BOOK99R

Notes:
"U(4.9) rads #5" on spine

Blank pages: page opposite page 1, 1, 292-308, inside back cover sheets

-3 half sheets between front cover sheets
-the following pages each have 1 sticker and 1 drawing on each page: 4, 5, 6, 8, 29, 43, 44, 54, 56, 59, 61, 66, & 72
-pages 15/16, 33/34, 141/142, each have a paper clip at the top
-page 21 has small piece of paper - paper clipped at the top
-pages 52/53, 58/59, 72/73, 80/81 each have a small blank piece of paper between pages
-the following pages have 1 small drawing attached to each page: 90, 93, 149, 152, 154, 157, 159, 163, 166, 169, 171, 173, 174, 179, 183, 185, 186, 189, 191, 194, 195, 198, 199, 201, 202, 206, 207, 209, 212, 213, 215, 217, 223, 224, 227, 232, 235, 237, 242, 243, 246, 248, 250, 252, 254, 256, 259, 263, 266, 268, 270, 273, 275, 277, 278, 280, 282, 283, 285, 286, 288, 290, 291
-the following pages have (#) small drawings attached to that page: 83(2), 84(2), 86(4), 88(2), 89(3), 92(2), 95(2), 96(3), 97(3), 98(2), 100(3), 101(2), 103(2), 104(2), 105(2), 155(3), 176(2), 178(2), 219(3), 220(2), 229(3)
-pages 142 and 146 have 3 pieces of paper taped to each page
-pages 190/191 have 1 keypunch computer card between pages

Scanned by:
Sheila Finch
RSICC /Oak Ridge National Lab.
September 10, 1999

14-2-1

SHAW'S

PIONEERS SINCE 1831

Account Book

No. S 149

NO UNITS

Journal . . . . . .

Ledger, Single Entry . .

Ledger, Double Entry .

Record Ruled (27 Lines)

Made in 150, and 300 Pages

MADE IN U. S. A.

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

↓ 1.30 sep.

Pb backed by SS

" " " Cd (crossed out)

Pb refl, Cd sheet sep in lattice 173
4 sides

2x2 clusters 173
" 4-rod ?

9 rod clusters + Cd sheet in lat. 174

" + Boral " " " 176

+ " +1 row vacant 178

Pb 4 side, Boral 1 side, 179

" , "walk" Boral thru 4-rod-cluster lattice 183

" Cd & Boral thru regular lattice

Depleted U, 1 face 191

9-rod clusters 194

4- " " 195

2-rod rows vacant, 2 dir. 198

3-rod rows " " 199

4-rod clusters, SS plate ~~204~~ 201

9 " " " 202

Depl U + SS, 1 face 206

9-rod clusters 207

4 " " 209

Depl U spaced from lattice 212

4 clusters 215

Assorted clusters 220

↓ 2.05 sep.

Log #5 (cont)

0.3 rods in H_2O

2.05 cm sep.

4 clusters, 1 row sep 92

" 2 " " 95

9 " 1 " " 96

4 " 3 " " 101

1.3 cm sep.

4 clusters, ~~...~~ 2 & 3 row sep. 103

2 halves, 3 row sep. 103

64 4-rod clusters, 1 row sep. 104

Support rebuilt to support Pb

no Pb 107

Pb

8x10x16" Pb - one face 109

Trouble

Pb + Silastic 731 RTV (1 face) 135

Pb - 2 faces 135

Pb - 4 faces (diagrams) 142

4-cluster, 1 row sep, 4-face Pb 149

2 row sep. 152

3 " " 154

5x5 clusters, 1 row sep 155

5x5 " + "odd" rods, 1 row sep. 157

lattices of 9-rod

4-rod clusters, 1 row sep 159

" " " +SS, 1 face 163

Log #5

2/2/70

0.2 g B/l

0.5" rods 3.4 cm sep. 2

(2/18/70 = p.14)

(3/2/70) p.15

$U^{(5)}O_2F_2$ soln in 36" (inner) diam. tank 16

0.3" rods in soln (attack) 20

Rods in shrinkable polyolefin tubing, no grid sheets 23

0.3 rods in soln 2.050 sep. 23

Plexiglas top reflector, variable T 43-57

0.3", 2.403 cm sep (1/4" top grid?) 53

2.9 " " — — — — 58

0.5 rods 2.59 cm 61

3.40 65

3.94 68

0.3 rods 3.25 cm sep. 75

0.5 " 4.4 " " 78

In H_2O in Nell (beginning of "cluster" lattices)

0.3 rods, 1.300 cm 82!

4 clusters, 1 row sep 83

4 " 2 " sep. 88

9 " 1 row sep 90

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP		Source distance	SET	START-UP RANGE
K-1	3×10^{-12}	Meter	✓	2"	✓	3×10^{-12}
	"	Rec	✓	1"	✓	"
K-2	"	M	✓	2"	✓	"
	"	R	✓	1"	✓	"
R-1						
R-2						
PM-1	700V		✓	.5"	✓	500V
PM-2	1200V	Lo	✓	10"	✓	900V
	"	Alarm	✓	1"	✓	"

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

DUMP WELL PROBE LIGHT ______

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKH

Source in checked by AKH Source No. M-43

Emergency equipment ... been checked by F.D.C.

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

Red light on by AKH Time 0805

Start-up OK'd by F.D.C. AKH Date 2-2-70

.50" Rod.
30 cm length.
Rounded arrays.
Separation

Repeat of last experiment described on page 305. Log Book #3

Have an 14×14 array, with 22 rods removed from each corner. Total of 108 rods.

