rohette worth = 361.0¢

1455 Drain to ~ 36.00 cm and replaced
spent fuel element.

Water ht = 60.70 cm
⁴ + Per Log = 115.17 sec = 8.8¢
 Rohette + Per = 9.3¢

Temp °C
24.2°C

1509 Spent fuel element removed: - Per
Rohette worth = 361.0¢

Drain to ~ 36.00 cm and replaced spent fuel
element.

Water ht = 60.70 cm
⁵ + Per Log = 113.00 sec = 9.0¢
 Rohette + Per = 9.5¢

Temp °C
24.2°C

1530 Spent fuel element removed: - Per
Rohette worth = 361.0¢

(w.c. = 361 + 9.3 (avg) = 370.3¢

Drain: Outside center of H.F.I.R. Core read 120 mm.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K1	3×10^{-12}	Meter ✓	1"	-	3×10^{-12}
"	"	Fest ✓	"	-	"
K2	-	Meter			
"	-	Fest			
P-1					
PM-1	700V	Alarm ✓	Cont	-	500V
PM-2	1200V	Low -	12"	-	900V
"	"	Alarm -	3"	✓	"
LOG N CALIBRATE		OPERATE	SOURCE No. B-80		
DUMP WELL FROSE LIGHT					

START-UP CHECK LIST

Equipment checked by I.P.C. AKM Personnel check by E.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.P.C.
 Instruments in trip circuit: K-1 PM-1-2
 Red light on by AKM Time 0940
 Start-up OK'd by E.D.C. AKM Date 4-25-68

New spent fuel element with 2 fuel plates
 D-3224, D-5495, Plus 4 natural strips
 D-2.3, 4.5, and 4 stainless steel strips.

Water ht = 60.50 cm
 + Per

Temp °C = 29.2 °C

$t = 36.94 sec = 20.04$

1033 Water ht = 51.50 cm
 System just critical
 Drain.

Water ht = 60.70 cm
 2 + Per $t = 39.11 sec = 19.34$

1044 Spent fuel element removed: - Per
 Rockette worth = 203.24 + 18.95

Drain to ~ 21.00 cm and replaced spent fuel element.

Water ht = 60.70 cm
 3 + Per
 $t = 39.11 sec = 19.34$

1106 Spent fuel element removed: - Per
 Rockette worth = 203.65 + 18.64

over.

Drain to $\sim 37.0^{cm}$ and replaced spent fuel element.

Water ht = 60.70 cm

⁴+Per

$C = 41.29 \text{ sec} = 19.6 \text{ f}$ ~ 163.47

1120 Spent fuel element removed:
Rohette print-out did not work:
Drain.

1230 Replaced spent fuel element.

Water ht = 60.70 cm

⁵+Per

$C = 39.11 \text{ sec} = 19.3 \text{ f}$ ~ 163.47

Temp °C

24.3 °C

1335 Spent fuel element removed. - Per.
Rohette worth = 202.92 f
Core = 203.45 + 18.88 avg = 222.33 f

1350 Now have Rohette on K-1 channel chamber.
K-2 checked for sodium response.

Water ht = 60.70 cm

⁶+Per

$C = 39.11 \text{ sec} = 19.3 \text{ f}$

1420 Spent fuel element removed. - Per.

Rohette worth = 202.05 f

Core = 202.65 + 19.6 avg = 222.25 f

Drain to ~ 36.0 cm. Replaced spent fuel element, and moved Rohette chamber (~~K-1~~) to outside bottom of small reflector tank.

Water ht = 60.70 cm

⁷+Per

$C = 39.11 \text{ sec} = 19.3 \text{ f}$

1442 Spent fuel element removed. - Per.

Rohette worth = 210.05 f

Core = 210.05 + 19.7 = 229.75 f

Replaced spent fuel element.

Water ht = 60.70 cm

⁸+Per

$C = 39.11 \text{ sec} = 19.3 \text{ f}$

Temp °C

24.3 °C

1518 Spent fuel element removed: - Per.

Rohette worth = 208.41 f

Core = 208.41 + 19.73 = 228.14 f

Drain to ~ 36.0 cm

aver.

Replaced spent fuel element.

Water ht = 60.70 cm
 + Per
 $t = 39.11 \text{ sec} = 19.3 \text{ f}$

1543 Replaced spent fuel element removed: - Per.
 Robette worths = 208.77 f
 $\text{corr} = 208.77 + 19.85 = 228.62 \text{ f}$
 Drain:

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1 Robette		Meter			
		Fast			
K-2 3×10^{-12}		Meter	1"	✓	3×10^{-12}
"		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 AKM Personnel check by RRR
 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 circuits: K-2 PM-1-2
 Red light on by AKM Time 0810
 Start-up OK'd by F.D.C. AKM Date 4-26-68

aw's

Repeat of experiment described on pages 87 & 88.

Water ht = 60.80 cm

¹+Per.

Temp °C

24.1 °C

$$t = 41.29 \text{ sec} = 18.6 \text{ f}$$

0855 Removed spent fuel element ¹-Per.

$$\text{Rohette worth} = 209.34 + 19.42 = 228.76 \text{ f}$$

Drain:

Now have spent fuel element with 4 fuel plates $\#$ D-3224, D-5495, D-3242, D-2870, plus 6 enriched strips $\#$ 2, 3, 7, 8, 9, 10, 4 natural strips $\#$ 2, 3, 4, 5, and 4 stainless steel strips. Rohette chamber (K-1) still on outside bottom of small reflector tank.

0952 Water ht = 52.20 cm
System just critical

Water ht = 60.80 cm

²+Per

$$t = 52.15 \text{ sec} = 15.5 \text{ f}$$

1000 Removed spent fuel element ²-Per
Rohette worth = $379.89 + 12.76 = 392.65 \text{ f}$
Drain to \approx 36.0 cm. Replaced spent fuel element.

Water ht = 60.70 cm

³+Per.

$$t = 76.05 = 12.2 \text{ f}$$

1031 Removed spent fuel element ³-Per
Rohette worth = $376.82 + 12.72 = 389.54 \text{ f}$
Drain to \approx 36.0 cm. Replaced spent fuel element. and moved Rohette chamber (K-1) back in small reflector tank.

Water ht = 60.80 cm

⁴+Per

Temp °C

24.2 °C

$$t = 73.88 \text{ sec} = 12.4 \text{ f}$$

1120 Removed spent fuel element ⁴-Per
Rohette worth = $358.76 + 12.68 = 371.44 \text{ f}$

Drain.

Now have Rohette chamber (K-1) in an open top box made of .035" cd. (top = 5" x 6" x 20". Mounted at bottom (outside) of small reflector tank.

1509 Water ht = 52.20 cm
system just critical

Water ht = 60.70 cm
5 + Per Temp °C
24.3 °C
 $\tau = 73.88 \text{ sec} = 12.14 \text{ f}$

1522 Removed spent fuel element; - Per
Rohette count = $366.16 + 12.76 = 378.92 \text{ f}$

1528 Drain:

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SFT	START-UP RANGE
K-1 Rohette		Meter			
"		Foot			
K-2 3×10^{-12}		Meter	1"	-	3×10^{-12}
"		Foot	"	-	"
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 <input checked="" type="checkbox"/>		OPERATE <input checked="" type="checkbox"/>		SOURCE No. B-80	
DUMP WELL PROBE LIGHT <input type="checkbox"/>					

START-UP CHECK LIST

Equipment checked by AMF Personnel check by AMF
 Instruments and safeties checked and reset by AMF
 Source in checked by AMF Source No. M-43
 Emergency equipment in control room checked by F.D.C.
 Instruments in trip circuit: K-2 PM-1-2
 Red light on by AMF Time 0815
 Start-up OK'd by F.D.C. AMF Date 4-29-68

Cores 42-0 42-1

Repeat of experiment described on page 92.