Water ht = 27.90 cm — Temp °C
+Per — 24.5°C

τ = 1195.15 sec = 1.04

0903 Water ht = 23.90 cm
System just critical
Drain.

Now have an 11×11 array, with 4 rods removed from each corner. Total of 105 rods.

0955 Water ht = 27.80 cm — Temp °C
System sub critical — 24.7°
Drain.

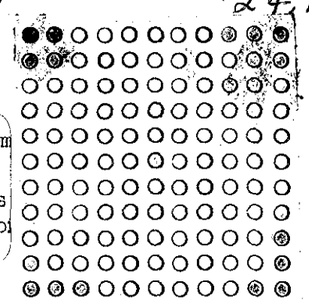
AKH

added 2 rods, 1 each, to opposite corners.
Now have an 11 X 11 array, with 3 rods
removed from 2 corners and 9 rods removed
from 2 corners. Total of 107 rods.

Water lvl = 22.50 cm Temp °C
2 + Per 24.7°C
τ = 60.84 sec = 14.3 ¢
1014 Water lvl = 19.00 cm
System just critical
Drain.

Removed 1 rod. Now have an 11 X 11 array
with 4 rods removed from 3 corners
and 3 rods removed from 1 corner.
Total of 106 rods.

1057 Water lvl = 27.90 cm Temp °C
System just critical 24.8°C
Drain.



2/2/70: 11x11 array with 4 rods removed from 3 corners & 3 removed from 1 corner. Total rods: 106. 0.50" rods 30 cm length. Separation 3.4 cm. C-C. p.4

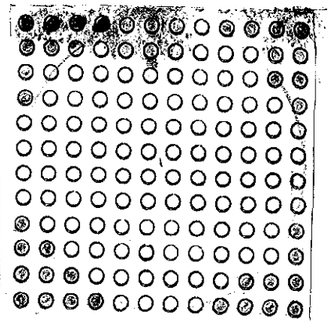
Now have an 12 X 12 array. With 10 rods
removed from 2 corners, and 9 rods
removed from 2 corners. Total of 106 rods.

Water lvl = 21.80 cm Temp °C
3-Per 25°C
τ = -323.78 sec = -4.6 ¢
1300 Drain.

Added 1 rod. Have now an 12 X 12
with 9 rods removed from 3 corners and
10 rods removed from 1 corner. Total of
107 rods.

Water lvl = 20.20 cm. Temp °C
4 + Per 25.0°C
τ = 178.19 sec = 6.2 ¢ = 6.5 ¢/cm
1324 Water lvl = 19.25 cm
System just critical
Drain.

2/2/70: 12x12 array with 9 rods removed from 3 corners & 10 from 1 corner. Total rods: 107 0.50" rods, 30 cm length Separation 3.4 cm C-C
p. 5



avg.

Now have an 12 X 13 array, with 12 rods removed from 2 opposite corners. and 13 rods removed from 2 corners. Total of 106 rods.

Water ht = 27.90 cm

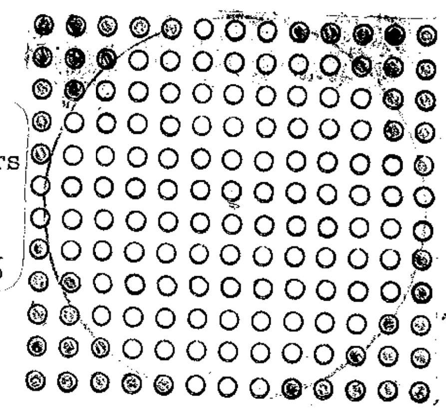
Temp °C
25 °C

5 - Per

τ = − 295.53 sec = − 5.1 ¢

1545 Drain:

2/2/70: 12x13 array with 12 rods removed from 2 opposite corners & 13 from 2 corners. Total rods:106. 0.50" rods,3.4cm separation C-C. 30-cm length. p.6



INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP		SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter	✓	2"	✓	3×10^{-12}
	"	Fast	✓	1"	✓	"
K-2	"	Meter	✓	2"	✓	"
	"	Fast	✓	1"	✓	"
R-1						
R-2						
PA-1	700 v	Alarm	✓	.5"	✓	500 v
PA-2	1200 v	Low	✓	10"	✓	900 v
[illegible]		Alarm	✓	1"	✓	"

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

DUMP WELL FROSE LIGHT ______

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKH

Source in checked by RKH Source No. M-93

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

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

Red light on by RKH Time 0830

Start-up OK'd by F.D.C. RKH Date 2-3-70

.50" Rod.
30 cm length.
3.4 cm separation c-c.

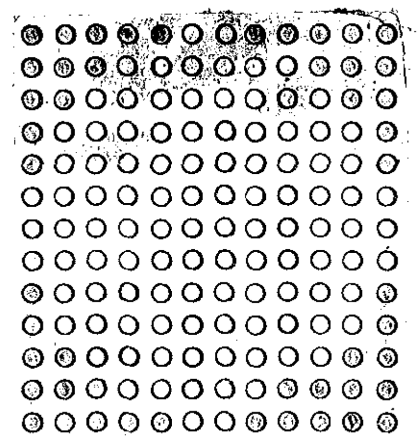
Now have an 12 X 13 array: with 12 rods removed from 3 corners, and 13 rods removed from 1 corner. Total of 107 rods.

ph 7.75

Water ht = 19.95 cm   Temp °c
+Per   24.7°c

τ = 202.09 sec = 5.5¢ = 7.3¢/cm

0913 Water ht = 19.20 cm.
System just critical
Drain



2/3/70: 12x13 array with 12 rods removed from 3 corners & 13 from 1 corner. Total rods: 107 0.50" rods 30 cm length 3.4 cm separation C-C
p. 8

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP		SOURCE DISTANCE	SET	START-UP RANGE
K-1	3x10⁻¹²	Meter	✓	2"	✓	3 X10⁻¹²
	"	Fast	✓	1"	✓	"
K-2	"	Meter	✓	2"	✓	"
	"	Fast	✓	1"	✓	"
R-1						
R-2						
PM-1	700v	Alarm	✓	.5"	✓	500v
PM	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 E.D.C. AKH Personnel check by E.D.C.

Instruments and safeties checked and reset by AKH

Source in checked by AKH Source No. 19-43

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

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

Red light on by AKH Time 1312

Start-up OK'd by E.D.C. AKH Date 2-18-70

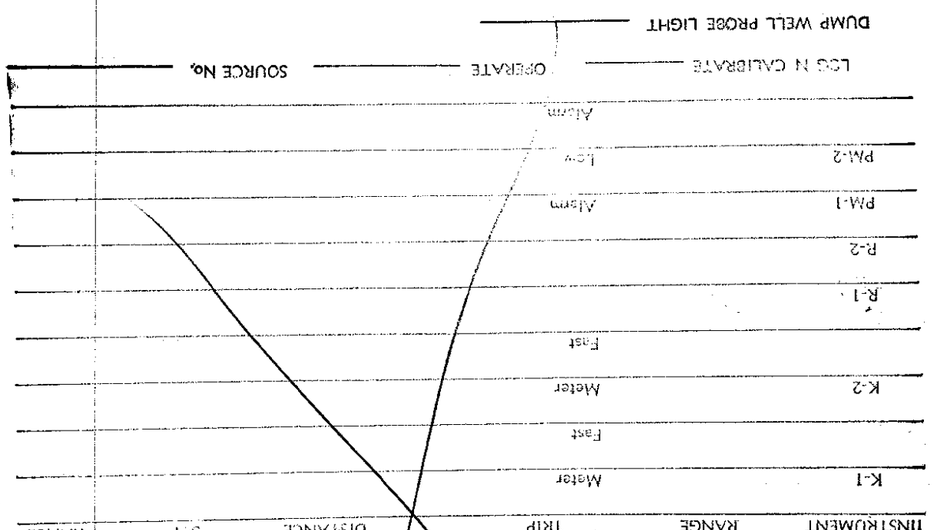
.50" Rods.
30 cm length.
3.4 cm separation c-c.

Have an 12 x12 array. 9 rods removed from 3 corners and 10 rods removed from 1 corner. Total of 107 rods.

Water lvl = 21.60 cm
+ Per.

Temp °C
25°C

1412 Water lvl = 19.15 cm
System just critical
Drain.



INSTRUMENT CHECK

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 _____

INSTRUMENT CHECK

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

LOG N CALIBRATE _____ OPERATE _____ SOURCE No. _____

DUMP WELL PROBE LIGHT _____

START-UP COPY TEST

Equipment checked by _____ Check by _____

Instruments and [illegible] by _____

Source in check[illegible] Source No. _____

Emergency equip[illegible] checked by _____

Instruments in trip [illegible] _____

Red light on by _____ Time _____

Start-up OK'd by _____ Date _____

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 X10 -12	Meter ✓	2"	✓	3 X10 -12
	"	Fast ✓	1"	✓	"
K-2	"	Meter ✓	2"	✓	"
	"	Fast ✓	1"	✓	"
R-1					
R-2					
PM-1	700 V	Alarm ✓	.5"	✓	500 V
PM-2	1200 V	Low ✓	10"	✓	900 V
	"	Alarm ✓	1"	✓	"

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

DUMP WELL PROBE LIGHT _____

START-UP CHECK LIST

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

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

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

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

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

Red light on by A.K.K. Time 14 30

Start-up OK'd by F.A.C. A.K.K. Date 2-19-70

.50 inch Rods.
30 cm length.
3.4 cm Separation c.c.

Have an 12 X12 array. 9 rods removed from 3 corners. and 10 rods removed from 1 corner. Total of 107 rods.

Water ht = 21.40 cm.
T/hr

Temp °C
25°C

1541 Water ht = 19.20 cm
System just critical
Drain!

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	4"	✓	3×10^{-12}
	"	Fast ✓	4"	✓	"
K-2	"	Meter ✓	3"	✓	"
	"	Fast ✓	1"	✓	"
R-1					
R-2					
PM-1	700V	Alarm ✓	Cont	✓	500V
PM-2	1200V	Low ✓	8"	✓	900V
	"	Alarm ✓	1"	✓	"

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

DUMP WELL PROBE LIGHT ______

START-UP CHECK LIST

Equipment checked by RKLL (E.D.C) Personnel check by E.D.C

Instruments and safeties checked and reset by RKLL

Source in checked by RKRJ Source No: M-43

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

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

Red light on by RKRJ Time 1315

Start-up OK'd by E.D.C. RKRJ Date 3-7-72

37.750 F.D X 35.750" ht. SS Tank.
5% VO_2F_2 solution and 5% metal Rods.
Tank is mounted 17.0" ~~from floor~~ from floor to bottom of tank.
5% VO_2F_2 solution: no rods.
Mixing of solution:
Solution Zero = 29.10 cm on scale.
½" Feed rate = 1.90 cm/min.
½" Drain rate = 2.0 cm/min.
3" Pump rate = 5.8 cm/15 sec = 23.2 cm/min.