0910 Water ht = 52.20 cm
System just criticalWater ht = 60.80 cm Temp °C
+ Per 24.0°C
C = 80.40 sec = 11.740922 Removed spent fuel element: - Per
Rohette worth = 360.74 + 11.91 = 372.65 f

Drain.

Moved Rohette chamber from bottom of
tank to side. Chamber covered with
cd box on three sides. (open side facing
core.)Water ht = 60.80 cm Temp °C
+ Per 24.0°C
C = 78.23 sec = 11.94

even.

1055 Drain: Was unable to do - Per due to
power level. H-2 = 40% 3×10^{-8} . Rohette
chamber = ~ 3 on meter. (below range.)1350 Repeat of experiment described on page 77.
(Removal of plastic and set from spent
fuel element.)Water ht = 60.60 cm Temp °C
+ Per 24.10°C
C = 128.21 sec = 8.141430 Water ht = 53.40 cm
System just critical
Drain.

Cores 43-0 & 43-1

Have Cores 43-0 & 1 assemble in small
reflector tank. Inner core spaced .375"
with plastic spacers.1543 Water ht = 60.70 cm Temp °C
System sub critical 24.2°C
Drain.

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 PROCBE LIGHT

START-UP CHECK LIST

Equipment checked by F.D.C. Personnel check by F.D.C.
 Instruments and safeties checked and reset by AMH
 Source in checked by AMH Source No. M-43
 Emergency equipment in control room checked by F.D.C.
 Instruments in trip circuits: K-1-2 PM-1-2
 Red light on by AMH Time 0825
 Start-up OK'd by F.D.C. AMH Date 4-30-66

Have spent fuel element installed with 4 fuel plates. D-3224, D-5495, D-3242, D-2870.
 Plus 6 enriched strips # 2, 3, 7, 8, 9, 10, and 4 natural strips # 2, 3, 4, 5.

Water ht = 60.60 cm.
 - Per, N.C.

0907 Drain to ~ 25.0 cm and natural strip # 5.

Water ht = 60.70 cm Temp °C
 + Per 29.2 °C
 $C = 117.34 \text{ rev} = 8.74$

0938 Water ht = 53.35 cm.
 System just critical
 Drain.

$391.00 - 155.90 - 39.60 - 8.1$
 $= 186.604$

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

Water ht = 60.70 cm Temp °C
 + Per 29.2 °C
 $C = 54.32 \text{ rev} = 15.54$

1025 Water ht = 52.00 cm
 System just critical
 Drain.

$370.00 - 39.60 - 15.50$
 $= 184.904$

Cores 440 + 44-1

Now have cores 44-0 and 44-1 assemblies in small reflector tanks.

1330 Water ht = 60.50 cm
System sub critical
Drain.

now have spent fuel element with 2 fuel plates # 0-3224, 0-5495. Plus 3 natural strips # 2, 3, 4.

Water ht = 60.60 cm
4 Per Temp °C
t = 38.03 sec = 19.6 f 29.4 °C

1415 Water ht = 51.40 cm
System just critical
Drain. Core = 240.00 - 39.60 - 19.60
= 180.80 f

Now have spent fuel element with 4 fuel plates # 0-3224, 0-5495, 0-3242, 0-2870. Plus 6 enriched strips # 2, 3, 7, 8, 9, 10, and 3 natural strips # 2, 3, 4.

Water ht = 60.70 cm.
5 Per
t = 74.97 sec = 12.3 f

Water ht = 52.35 cm
System just critical
Drain. Temp °C 29.5 °C

Core = 391.00 - 155.90 - 39.60 - 12.3
= 183.20 f

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE	SET	START-UP RANGE
K1	3×10^{-12}	Meter	1"	-	3×10^{-12}
"	"	Fast	"	-	"
"	"	Meter	"	-	"
"	"	Fast	"	-	"
700V		Alarm	cont	-	500V
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 F.D.C. AKAL Personnel check by F.D.C.
 Instruments and sockets checked and reset by AKAL
 Source in checked by AKAL Source No. M-43
 Emergency eqpt. and in control room checked by F.D.C.
 Instruments in use checked: K-1-2 PM-1-2
 Red light on by AKAL Time 0905
 Start-up OK'd by F.D.C. AKAL Date 5-1-68

Cover 44-0 - 44-1

Repeat of experiment described on bottom of page 98-99. (Spent fuel element removed 4-30-68 and replaced 5-1-68 only change made).

Water ht = 60.60 cm. Temp °C
 + Per 24.3 °C
 T = 95.61 sec = 10.2 f

0956 Water ht = 52.90 cm
 System just critical
 Drain Core = 391.00 - 155.90 - 39.60 - 10.2
 = 185.30 f

Water ht = 60.70 cm. Temp °C
 + Per 24.3
 T = 95.61 sec = 10.2 f

1044 Water ht = 52.90
 System just critical
 Drain Core = 391.00 - 155.90 - 39.60 - 10.2
 = 185.30 f

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					
PIA-1	700V	Alarm ✓	Cont	-	500V
PIA-2	1200V	Low ✓	12"	-	900V
"	"	Alarm ✓	3"	-	"

LOG N CALIBRATE OPERATE SOURCE No. B-80

DUMP WELL PRGBE LIGHT

START-UP CHECK LIST

Equipment checked by AKM Personnel check by FID.C
 Instruments and safeties checked and reset by AKM
 Source in checked by AKM Source No. M-23
 Emergency equipment in control room checked by FID.C
 Instruments in trip circuit: K-1-2, PIA-1-2
 Red Light on by AKM Time 0830
 Start-up OK'd by FID.C AKM Date 5-3-68

Contd 45-0 & 45-1

Have core 45-0-1 assemble in small reflector tanks.

0918 Water ht = 60.40cm Temp °C
 System sub critical 24.0°C
 Drain.

Now have spent fuel 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.

Water ht = 60.90cm Temp °C
 + Per 24.2°C
 $C = 189.05 \text{ sec} = 5.9 \mu$

1110 Water ht = 54.25cm
 System just critical
 Drain. Core = 391.00 - 155.90 - 39.60 - 5.9 = 189.60 μ

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

over.

Cone 45-0.45-1

Water ht = 60.70 cm

Temp °C

²+Per

24.3 °C

$C = 76.05 \text{ sec} = 12.2 \text{ f}$

1320 Water ht = 52.60 cm

System just critical

Drain.

$C_{me} = 240.00 - 39.60 - 12.20$

$= 188.20 \text{ f}$

Remained natural trips # 2, 3, 4. Replaced them with 2 enriched trips # 6, 7.

Water ht = 60.80 cm

Temp °C

³+Per

24.3 °C

$C = 630.17 \text{ sec} = 2.0 \text{ f}$

1515 Water ht = 56.85 cm

System just critical

Drain.