1555 Solution ht = 102.8 cm
System sub critical
Draining.

INSTRUMENT CHECK

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

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

DUMP WELL PROBE LIGHT ✓

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AXR

Source in checked by AXR Source No. 19-43

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

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

Red light on by AXR Time 0825

Start-up OK'd by I.D.C. AXR Date 3-8-72

5% UO_2F_2 ~~solution~~ solution : no Rod.
Mixing of solution

solution hit = 109.60 cm
System sub critical
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	3"	✓	3×10^{-12}
	"	Fast ✓	1"	✓	"
K-2	"	Meter ✓	3"	✓	"
	"	Fast ✓	1"	✓	"
R-1					
R-2					
PM-1	700 V ✓	Alarm ✓	Cont	✓	500 V
PM-2	1200 V ✓	Low ✓	8"	✓	900 V
	"	Alarm ✓	1"	✓	"

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

DUMP WELL PROBE LIGHT ✓

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKR

Source in checked by RKR Source No. Ra-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 R.K.R/c Time 1945

Start-up OK'd by F.D.C. RKR Date 3-20-72

.30" Rods.
2.050 cm separation C-C.
VO_2F_2 solution.
30 cm length
Solution ht = 36.50 cm = bottom of rods.
Have a 12 X 12 array: Total of 144 rods.

1505 Solution ht = 65.0 cm Temp °C
System just critical 25.0 °C
Drain:

Removed 6 rods. Now have an 12 X 12 - 6
array: Total of 138 rods.

1535 Solution ht = 65.75 cm
System just critical
Drain.

Removed 6 rods. Now have an 11 X 12 array.
Total of 132 rods.

1551 Solution ht = 66.60 cm
System just critical
Drain.

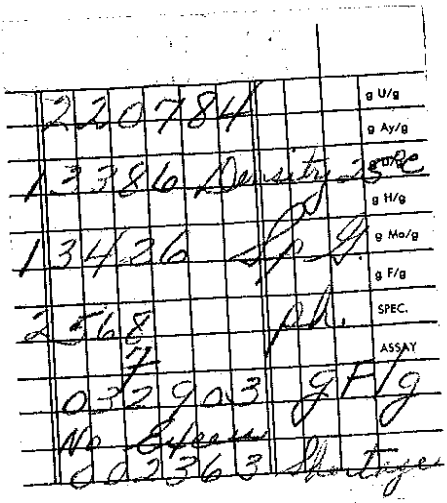
3-21-72 Found that $V(5)O_2F_2$ solution had attack
$V(5)$ rods in grid plates. Solution sample
taken:
ask for:
Sample #1.
1 - gU/g. = .220784 4.9 = 296.42 g/l
2 - sp. gr. = 1.3426 density = 295.54 g/l
3 - density = 1.3386 (at 25 °C)
4 - pH = 2.568
5 - HF (free in solution) = ~~.032903 gF/g~~ None.
6 - F_2 or F (if present. = .032903 gF/g.
0.002363 shortage F in solution
Sample #1
g = 169.9 g
T = 19.3 g
N = 150.6 g = 33.2g

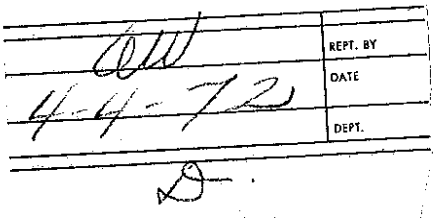
REQUISITION 694425 9/18/20

REPORT TO R. K. Reedy

BUILDING NO. 9213

TELEPHONE NO. 35237


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


REPT. BY
DATE
DEPT.

INSTRUMENT CHECK

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

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

DUMP WELL PROBE LIGHT ✓

START-UP CHECK LIST

Equipment checked by F.D.C. / R.K.L. Personnel check by F.D.C.

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

Source in checked by R.K.L. 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 R.K.L. Time 0815

Start-up OK'd by F.D.C. R.K.L. Date 4-27-72

4-27-72 Continuing experiments with U(5) rods after cladding rods with a clear plastic, shrinkable irradiated Polyolefin tubing. Also made new plastic tube sheets with new dia holes for rods.

avg zero (top of Rods) .30" Rods

Solution ht = 66.80 cm, 2.050 cm separation, c-c

UO_2F_2 solution. 30 cm length

Have an 11x11 array: total of 121 rods.

Δh = .05

solution ht = 68.75 cm — temp °C

+ Per — #3 = 25.0°C

τ = 113.0 sec = 9.0¢ = 180¢/cm — 4 = 24.8°C

1019 solution ht = 68.70 cm

System just critical

Drain ~ 6.0 cm solution.

Removed 6 rods: Now have an 11x11-6. 115 rods.

Δh .10

Solution ht = 70.20 cm — temp °C

+ Per — #3 = 25.0°C

τ = 82.6 sec = 11.4¢ = 114.0¢/cm — 4 = 24.8°C

1048 solution ht = 70.10 cm

System just critical

Drain ~ 6.0 cm.

over:

Removed 5 rods. Now have an 10 X 11 array
Total of 110 rods.

Solution ht = 71.70 cm Δ4 = .30 cm Temp °c
3 + Per #3 = 25.0 °c
Σ = 47.8 = 16.9 ¢ = 56.3 ¢/cm 4 = 29.8 °c
1115 Solution ht = 71.40 cm
System just critical
Drain.

Removed 5 rods. Now have an 10 X 10 array
with 5 rods on 1 face. Total of 105 rods.

Solution ht = 73.45 Δ3 = .25 Temp °c
4 + Per #3 = 25.1 °c
Σ = 69.5 cm = 13.0 ¢ = 52.0 ¢/cm #4 = 25.0 °c
1252 Solution ht = 73.20 cm
System just critical
Drain
Removed 5 rods. Now have an 10 X 10 array.
Total of 100 rods.

Solution ht = 75.95 cm Δ4 = .55 cm Temp °c
5 + Per #3 = 25.1
Σ = 60.8 cm = 13.0 ¢ = 26.0 ¢/cm 4 = 25.0

1300 Solution ht = 75.40 cm
System just critical
Drain.

Removed 5 rods. Now have an 10 X 10 - 5
array. Total of 95 rods.

Solution ht = 79.90 cm Δ4 = .80 Temp
6 + Per #3 = 25.5 °c
Σ = 60.8 cm = 14.3 ¢ = 17.9 ¢/cm 4 = 25.5 °c
1416 Solution ht = 79.10 cm
System just critical
Drain.

Removed 2 rods. Now have an 10 X 10 - 3
array. Total of 93 rods.

Solution ht = 82.10 cm Δ4 = .90 Temp °c
7 + Per # 3 = 25.5 °c
Σ = 71.7 cm = 12.7 ¢ = 14.1 ¢/cm 4 = 25.5 °c
1506 Solution ht = 81.20 cm
System just critical
Drain.

over:

Removed 3 rods. Now have an 9X10 array. Total of 90 rods.

Δh = 1.5cm

Solution ht = 86.65cm — Temp #3 = 25.5°C

+Per — #4 = 25.5°C

t = 69.5 sec = 13.0¢ = 8.7¢/cm.

1555 Solution ht = ~~86.65cm~~ 85.15cm

System just critical

Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP		SOURCE DISTANCE	SET	START-UP RANGE
K-1	3X10⁻¹²	Meter	✓	2"	✓	3X10⁻¹²
	"	Fast	✓	"	✓	"
K-2	"	Meter	✓	2"	✓	"
	"	Fast	✓	1"	✓	"
R-1						
R-2						
PM-1	700V	Alarm	✓	cont	✓	500V
PM-2	1200V	Low	✓	6"	✓	900V
	"	Alarm	✓	cont	✓	"

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

DUMP WELL PROBE LIGHT ✓

START-UP CHECK LIST

Equipment checked by ~~AKRL~~ I.P.C Personnel check by I.P.C

Instruments and safeties checked and reset by AKRL

Source in checked by AKRL Source No. M-43

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

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

Red light on by AKRL Time 0812

Start-up OK'd by I.P.C, AKRL Date 4-28-72

.30" Rods.
2.050 cm separation c-c.
UO_2F_2 solution.
30 cm length

Removed 3 rods. Now have an 9X9 ~~array~~ array with 6 rods on 1 face.
Total of 87 rods.

	Solution ht = 92.75 cm ($\Delta h = 1.15$ cm)	Temp °C
	+Per	#3 = 25.3
	T = 108.6 sec = 9.2¢ = 5.3	4 = 25.5
1036	Solution ht = 91.00 cm	
	System just critical	
	Drain	

Removed 3 rods. Now have an 9X9 array with 3 rods on 1 face. Total of 84 rods.

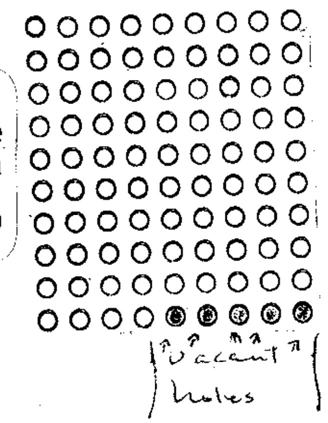
	Solution ht = 111.80 cm	Temp °C
	2 −Per: N.G.	#3 = 25.9°C
1:36	Drain	4 = 25.9°C

Added 1 rod. Now have an 9X9 array with 4 rods on 1 face. Total of 85 rods.

	Solution ht = 103.2 cm. ($\Delta h = 1.7$ cm)	Temp °C
	3 +Per	#3 = 26.0
	T = 341.2 sec = 3.5¢ = 2.1 ¢/cm	#4 = 26.0
1636	Solution @ 101.5 cm. Critical.	
	Drain	

K-2 erratic again during drain.

4/28/72 - 9x9 array
with 4 rods on 1 face
Total rods 85 .30 dia
2.050 cm sep. c-c
p.29



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 ✓	2"	✓	"
	"	Fast ✓	1"	✓	"
B-1					
B-2					
PM-1	700 V	Alarm ✓	Cont	✓	500 V
PM-2	1200 V	Low ✓	8"	✓	900 V
	"	Alarm ✓	1"	✓	"

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

DUMP WELL PROBE LIGHT ✓

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKA

Source in checked by RKA Source No. 19-43

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

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

Red light on by RKA Time 0810

Start-up OK'd by E.D.C., RKA Date 5-10-72

.30" Rods
2.050 cm separation c-c.
UO_2F_2 solution.
30 cm lengths

Now have an 10×10 - 5 array. Total of 95 rods. Total of 95 rods.