$C_{me} = 240.00 - 47.60 - 2.0$

$= 190.40 \text{ f}$

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	ST	START-UP
K1 Rockettes		Water			
		Rad			
K2	3×10^{-12}	Meter	1"	✓	3×10^{-12}
"		Rad	"	✓	"
B1					
B2					
PA1	700V	Alarm	cont	✓	500V
PA2	1200V	low	12"	✓	900V
"		Alarm	3"	✓	"
LOG N CALIBRATE		✓	OPERATE	✓	SOURCE No. B-80
DUMP WELL EXITS LIGHT					

START-UP CHECK LIST

Equipment checked by AKM Personnel check by FID.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 FID.C
 Instruments in trip circuit: K-2 PM-1-2
 Rad level on by AKM Time 0910
 Start-up OK'd by FID.C AKM Date 5-6-68

5-6-68

Cores 45-0 + 45-1

Have spent fuel element installed with 2 fuel plates # 0-3224, 0-5495. Plus 3 natural strips # 2,3,4. (Top of spent fuel plates even with top of inner core plates). The spent fuel element is attached to 1/8 ton hoist. (Rate of travel = 32 ft/min). Purpose of the following experiment is to check worth of spent fuel plate element when removed from H. F. I. R. Core, by measuring - Per with Rohette instrument. The fuel loop has 1/4" x 1.0" x 30 3/4" plastic strips taped on to act as guides in inner element. (2 on each corner.)

(Rohette chamber inside small reflector tank.) (K-1).

Water ht = 60.80 cm Temp °C
+ Per 24.0 °C

log t = 45.63 sec = 17.40 f

1000 Water ht = 51.75 cm
System just critical
Drain to ~ 43 cm. Repeat + Per:
Core = 240.00 - 39.60 - 17.40 = 183.00

Water ht = 60.70 cm
+ Per.

log t = 45.63 sec = 17.40 f

1011 Removed spent fuel element² - Per
Rohette worth = 204.04 + 17.61 = 221.65 f

Drain to ~ 36.00 cm and replaced spent fuel element.

Water ht = 60.80 cm Temp °C
+ Per 24.0 °C

log t = 45.63 sec = 17.40 f
Core = 240.00 - 39.60 - 17.40 = 183.00

1100 Removed spent fuel element³ - Per
Rohette worth = 204.69 + 17.80 = 222.49 f

Using only 2 Rohette instruments core = 186.46 f

Now have spent fuel element with 4 fuel plates # 0-3224, 0-5495, 0-3242, 0-2870. Plus 6 enriched strips # 2,3,7,8,9,10, and 3 natural strips # 2,3,4.

Water ht = 60.80 cm Temp °C
+ Per 24.10 °C

t = 110.82 sec = 9.1 f Core = 391.00 - 155.90 - 39.60 - 9.1

Water ht = 53.20 cm = 186.40 f

System just critical
Drain to ~ 50.0 cm.

over.

✓ Water ht = 60.80 cm

⁵ + Per

$t = 106.98 \text{ sec} = 9.4 \text{ f}$

1334 ✓ Removed spent fuel element ⁵ - Per 126.17
 Rohette worth = $362.14 + 9.86 = 372.00$

Drain to ~ 36.00 cm and replaced spent fuel element

Water ht = 60.80 cm

⁶ + Per

$t = 108.65 \text{ sec} = 9.2 \text{ f}$ 156.70

Temp °

24.10°

1405 ✓ Removed spent fuel element ⁶ - Per
 Rohette worth = $357.99 + 9.82 = 367.81$

Drain to ~ 36.00 cm and replaced spent fuel element.

Water ht = 60.80 cm

⁷ + Per

$t = 104.30 \text{ sec} = 9.6 \text{ f}$ 155.94

Temp °

24.2°

✓ 1450 Removed spent fuel element ⁷ - Per

Rohette worth = $361.37 + 9.96 = 371.33$

Doing any of Rohette measurement. Enc. = 186.18

Drain:

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE RANGE	SET	START-UP RANGE
K3	3×10^{-12}	out	stop		
X		out	"		
K3	"		"		3×10^{-12}
"	"		"		"
P1					
P2					
700 V		Alarm	cont		500 V
1200 V		low	12"		900 V
"		Alarm	3"		"
LOG N CALIBRATE		<input checked="" type="checkbox"/>	OPERATE		<input checked="" type="checkbox"/>
DUMP WELL PROBE LIGHT		<input checked="" type="checkbox"/>	SOURCE No.		B-80

START-UP CHECK LIST

Equipment checked by F.I.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.I.C.
 Instruments in trip circuit: K-2 PM-1-2
 Red Light on by AKH Time 1330
 Start-up OK'd by F.I.C. AKH, Date 5-7-68

Cones 46-0 + 46-1

Have H.F.I.R. Cones 46-0, 46-1 assembled in small reflector tank. Inner cone spaced .375" with plastic spacers.

1437 Water ht = 60.50 cm
 System sub critical
 Drain.

Now have spent fuel element with 8 fuel plates # 0-3224, 0-5495, 0-3242, 0-2870. Plus 6 enriched strips # 2, 3, 7, 8, 9, 10, and 3 natural strips # 2, 3, 4. Top of spent fuel plates even with top of inner cone fuel plates.

Water ht = 60.70 cm Temp °C
 + Per 29.2 °C
 C: 39.11 sec = 19.3 f

1520 Water ht = 51.10 cm
 System just critical
 Drain.

$$\frac{15.11}{15.11} \times 391.00 - 155.90 - 39.60 - 19.3 = 176.204$$

over:

now have spent fuel element with 2 fuel plates # D-3224, D-5495. Plus 4 natural strips # 2, 3, 4, 5.

Water ht = 60.90 cm
 2 + Pen
 C = 65.19 acc. = 13.6 f

Temp °C
 29.2 °C

1607 Water ht = 52.20 cm
 System just critical
 Drains.

Cone = 240.00 - 52.60 - 13.6
 = 173.80 f

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3x10⁻¹² act	Meter Fast			
K-2	3x10 ⁻¹²	Meter ✓ Fast ✓	1"		
R-1					
R-2					
PM-1	700 V	Alarm ✓	cont		
PM-2	1200 V	Low ✓ Alarm ✓	12" 3"		
LOG N CALIBRATE		✓	OPERATE	✓	SOURCE No. B-80
DUMP WELL PRGSE LIGHT					

START-UP CHECK LIST

Equipment checked by ^{F.D.C.} AKH 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-2 PM-1-2
 Red light on by AKH Time 0942
 Start-up OK'd by F.D.C. AKH Date 5-8-66

Cone 46-0 - 46-1

Repeat of experiment described on page 112.

Water ht = 60.90 cm Temp °C
 + Per 24.2 °C
 $t = 73.88 \text{ sec} = 12.44$

1020 Water ht = 52.60 cm
 System just critical
 Drain. Core = $240.00 - 52.60 - 12.40$
 = 175.00 f

Cores # 55-0 & 55-1

(Use cores 55-0, 55-1 assemble in small
 reflector tank. Inner core spaced with .375"
 plastic spacers.)