Δh = .50

Solution ht = 78.95 cm   Temp °C
1 + Per   #3 = 25.5
τ = 84.7 sec = 11.2¢ = 22.4¢/cm   4 = 25.7

0949 Solution ht = ± 78.45 cm
System just critical
Drain

Removed the 2×2×3/16 L support (stainless steel) from bottom of array. Replaced it with 4 pc of 2.5"×2" plexiglass tubes at each corner of 1.5" plexiglass support plate.

Δh = .60 cm

Solution ht = 78.50 cm   Temp °C
2 + Per   #3 = 25.7
τ = 71.7 sec = 12.7¢ = 21.2¢/cm.   4 = 26.0
Solution ht = ± 77.90 cm
System just critical
Drain   Removal of 2×2×3/16 L = ~11.6¢

INSTRUMENT CHECK

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

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

DUMP WELL PROBE LIGHT ✓

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKAC

Source in checked by RKAf Source No. 19-43

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

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

Red light on by RKAf Time 0805

Start-up OK'd by I.D.C, RKAf Date 5-11-72

.30" Rods

2.050 cm separation c-c, 30 cm length

UO_2F_2 solution.

Repeat of last experiment.

Δh = .65 cm

Solution ht = 78.55 cm   Temp °C

+Per   #3 = 25.5°C

I = 6519 ¢ = 13.6¢ = 20.9¢/cm   4 = 25.7°C

10:00 Solution ht = 77.90 cm.

System just critical

Drain.

Solution sample taken

II 1

Y-12 Reg # 684631   X-10 Reg # A-5452

G = 153.5 g   G = 153.7 g

T = 19.2 g   T = 18.8 g

N = 134.3 g = 29.8 g   N = 134.9 g

Y-12   ask for   X-10

1 g U/g .22200   1 - mg/g = 222.3

2 sp. gr. 1.3448   2 - sp. gr. = 1.3448

3 Density - 1.3408   3 - Density = 1.3420

4 Temp °C   4 - Temp °C = 20.0°C

Using density = 298.33 g U/l

over!

Array now raised 4.0" from bottom of tank. Have 4 pc 2.5" X 4.0" plexiglass tubing at each corner of support plate. Stainless steel support sill removed. (New zero at top of rods = 71.88 cm

Solution ht = 81.20 cm   Δh = .60 cm
+ Per

Temp °C
#3 = 26.0 °C
4 = 26.1 °C

τ = 49.98 sec = 16.4 ¢ = 27.37 ¢/cm.

1450 Solution ht = 80.60 cm
System just critical
~~Drain~~

Moving array 2.0" more from bottom of tank, giving 10.16 cm bottom reflector (solution). Reduced the thickness of the top reflector from last run at 2.0" bottom reflector a total of 2.38 cm.

INSTRUMENT CHECK

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

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

DUMP WELL PROBE LIGHT ✓

START-UP CHECK LIST

Equipment checked by F.P.C. RKKL Personnel check by F.P.C.

Instruments and safeties checked and reset by RKKL

Source in checked by RKKL Source No. M-43

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

Instruments in trip circuit: K-1-2 P-M-2

Rod light on by RKKL Time 0805

Start-up OK'd by F.P.C. RKKL Date 5-12-72

Repeat of last run (5-11-72)

$\Delta h = .30$ cm

Solution ht = ~~81.40 cm~~ 80.90 cm — Temp °C

+Per — #3 = 25.5 °C

T = 86.92 sec = 11.0¢ = 36.7¢/cm — 4 = 25.7 °C

0950 Solution ht = 80.60 cm

System just critical

Drain.

Removed 2 rods. Now have an 10 X 10 − ~~8~~ 7 array. Total 93 rods.

$\Delta h = .55$ cm

Solution ht = 82.65 cm — Temp °C

2 +Per — #3 = 25.7 °C

T = 69.54 sec = 13.0¢ = 23.6¢/cm — 4 = 26.0 °C

1045 Solution ht = 82.10 cm

System just critical

Drain.

Removed 1 rod. Now have an 10 X 10 − 8 array, total of 92 rods.

$\Delta h = .65$ cm

Solution ht = 83.50 cm — Temp °C

3 +Per — #3 = 25.8 °C

T = 76.05 sec = 12.2¢ = 18.8¢/cm. — 4 = 26.0 °C

1335 Solution ht = 82.85 cm

System just critical

Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 X 10^{-12}	Meter ✓	2"	✓	3 X 10^{-12}
	"	Fast ✓	1"	—	"
K-2	"	Meter ✓	2"	✓	"
	"	Fast ✓	1"	✓	"
R-1					
R-2					
PM-1	700 V	Alarm ✓	Cont	✓	500 V
PM-2	1200 V	Low ✓	8"	✓	900 V
	"	Alarm ✓	1"	✓	"

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

PUMP WELL PROBE LIGHT ✓

.30" Rod
2.05° cm separation c-c
VO_2F_2 solution
30 cm length.

START-UP CHECK LIST

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

Instruments and safeties checked and reset by BKH

Source in checked by BKH Source No. NA-43

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

Instruments in temp circuit: K-1-2 NA-1-2

Red light on by B.K.H. Time 0800

Start-up OK'd by I.D.C. BKH Date 5-15-72

Repeat of last num. p-36-37.