1310 Water ht = 60.80 cm Temp °C
 System sub critical 24.2 °C
 Drain.

Cores 55-0, 55-1

Now have spent fuel element with 2 fuel
 plates # D-3224, D-5495, Plus 3 natural
 strips # 2, 3, 4

1505 Water ht = 60.90 cm Temp °C
 System sub critical 24.2 °C
 Drain to 0.0 cm and removed natural
 strip # 3.

Water ht = 60.80 cm Temp °C
 + Per 24.2 °C
 $t = 256.91 \text{ sec} = 4.54$

1547 Water ht = 55.00 cm
 System just critical
 Drain. Core = $240.00 - 26.60 - 9.5$
 = 208.90 f

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP NUMBER
K-1	cect	Master			
"	"	Ext			
K-2	3x10 ⁻¹²	Master	1"	-	3x10 ⁻¹²
"	"	Ext	"	-	"
PM-1	7000	Alarm	Cont	-	5000 ⁺
PM-2	12000	Low	12"	-	9000 ⁺
"	"	Alarm	3"	-	"
LOG N CALIBRATE <input checked="" type="checkbox"/>		OPERATE <input type="checkbox"/>		SOURCE No. B-80	
DUMP WELL PROBE LIGHT <input type="checkbox"/>					

START-UP CHECK LIST

Equipment checked by AKM Personnel check by F.I.D.C.
 Instruments and safeties checked and reset by AKM.
 Source in checked by AKM Source No. 19-43
 Emergency equipment in control room checked by F.I.D.C.
 Instruments in trip circuit: K-2 PM-1-2
 Red light on by AKM Time 0955
 Start-up OK'd by F.I.D.C. AKM Date 5-9-68

Now have spent fuel 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 # 2 & 4.

Water ht = 60.80 cm Temp °C
 - Per. 24.2°C
 C = -604.09 sec = -2.34 Core = 391.00 + 2.3 = 182.50 = 210.80 f

1040 Drain to 30.0 cm and removed # 2 ~~natural~~ enriched strip, and added natural strip # 3.

Water ht = 60.80 cm. Temp °C
 24 Per. 24.2°C
 C = 102.13 sec = 9.7 f

1108 Water ht = 53.10 cm
 system just critical
 Drain. Core = 391.00 - 130.30 = 39.60 - 9.7 = 211.40

Cores 56-0, 56-1

Have H.F.I.R. Core 56-0, 56-1 assemble in small reflector tank. Inner element spaced .375" with plastic spacers.

1340 Water ht = 60.60 cm
 system sub critical
 Drain.

Cores 56-0 56-1

Now have spent fuel element with 8 fuel plates, # D-3224, D-5495, D-3242, D-2870. plus 5 enriched strips # 3, 7, 8, 9, 10. and 3 natural strips # 2, 3, 4.

Water ht = 60.80 cm Temp °C
 + Per 29.5°
 $t = 67.36 \text{ sec} = 13.3 \text{ f}$

1520 Water ht = 52.25 cm
 System just critical
 Drain.

$$\text{core} = 391.00 - 130.30 - 396.0 - 13.30 = 207.80 \text{ f}$$

INSTRUMENT CHECK

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

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

START-UP CHECK LIST

Equipment checked by AKK Personnel check by AKK
 Instruments and safeties checked and reset by AKK E.B.J
 Source in checked by AKK Source No. M-43
 Emergency equipment in control room checked by E.B.J
 Instruments in trip circuit: K-2 PM-1-2
 Red light on by AKK Time 1245
 Start-up OK'd by E.B.J. AKK Date 5-10-68

Cone 56-0 56-1

Now have spent fuel element with 2 fuel plates # D-3224, D-5495. Plus 2 natural strips # 2 + 4.

Water ht = 60.70 cm Temp °C
 + Per 24.5 °C
 C = 13.4, 7.3 cm = 7.8 f

1340 Water ht = 53.90 cm
 System just critical
 Chain. Core = 240.00 - 26.60 - 7.8
 = 205.60 f

INSTRUMENT CHECK

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

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

START-UP CHECK LIST

Equipment checked by F.I.D.C. AMH Personnel check by F.I.D.C.
 Instruments and safeties checked and reset by AMH
 Source in checked by AMH Source No. 19-93
 Emergency equipment in control room checked by F.I.D.C.
 Instruments in trip circuit: K-2 PM-1-2
 Red light on by PKH Time 0810
 Start-up OK'd by F.I.D.C. PKH Date 5-14-68

Have spent fuel element installed with 2 fuel plates # 0-3224 0-5495. Plus 2 natural strips # 2 & 4. (top of spent fuel plates even with top of inner core plates). The spent fuel element is attached to 1/8 ton hoist (Rate of travel = 32 ft/min). Purpose of the following experiment is to check worth of spent fuel element when removed from H.F.L.R. core, by measuring ρ_{sp} with Rohette instrument. The fuel box has 1/4" x 1.0" x 3 3/4" plastic strips taped on to act as guides in inner element. (2 on each corner). Rohette chamber (K-1) inside small refueling tank.

Water ht = 60.70 cm Temp °C
 ρ_{sp}
 $C = 104.30 \text{ sec} = 9.64$ 23.5°C

0931 Water ht = 52.80 cm
 System just critical $C = 240.00 - 26.60 - 9.6$
 $= 203.804$

Water ht = 60.70 cm Temp °C
 ρ_{sp} 23.5°C
 $C = 104.30 \text{ sec} = 9.64$ $C = 240.00 - 26.60 - 9.6$
 $= 203.804$

1000 Removed spent element. ρ_{sp}
 Rohette worth = $208.17 + 12.31 = 220.504$
 Drain. corrected for K = 197.834

Replaced spent fuel element:

Water ht = 60.90 cm Temp °C
 ρ_{sp} 23.7°C
 $C = 71.71 \text{ sec} = 12.74$ $C = 240.00 - 26.60 - 12.7$
 $= 200.704$

1305 Removed spent fuel element ρ_{sp}
 Rohette = $207.72 + 13.34 = 221.06$
 corrected for K = 198.444

Replaced spent fuel element.

Water ht = 60.80 cm Temp °C
 ρ_{sp} 23.7°C
 $C = 69.59 \text{ sec} = 13.04$ $C = 240.00 - 26.60 - 13.0$
 $= 200.40$

1340 Removed spent fuel element ρ_{sp}
 Rohette worth = $208.22 + 12.75 = 220.97$
 Drain. corrected for K = 198.344

Replaced spent fuel element. Now have
 4 fuel plates # 0-3224, 0-5495, 0-3242,
 0-2870. plus 5 enriched strips # 3, 7, 8, 9, 10,
 and 3 natural strips # 2, 3, 4.

aver.

Water ht = 60.90 cm Temp °C
 5 + Per 23.7 °C
 $C = 49.98 \times 11 = 16.4 f$ $C_{cor} = 391.00 - 130.30 - 39.60 - 16.9$
 $= 204.70 f$

1445 Replaced spent fuel element 5 - Per
 Casket worth = 350.91 + 17.41 = 368.05
 Credited for K = 209.30 f

Drain to ~ 30 cm and replaced spent fuel element.

Water ht = 60.80 cm Temp °C
 6 + Per 23.7 °C
 $C = 49.98 \times 11 = 16.9 f$ $C_{cor} = 391.00 - 130.30 - 39.60 - 16.9$
 $= 204.20 f$

1518 Replaced spent fuel element 6 - Per
 Casket worth = 352.10 + 17.01 = 369.11
 Credited for K = 210.43 f

INSTRUMENT CHECK

INSTR	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1					
K-2					
R-1					
R-2					
PM-1		Alarm			
PM-2		Alarm			

LOG N CAL _____ OPERATE _____ SOURCE No. _____
 DUMP WELL TRIP LIGHT _____

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1					
K-2					
R-1					
R-2					
PM-1		Alarm			
PM-2		Alarm			

LOG N CAL _____ OPERATE _____ SOURCE No. _____
 DUMP WELL TRIP LIGHT _____

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1		Meter			
		Fast			
K-2	3K10-12	Meter	1"		3K10-12
"		Fast	"		"
R-1					
R-2					
PM-1	700V	Alarm	Cont		5000
PM-2	1200V	Low	12"		9000
"		Alarm	3"		"
LOG N CALIBRATE <input checked="" type="checkbox"/>		OPERATE <input type="checkbox"/>		SOURCE No. <u>B-80</u>	
DUMP WELL PROBE LIGHT <input type="checkbox"/>					

START-UP CHECK LIST

Equipment checked by 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 F.D.C.
 Instruments in trip circuit: K-2 PM-1-2
 Red light on by AKM Time 0815
 Start-up OK'd by F.D.C. AKM Date 5-16-68

Core #
48-0 48-1

Now have cores 48-0 & 48-1 assemble in small reflector tank. Inner core spaced .375" with plastic spacers.