$\Delta h = .95$ cm

Solution ht = 83.35 cm
1 + Per
C = 91.27 cm = 10.6 ¢ = 23.5 ¢/cm

Temp °C
#3 = 25.0°C
¢ = 25.2°C

0945 Solution ht = ± 82.90 cm
System just critical
Drain.

Added 3 rods. Now have an 10 X 10 - 5 array. Total of 95 rods.
Purpose is to repeat experiment on p-34-36.

$\Delta h = .55$ cm

Solution ht = 81.10 cm
2 + Per
C = 65.19 cm = 13.6 ¢ = 24.7 ¢/cm

Temp °C
#3 = 25.5°C
¢ = 25.7°C

1051 Solution ht = ± 80.55 cm
System just critical
Drain.

Replaced the top tube sheet (.50" thickness) with a (.250" thick tube sheet) Now have an 10 X 10 - 8 array. Total of 92 rods.

$\Delta h = .40$ cm

Solution ht = 82.20 cm
3 + Per
C = 78.23 cm = 11.9 ¢ = 29.7 ¢/cm.

Temp °C
#3 = 26.0°C
¢ = 26.2°C

Solution ht = ± 81.80 cm.
System just critical
Drain.

Drain

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE IN / OUT	SET	START-UP RANGE
K-1	$3X10^{-12}$	Meter ✓	2"	✓	$3X10^{-12}$
	"	Fast —	1"	✓	"
K-2	"	Meter ✓	2"	—	"
		Fast ✓	1"	—	"
P/A-1					
P/A-2					
P/A-1	7000	Alarm —	cont	✓	6000
P/A-2	12000	Low ✓	8"	✓	9000
	"	Alarm ✓	1"	✓	"

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

DUMP WELL PROBE LIGHT ✓

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKK

Source in checked by RKK Source No. M-93

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

Instruments in trip circuit: K-1-2 P/A-1-2

Red light on by RKK Time 1010

Start-up OK'd by F.D.C. RKK Date 6-16-72

.30" rods
2.050 cm operation c-c.
D_2F_2 solution
30 cm lengths.

still have the 10 X 10 - 8 array. total of 92 rods. also have in contact on top of array 2 pc of plexiglass 1 that is 1" X 24" X 24". and 1 that is .50" X 24" X 24" making a total of 1.5" thick. This is a make-up of the bottom support plate. also the top tube sheet is the .250" thick one.

Solution ht = 112.50 cm
1 - Per
N.G.
1008 Drain

Temp °c
#3 = 25.7 °c
4 = 26.0 °c

added 1 rod. Now have an 10 X 10 - 7 array. Total of 93 rods.

Δh = 3.45 cm
Solution ht = 105.70 cm
2 Per
τ = 245.55 sec = 4.1 ℓ = 1.4 ℓ/cm.
1555 Solution ht = 102.25
System just critical
Drain.

Temp °c
#3 = 25.8 °c
4 = 26.2 °c

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	2"	✓	3×10^{-12}
	"	Fast —	"	✓	"
K-2	"	Meter —	2"	✓	"
	"	Fast ✓	1"	—	"
P-1					
P-2					
PM-1	700V	Alarm — (Taken out of service)			
PM-2	1200V	Low ✓	8"	—	900V
	"	Alarm ✓	1"	✓	"

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

DUMP WELL PROBE LIGHT ______

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKR

Source in checked by RKR Source No. P-93

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

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

Red light on by RKR Time 1210

Start-up OK'd by F.D.C. RKR Date 5-17-72

.30" rods.
2.050 cm separation c-c.
UO_2F_2 solution.
30.0 cm length

Have an 10 X 10 - 7 array. Total of 93 rods. Also the 1.5" of plexiglass described on p-41 has been removed.

Solution ht = 81.55 cm (Δh = .30 cm) Temp °C

1 + Per #3 = 25.7 °C

τ = 91.27 sec = 10.6¢ = 35.3¢/cm 4 = 25.7 °C

1329 Solution ht = 81.25 cm

System just critical

Drain.

Repeat of above:

Solution ht = 81.20 cm (Δh = .45) Temp °C

2 + Per # 3 = 25.7 °

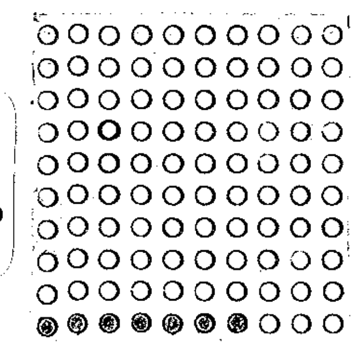
τ = 73.88 sec. = 12.4¢ = 27.55¢/cm 4 = 25.7 °C

1512 Solution ht = 80.75 cm

System just critical

Drain.

5/17/72 10x10 array w 7 rods removed from 1 face. Total rods 93 .30" dia. 2.050 cm sep c-c P.43



INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE RANGE	SEE	START-UP RANGE
[illegible]	3X10-12	Meter ✓	2"	✓	3X10-12
	"	Pen ✓	1"	✓	"
	"	Meter ✓	2"	✓	"
	"	Pen ✓	1"	✓	"
PM 1	700 V	Alarm ✓	cnt	✓	500 V
PM 2	1200 V	Low ✓	8"	✓	900 V
	"	Alarm ✓	1"	✓	"

LOG N CALIBRATE ✓ OPERATE _____ SOURCE No. 3-80

DUMP WELL PROBE LIGHT ✓

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKM

Source in checked by RKM Source No. M-93

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

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

Red light on by RKM Time 0935

Start-up OK'd by I.D.C. RKM Date 5-18-72

30" rods.
2.050 cm separation c.c.
UO_2F_2 solution
30 cm length.