0858 Water ht = 60.70 cm
 System sub critical
 Drain.

Now have spent fuel element with 4 fuel plates # D-3224, D-5495, D-3242, D-2870.
 Plus 6 enriched strips # 2, 3, 7, 8, 9, 10 and 4 natural strips # 2, 3, 4, 5.

1003 Water ht = 60.80 cm Temp °C
 System sub critical 23.7 °C
 Drain. ~ 20.0 cm.

Replaced natural strip # 2 with 1 stainless steel strip. total fuel = 196.544

Water ht = 60.80 cm Temp °C
 + Per 23.7 °C
 T = 1477.6 sec = .904

1057 Water ht = 58.15 cm
 System just critical
 Drain. core = 391.00 - 155.90 - 39.30 - 1.34 - .90 = 193.564

Cnts 48-0-48-1

Now have spent fuel element with 2 fuel plates # 0-3224 & 0-5495, plus 3 natural strips # 3, 4, 5.

Water ht = 60.80 cm Temp °C
~~7 Per~~ 7 Per 24.0 °C
 T = 147.76 sec = 7.24

1344 Water ht = 54.05 cm
 System just critical
 Drain Core = 240.00 - 39.30 - 7.20 = 193.50%

Repeat with 4 fuel plates. Have 6 enriched strips # 2, 3, 7, 8, 9, 10, and 3 natural strips # 3, 4, 5.

Water ht = 60.80 cm Temp °C
³ + Per 24.0 °C
 T = 648.50 sec = 1.84

1525 Water ht = 56.70 cm
 System just critical
 Drain Core = 391.00 - 155.90 - 39.30 - 1.80
 = 194.00%

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1		Meter			
		Fast			
K-2	3 x 10 ⁻¹²	Meter ✓	1"		3 x 10 ⁻¹²
"		Fast ✓	"		"
R-1					
R-2					
PM-1	700V	Alarm ✓	ent		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 E.O.C. Personnel check by E.O.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 E.O.C.
 Instruments in trip circuit: K-2 PM-1 & 2
 Red Light on by AKH Time 0910
 Start-up OK'd by E.O.C. AKH Date 5-17-68

Cores 49-0 + 49-1

Have cores 49-0 + 49-1 assemble in small reflector tank. Inner core spaced .375" with plastic spacers.

0953 Water ht = 60.60 cm
System sub critical
Drain.

Now have spent fuel element with 9 fuel plates # D-3224, D-5495, D-3242, D-2870. plus 6 enriched strips # 2, 3, 7, 8, 9, 10. and 2 natural strips # 3 & 4. Total pieces = 182.20 f

Water ht = 60.80 cm Temp °C
+ Per. 23.7 °C
C = 206.43 = 5.44

1055 Water ht = 54.60 cm
System just critical
Drain. Core = 391.00 - 155.90 - 26.30 - 5.40
= 203.40 f

Now have spent fuel element with 2 fuel plates # D-3224, D-5495. plus 2 natural strips # 3 & 4.

Water ht = 60.70 cm Temp °C
+ Per. 23.7 °C
C = 71.71 sec = 12.74

1328 Water ht = 52.75 cm
System just critical
Drain. Core = 240.00 - 26.30 - 12.70
= 201.00 f

Cores 50-0 + 50-1

Now have Cores 50-0 + 50-1 assemble in small reflector tank. Inner core spaced .375" with plastic spacers.

1530 Water ht = 60.60 cm
System sub critical
Drain.

INSTRUMENT CHECK

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

START-UP CHECK LIST

Equipment checked by F.P.C. AKH Personnel check by F.D.C.
 Instruments and safeties checked and tested by AKH.
 Source in checked by AKH Source No. 19-43
 Foreign equipment in control room checked by F.D.C.
 Instruments in trip circuit: K-2 PM-1-2
 Red light on by AKH Time 0810
 Start-up OK'd by F.D.C. AKH Date 5-20-68

Core 50-0+50-1

Now have spent fuel element with 2 fuel plates #0-3224, 0-5495, plus 2 natural strips #3 & 4.

Water ht = 54.00 cm Temp °C
 + Per. 22.6 °C
 $t = 41.29 \text{ sec} = 18.6 \text{ f}$

0855 Water ht = 50.75 cm
 System just critical
 Drain.

Added natural strip #2.

Water ht = 60.80 cm
 + Per
 $t = 60.84 \text{ sec} = 14.3 \text{ f}$

0935 Water ht = 52.30 cm
 System just critical
 Drain Core = $240.00 - 39.60 - 14.30 = 186.10$

Now have spent fuel element with 4 fuel plates #0-3224, 0-5495, 0-3242, 0-2870. Plus 6 enriched strips #2, 3, 7, 8, 9, 10. and 3 natural strips #2, 3, & 4.

over

Water ht = 60.80 cm

³+Per

$$C = 128.21 \text{ sec} = 8.1 \text{ f}$$

1052 Water ht = 53.60 cm

System just critical

Drain.

$$\begin{aligned} \text{Core} &= 391.00 - 155.90 - 39.60 - 8.10 \\ &= 187.40 \text{ f} \end{aligned}$$

Core ~~52-0~~ ⁵¹⁻⁰ ~~52-1~~ ⁵¹⁻¹

New have core ^{51-0 & 51-1} ~~52-0 & 52-1~~ assemble in small reflector tank. Inner core spaced .375" with plastic spacers.

1330 Water 60.90 cm

System sub critical

Drain.

New have spent fuel 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.

Water ht = 60.80 cm

⁴+Per.

$$C = 82.57 \text{ sec} = 11.4 \text{ f}$$

Temp °C

23.2 °C

1416 Water ht = ~~56~~ 52.65 cm

System just critical

Drain.

$$\begin{aligned} \text{Core} &= 391.00 - 155.90 - 39.60 - 11.4 \\ &= 184.10 \text{ f} \end{aligned}$$

New have spent fuel element with 2 fuel plates # D-3224, D-5495. Plus 3 natural strips # 7, 3, & 4.

Water ht = 60.80 cm

⁵+Per.

$$C = 43.46 \text{ sec} = 18.0 \text{ f}$$

Temp °C

23.5 °C

1522 Water ht = 51.70 cm

System just critical

Drain.

$$\begin{aligned} \text{Core} &= 240.00 - 39.60 - 18.0 \\ &= 182.40 \text{ f} \end{aligned}$$

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1		Meter			
		Fast			
K-2, 3, 10-12		Meter	1"	✓	3, 10-12
"		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. <u>B-80</u>	
DUMP WELL PROBE LIGHT					

START-UP CHECK LIST

Equipment checked by AKM Personnel check by F.I.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.I.C.
 Instruments in trip circuits: K-2, DM-1-2
 Rel. M. set on by AKM Time 0805
 Start-up OK'd by F.I.C. AKM Date 5-21-68

51-0 & 51-1
~~Cover 51-0 & 51-1~~

Repeat of experiment described on bottom of page 135.

Water ht = 60.80 cm Temp ° = 23.1 °C
 + Per
 $T = 52.15 \text{ sec} = 15.9 \text{ f}$

0900 Water ht = 51.95 cm
 System just critical
 Drain. Done = 240.00 - 39.60 - 15.9 = 184.50

Cores 52-0 & 52-1

Now have cores 52-0 & 52-1 assemble in small reflector tank. Run core spaced 1.375" with plastic spacers.

1042 Water ht = 60.80 cm
 System sub critical
 Drain.

Now have spent fuel element with 2 fuel plate # D-3224, D-5495. Plus 3 natural tubes # 2, 3, 4.

over.

Cores 52-0 & 52-1

Water ht = 60.80 cm

+ Per

$$t = 113.00 \text{ sec} = 9.0 \text{ f}$$

Temp °C

23.2 °C

1113

Water ht = 53.60 cm

System just critical

Drain.

$$\text{Core} = 240.00 - 39.60 - 9.0 \\ = 191.40 \text{ f}$$

Now have spent fuel 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.

Water ht = 60.80 cm.

+ Per

$$t = 630.17 \text{ sec} = 2.0 \text{ f}$$

Temp °C

23.5 °C

1350

Water ht = 56.75 cm.

System just critical

Drain.

$$\text{Core} = 391.00 - 155.90 - 39.60 - 2.0 \\ = 193.50$$

Cores 53-0 & 53-1

Now have cores 53-0 & 53-1 assembled in small reflector tanks. Inner core spaced 375° with small reflector tanks.

1510

Water ht = 60.50 cm

System sub critical

Drain.

Now have spent fuel 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.

Water ht = 60.70 cm

System sub critical

Drain. to ~ 34.0 cm.

Removed enriched strip # 9. and added natural strip # 5. power = 182.20 f

Water ht = 60.80 cm.

+ Per

$$t = 521.52 \text{ sec} = 2.3 \text{ f}$$

Temp °C

23.7 °C

Water ht = 56.75 cm

System just critical

Drain:

$$\text{Core} = 391.00 - 129.60 - 52.60 - 2.3 = 206.50 \text{ f}$$

REQUISITION

684550

-SON
FEB 7 AM 11:13

REPORT TO R.K. Reed
BUILDING NO. 9213
PHONE NO. 35237

SPECTROGRAPHIC REPORT

MATERIAL TYPE <u>H₂O</u>	DATE <u>2-28-69</u>	BATCH NUMBER	PLATE SHEET NO. <u>A-0878</u>	REQUISITION NO. <u>684550</u>
SPECTROCHEMICAL METHOD		REPORTING UNIT		REPORTING BASIS
<input type="checkbox"/> CARRIER (PYRO)	<input checked="" type="checkbox"/> COMPLETE BURN	<input type="checkbox"/> RARE EARTH	<input type="checkbox"/> μg/g (ppm)	<input type="checkbox"/> %
<input type="checkbox"/> NO CARRIER	<input type="checkbox"/> SEMI-QUANT	<input type="checkbox"/> HIGH VOLTAGE SPARK	<input checked="" type="checkbox"/> μg/ml	<input type="checkbox"/> TOTAL μg
			<input checked="" type="checkbox"/> AS-RECEIVED	<input type="checkbox"/> DRY
			<input type="checkbox"/> METAL	<input type="checkbox"/> ASH

* SPARK SOURCE MASS SPECTROGRAPH

Ag	Al	As	Au	B	Ba
Be <u><.01</u>	Bi	Br	Ca	Cd	Co
Cr <u><.01</u>	Cs	Cu <u><.1</u>	Fe	Ga	Ge
Hf	Hg	In	Ir	K	Li
Mg <u>.4</u>	Mn <u><.01</u>	Mo	Nb	Ni	
Nb	Os	P	Pb <u><.01</u>	Pd	Pt
Pu	Rb	Re	Rh	Ru	S
Sb	Sc	Se	Si	Sn	Sr
Ta	Te	Th	Ti	Tl	U
V	W	Y	Zn <u><.6</u>	Zr	
Ce	Dy	Er	Eu	Gd	Ho
La	Lu	Nd	Pr	Sm	Tb
Tm	Yb				

UCN-260
(2-10-67)

00000004										g U/g
										g Ay/g
										g D/g
										g H/g
										g Mo/g
										g F/g
										SPEC.
										ASSAY

J. Lee		REPT. BY
2-15-69		DATE
		DEPT.

7

INSTRUMENT CHECK

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

LOG IN CALIBRATE OPERATE SOURCE No. A-80

DUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by F.P.C. Personnel check by F.P.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.P.C.
 Instruments in trip circuit: K-1 PM-1-2
 Red Light on by AKH Time 0810
 Start-up OK'd by F.P.C. AKH Date 5-22-68

Now have spent fuel element with 2 fuel plates
 #D-3224, 0-5495. Plus 2 natural strips # 2, 3.

Water ht = 60.80 cm Temp °C
 + Res 23.1 °C
 C = 141.24 sec = 7.54

0908 Water ht = 54.15 cm
 System just critical
 Drain. Core = 240.00 - 26.3 - 7.5 = 206.20 g

Now have cores 54-0 & 54-1 assembled in
 small reflection tank, brass core spaced
 .375" with plastic spacers.

1017 Water ht = 60.60 cm
 System sub critical
 Drain.

avg:

Now have spent fuel element with 2 fuel plates, # D-3224, D-5495. Plus 3 natural strips # 2204.

Water ht = 60.80 cm
 2 Per
 $T = 269.45 \text{ mm} = 4.3 \text{ f}$
 Temp °C
 23.2 °C

Water ht = 55.15 cm
 System just critical.
 Drain. One = 240.00 - 39.60 - 4.30
 = 196.10

Water ht = 60.90 cm
 3 Per
 NB:
 1550 Water ht = 56.95 cm
 System just critical
 Drain.

Temp °C
 23.2 °C
 Ran for
O.R.I.N.S

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1		Meter			
		Fast			
K-2	3 x 10 ⁻¹²	Meter	1"	✓	3 x 10 ⁻¹²
"	"	Fast	"	✓	"
R-1					
P-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 F.D.C. RAK Personnel check by F.D.C.
 Instruments and safeties checked and reset by RAK
 Source in circuit by RAK Source No. M-43
 Emergency equipment in control room checked by F.D.C.
 Instruments in trip circuit: K-2 P14-1-2
 Red light on by AKM Time 0805
 Start-up OK'd by F.D.C. RAK Date 5-23-68

Core 54-0 + 54-1

Now have spent fuel element with 4 fuel plates. Plus 6 enriched strips # 2, 3, 7, 8, 9, 10. and 3 natural strips # 2, 3, 4.

Water ht = 60.80 cm

¹ - Per
N.G

0908 Drain:

Remained enriched strip # 2, and added natural strip # 5. Power = 182.90 f

Water ht = 60.90 cm

² - Per

Temp °C
23.3 °C

$\tau = 128.21 \text{ sec} = 8.1 \text{ f}$

1023 Water ht = 53.55 cm

System just critical

Drain:

Core = 391.00 - 130.30 - 52.60 - 8.1
= 200.00

Core 54-0 + 54-1

Repeat of experiment described on page 142. 2 fuel plates and 3 natural strips

Water ht = 60.90 cm,

Temp °C
23.3 °C

³ + Per
 $\tau = 412.86 \text{ sec} = 2.9 \text{ f}$

1336 Water ht = 56.15 cm.

System just critical

Drain:

Core = 240.00 - 39.60 - 2.9
= 197.50 f

Stopped
5/29

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE D. STAINES	SET	START-UP RANGE
K-1	3x10 ⁻¹²	Motor ✓	1"	✓	3x10 ⁻¹²
"	"	Fast ✓	"	✓	"
K-2	-	Motor -	-	-	-
R-1	-	-	-	-	-
R-2	-	-	-	-	-
PM-1	700V	Alarm ✓	1.5"	-	500V+
PM-2	1200V	Low ✓	10"	-	900V+
"	"	Alarm ✓	2"	-	"

LOG IN ON DEBRATE OPERATE SOURCE No. B-80

DUMP WELL FROSE LIGHT

START-UP CHECK LIST

Equipment checked by F.D.C. A.K.A. Personnel check by R.K.R.
 Instruments and cables checked and reset by A.K.A.
 Source in checked by A.K.A. Source No. M-43
 Emergency equipment in control room checked by F.D.C.
 Instruments in control room: K-1, PM-1, 1-2
 Red light on by A.K.A. Time 1235
 Start-up OK'd by F.D.C. A.K.A. Date 2-6-69

C.E-2 Core
 Standard.
 For H.F.R. Core.

12/23/69 - 282.4 @ 26°C
 1/14/69 - 286.4 @ 25.5°C
 Measurements of CE-2

1/12/66	-297.1 cents
1/17/66	-293.0 cents
5/27/66	-290.7 cents
2/10/67	-291.4 cents
9/8/67	-288.0 cents
4/16/68	-291.0 cents
2/6/69	-286.4 cents

Feed rate = 3.8 cm/min.
 3/4" dump rate = 10.1 cm/min
 3" dump rate = 36.6 cm/15 sec.

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

Water ht = 60.60 cm Temp °C
 + Pres. 24.0°C

1353 C = 73.88 sec = 12.4¢
 Water ht = 51.15 cm
 System just critical
 Drain core = 391.00 - 92.2 - 12.4 = -286.4¢

Water sample taken from small reflector tank.
 Reg # 684550
 sub for.
 # of #. = 00100004
 Pyro 40.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3x10 ⁻¹²	Meter ✓	1"	✓	3x10 ⁻¹²
"	"	Fast ✓	"	✓	"
K-2	"	Alarm ✓	"	✓	"
"	"	Fast ✓	"	✓	"
PM-1	700v	Alarm ✓	1.5"	✓	500v
PM-2	1200v	Low ✓	16"	✓	900v
"	"	Alarm ✓	2"	✓	"

LOG N CALIBRATE OPERATE SOURCE No. B-80

DUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by E.P.C. B.M.M. Personnel check by F.V.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 F.V.C.
 Instruments in trip circuit: K-1-2 PM-1-2
 Red light on by A.K.H. Time 0900
 Start-up OK'd by F.V.C. B.M.M. Date 2-7-68

Cover # 70-0 - 71-1
 No ~~bottom~~ "Combs"

Have cores # 71-0 & 71-1 assemble in small reflector tank. Inner core spaced .375" with plastic spacers.

0900 Water ht = 59.70 cm Temp °C
 System sub critical 24.0 °C
 Drain

H₂O = 48.30 cm = even with top of fuel plates
 " = 49.00 cm = " " " " ^{inner} fuel plates

New test have spent fuel 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.

1021 Water ht = 59.65 cm Temp °C
 System sub critical 24.1 °C
 Drain.

Removed enriched strip # 2, and added natural strip # 5.
 1050 Water ht = 59.90 cm Temp °C
 System sub critical 24.2 °C
 Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DIFFERENCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	1"	✓	3×10^{-12}
"	"	Dist ✓	"	✓	"
K-2	"	Meter ✓	"	✓	"
"	"	Dist ✓	"	✓	"
R-1					
FM-1	700V	Alarm ✓	5"	✓	500V
PIA-2	900V	Low ✓	10"	✓	900V
"	"	Alarm ✓	2"	✓	"

LOG N CALIBRATE OPERATE SOURCE No. D-80

DUMP WELL PROBE LIGHT

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 _____ Source No. _____

Emergency equipment in control room checked by _____

Instruments in trip circuit: _____

Red light on by _____ Time _____

Start-up OK'd by _____ Date _____

H.F.I.R
Cores II 70-0 70-1
No Comb

Have cores 70-0 + 70-1 assembled in small reflector tanks. Inner core spaced .375" with plastic spacers.

H₂O = 48.20 cm = even with top of outer fuel plate
" = 49.30 cm = " " " " inner " "

1110 Water ht = 59.90 cm
System sub-critical
Drain.

Temp °C
23.5 °C

Have spent fuel element with 2 fuel plates
D-3224, D-5495. Plus 3 natural strips
2, 3, 4.

1325 Water ht = 60.10 cm
System sub-critical
Drain.

Temp °C
23.5 °C

Removed natural strip #3.
1410 Water ht = 60.00 cm
- Per

Temp °C
23.6 °C

C = -804.01 rev = -1.7 f
Drain. N.G

even

Remained natural strips # 2 & 4. added
Enriched strip # 5.

1510 Water ht = 60.00 cm
2 - Pas
E = -797.5 sec = -1.74
Drains.

Temp °C
23.6 °C

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE	SET	START-UP
K-1	3×10^{-12}	Alarm ✓	1"	✓	3×10^{-12}
"	"	Fail ✓	"	✓	"
K-2	"	Alarm ✓	"	✓	"
"	"	Fail ✓	"	✓	"
R-1					
R-2					
PIA-1	700V	Alarm ✓	5"	-	500V
PIA-2	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 F.D.C. [Signature] Personnel check by F.D.C.
 Instruments and safeties checked and reset by A.H.C.
 Source is checked by A.H.C. Ser. No. M-43
 Emergency equipment in control room checked by F.D.C.
 Instruments in log cabinet: K-1-2 PIA-1-2
 Red light on by A.H.C. Time 0805
 Start-up OK'd by F.D.C. [Signature] Date 2-11-68

H.F.I.R.
Cores 70-0 70-1
No Combs.

Repeat of last experiment after checking alignment of Enriched strip # 5. (Found strip was off center by width of strip at bottom of element.)

Water ht = 60.10 cm Temp °C
- Per 23.5 °C
 $\tau = -673.63 \text{ sec} = -2.04$

0900 Drain.

Removed Enriched strip # 5. and added natural strip # 2.

Water ht = 60.10 cm Temp °C
+ Per. 23.5 °C
 $\tau = 97.78 \text{ sec} = 10.14$

0955 Water ht = 53.20 cm
System just critical
Drain. core = 240.0 - 13.3 - 10.1
= 216.64

H.F.I.R.
Cores 69-0 69-1
No Combs

New lower Cores 69-0+69-1 assemble in small reflector tank. Inner element spaced .375" with plastic spacers.

H₂O = 48.2 cm = even with top of outer fuel plate
H₂O = 49.7 cm = even with " " " " " "

1115 Water ht = 60.10 cm Temp °C
System sub critical 25.5 °C
Drain.

Have spent fuel element with 2 fuel plates # 0-3224, 0-5495. Plus 3 natural strips # 2, 3, 4.

1355 Water ht = 60.20 cm Temp °C
System sub critical 23.6 °C
Drain.

Removed natural strips # 2, 3.
Water ht = 60.10 cm Temp °C
+ Per. 23.8 °C
 $\tau = 54.32 \text{ sec} = 15.54$

1430 Water ht = 52.30 cm.
System just critical core = 240 - 13.3 - 14.3
Drain. = 212.404

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START UP
K13	3x10 ⁻¹²	Water	1"	-	3x10 ⁻¹²
"	"	Low	"	-	"
K9	"	Water	"	-	"
"	"	Low	"	-	"
B-1					
PA1	700V	Alarm	5"	-	500V
PA2	1200V	Low	10"	-	900V
"	"	Alarm	2"	-	"

LOG N CALIBRATE OPERATE SOURCE No. B-80

DUMP WELL PROBE LIGHT 7

START-UP CHECK LIST

Equipment checked by F.D.C. Personnel check by F.D.C.
 Instruments and safeties checked and reset by AMG
 Source in checked by AMG Source No. M-43
 Emergency equipment in control room checked by F.D.C.
 Instruments in trip circuit: H-120M1-2
 Red Light on by AMG Time 0815
 Start-up OK'd by F.D.C. AMG Date 2-12-68

H.F.I.R. Cores,
 Cores 69-0 - 69-1
 no Combs

Repeat of last experiment (bottom of p-157)

Have spent fuel element with 2 fuel plates
 #D-3224, D-5445. Plus 1 natural strip #C

Water ht = 60.10 cm
 + Res

Temp °C
 23.5

Water ht = 52.40 cm
 System just critical
 Drain

Core = 240.0 - 13.3 - 13.3
 = 213.4 g

Core 68-0 68-1

2 Combs Top & Bottom.

Have core 68-0 + 68-1 assembled in
 small reflector tank. Inner core spaced
 .375" with plastic spacers.

Water ht = 60.30 cm
 System sub-critical

Temp °C
 23.6 °C

H₂O = 48.15 cm = even with top of center element fuel plate
 " = 48.70 cm = " " " inner " " "

New base spent fuel element with 2 fuel plates # D-3224, D-5495. Have 2 natural strips # 2, & 3.

Water ht = 60.20 cm Temp $^{\circ}$ C
 2-Pex 23.6 $^{\circ}$ C
 $t = 2,020.9 \text{ sec} = -1.66 \text{ f}$ Core = 240.0 \pm 7.7 - 26.3

1355 Drain

= 214.4 f

Removed natural strip # 3.

Water ht = 60.15 cm
 1-Pex
 $t = 71.71 \text{ sec} = 12.7 \text{ f}$

1434 Water ht = 52.50 cm
 System just critical
 Drains.

Core = 240.0 - 13.3 - 12.7
 = 214.0 f

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DEFLECTION	SET	START-UP RANGE
K-1	3×10^{-12}	High <input checked="" type="checkbox"/>	1"	-	3×10^{-12}
"	"	Ext <input checked="" type="checkbox"/>	"	-	"
K-2	"	High <input checked="" type="checkbox"/>	"	-	"
"	"	Ext <input checked="" type="checkbox"/>	"	-	"
P-1					
P-2					
PM 1	700V	Alarm <input checked="" type="checkbox"/>	1.5"	-	500V
PM 2	1200V	Low <input checked="" type="checkbox"/>	1.0"	-	900V
"	"	Alarm <input checked="" type="checkbox"/>	2"	-	"

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

START-UP CHECK LIST

Equipment checked by F.P.C. Personnel check by F.O.C.
 Instruments and safeties checked and reset by AMC
 Source level checked AMC Source No. M-43
 Knowledge of status of all instruments checked by F.O.C.
 Instrument calibration: K-1-2 AM-1-2
 Red Meter set by AMC time 0805
 Start-up Card by F.O.C. AMC Date 2-13-68

H.F.I.R.
Cores 71-0 + 71-1
No Combs.

Repeat (see spec #150-151).
Have spent fuel element with 2 fuel
plates # 0-3224, 0-5495. Plus 1 natural
strip # 3.

H₂O = 48.1 cm = Top of fuel plates in outer core
" = 48.9 cm = " " " " inner "

Water ht = 60.10 cm Temp °C
+ Per. 23.5
E = 115,17 sec = 8.84

0900 Water ht = 53.50 cm
System just critical
Drain. Core = 240.0 - 13.0 - 8.8
= 219.24

H.F.I.R.
Cores 67-0 + 67-1
2 Combs Top + bottom.

Now have cores 67-0 + ~~67~~-1 ensemble in
small reflector tent. Inner core spaced
.375" with plastic spacers.

1053 Water ht = 60.20 cm Temp °C
System sub critical 23.5
Drain.

H₂O = 48.10 cm = even with top of outer fuel plate.
" = 48.75 cm = " " " " inner " "

Now have spent fuel element with 2 fuel
plates # 0-3224, 0-5495. Plus 2 natural
strips # 2 + 4.

1310 Water ht = 60.10 cm Temp °C
System sub critical 23.6 °C
Drain.

Removed natural strip # 2.
Water ht = 60.10 cm Temp °C
+ Per. 23.7 °C
E = 141.24 sec = 7.54 Core = 240.0 - 13.3 - 7.5

1342 Water ht = 53.90 cm
System just critical. Drain. = 219.24

H.F.I.R. Core.
67-0 outer & 71-1 inner.

Have spent fuel element with 2 fuel plates # 0-3224 & 0-5495. Plus natural strip # 4.

Water ht = 60.10 cm Temp °C
+ Per 23.7 °C

$\bar{v} = 51.06 \text{ sec} = 16.2 \phi$

1533 Water ht = 52.10 cm
system just critical
Drain.

Core = 240.0 - 13.3 - 16.2
= 210.5 ϕ

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET RANGE	START-UP RANGE
K-1 3 X 10 ⁻¹²		Meter	"		
"		Ext	"		
K-2 "		Meter	"		
"		Ext	"		
R-1					
R-2					
PM-1 700V			5"		500V
PM-2 1200V			10"		900V
"			2"		"
ECG IN CONTROL		OPERATE	SOURCE No.		
DUMP WELL PROBE EIGHT			08-0		

START-UP CHECK LIST

Equipment checked by F.P.C. Personnel check by AKV
 Instruments and safeties checked and reset by AKV
 Screens to be checked by AKV M-43
 Emergency equipment in control room checked by F.P.C.
 Instruments to be checked: K-1-2 PM-1-2
 Red light check: AKV 0820
 Start-up card by F.P.C. AKV 7-14-68

H.F.I.R. Core
71-0 outer & 67-1 inner.

Have spent fuel element with 2 fuel plates
0-3224 & 0-5495. Plus natural strip # 2.

Water ht = 60.10 cm. Temp °C
+ Per 23.9 °C

$\bar{v} = 656.25 \text{ sec} = 1.9 \phi$

0926 Water ht = 56.80 cm
system just critical
Drain.

Core = 240.0 - 13.3 - 1.9
= 224.8 ϕ

H.F.I.R.
 Cones 66-0 & 66-1
 2 cones top & bottom.

1 cone cones # 66-0 & 66-1 assemble in
 small reflector tank. inner cone spaced
 .375" with plastic spacers.

1306 Water ht = 60.20 cm Temp °
 System sub critical 23.5 °
 Drains

Now have spent fuel element with 2 fuel
 plates. # 0-3224 & 0-5495. plus 1 natural
 strip # 3.

H₂O = 48.30 cm = Top of fuel plate in outer element.
 " = 48.90 cm = " " " " inner "

1330 Shut down. to receive H.F.I.R. elements
 # 72-0 & 72-1.

See H.F.I.R. Log Book
 # 4