Repeat of last run # 93.

Δh = .40 cm

Solution ht = 81.20 cm — Temp °C

1 + Per — #3 = 25.5°C

τ = 93.44 μs = 10.4 f = 26.0 f/cm — 4 = 25.7°C

1135 Solution ht = ≠80.80 cm

System just critical

Drain.

Repeat of above.

Δh = .45 cm

Solution ht = 81.25 cm — Temp °C

2 + Per — #3 = 25.5°C

τ = 76.05 μs = 12.2 f = 27.11 f/cm — 4 = 25.7°C

1300 Solution ht = ≠80.80 cm

System just critical

Drain.

Δh = .30 cm

Solution ht = 81.10 cm. — Temp °C

3 + Per — #3 = 25.7°C

τ = 136.90 μs. = 7.7 f = 25.67 f/cm. — 4 = 25.7°C

1330 Solution ht = 80.80 cm

System just critical

Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE POSITION	SET	START-UP RANGE
K-1	$3X10^{-12}$	Meter ✓	2"	✓	$3X10^{-12}$
	"	Fast ✓	1"	–	"
K-2	"	Meter ✓	2"	✓	"
	"	Fast –	"	–	"
R-1					
R-2					
PM-1	7000	Alarm ✓	2nd	✓	5000
PM-2	12000	Low –	8"	✓	9000
	"	Alarm –	1"	✓	"

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

DUMP WELL PROBE LIGHT ✓

START-UP CHECK LIST

Equipment checked by R.K.H (I&C) Personnel check by I.D.C B.K.H

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

Source in checked by B.K.H Source No. M-43

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

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

Red light on by R.K.H Time 0920

Start-up OK'd by I.D.C. R.K.H Date 5-22-72

.30" rods
2.050 cm operation e-a.
0_2F_2 solution
30 cm length.

Report of last experiment (P-45)

Δk = .35 cm

Solution ht = 81.15 — Temp °c

17 Per — #3 = 25.2°c

C = 99.96 cm = 9.9 ℓ = 28.28 ℓ/cm — 4 = 25.5°c

1050 Solution ht = ± 80.80 cm

System just critical

Drain.

Have an 10X10-7 array; total of 93 rods. Also have in contact on top of array 1 pc of plexiglass that is .50"X24X24. Top tube sheet is .250" thick.

Δk = 2.40 cm

Solution ht = 83.15 cm — Temp °c

2 + Per — #3 = 25.5°c

C = 115.17 cm = 8.8 ℓ = 22.0 ℓ/cm — 4 = 25.7°c

Solution ht = 82.75 cm.

System just critical

Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP VALUE
K-1	3×10^{-12}	Meter ✓	2"	✓	3×10^{-12}
	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	2"	✓	"
	"	Fast ✓	1"	✓	"
R-1					
R-2					
PM-1	700V ✓	Alarm ✓	cont	✓	500V
PM-2	1200V ✓	Low ✓	8"	✓	900V
	"	Alarm ✓	1"	✓	"

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

DUMP WELL PROBE LIGHT ✓

START-UP CHECK LIST

Equipment checked by A.K.H. Personnel check by F.D.C

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

Source in checked by A.K.H. Source No. M-9-3

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

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

Red light on by A.K.H. Time 0805

Start-up OK'd by F.D.C, A.K.H. Date 5-23-72

.30" rods
2.050 cm separation c-c.
UO_2F_2 solution
30 cm length.

Have an 10 x 10 - 7 array. Total of 73 rods.
also have in contact on top of array
1 pc of plexiglas #.250" x 24" x 24" and
1 pc .50 x 24" x 24". Making a total of 1.750"
thick.

$\Delta k = 2.60$ cm

Solution HC = 84.80 cm
1 + per
C = 123.86 nec = 8.3 ¢ = 13.83 ¢/cm.

Temp °C
#3 = 25.5°C
4 = 25.7°C

0945 Solution HC = 84.20 cm
System just critical
Drain.

added 1 pc of plexiglas .250" x 24" x 24" to above.
Making a total of 1.0 thick.

$\Delta k = .9$ cm

Solution HC = 87.10 cm
2 + per
C = 106.48 nec = 9.4 ¢ = 10.44 ¢/cm

Temp °C
#3 = 25.0°C
4 = 25.7°C

1120 Solution HC = 86.20 cm
System just critical
Drain.

acry.

added 1 pc plexiglas .250" X24" X24" to above making a total of 1.250" thick

Δh = 1.8 cm

Solution ht = 92.70 cm. Temp °c

3 + Per #3 = 26.0°c

C = 112.99 rec = 9.0 ¢ = 5.0 ¢/cm 4 = 26.1°c

1330 Solution ht = 90.90 cm

System just critical

Drain

Now have only 1 pc of plexiglas on top of array. Thickness .250" X24" X24".

Δh = 1.50

Solution ht = 82.80 cm Temp °c

4 + Per #3 = 25.8°c

C = 76.05 rec = 12.2 ¢ = 29.4 ¢/cm 4 = 26.2°c

1436 Solution ht = ± 82.30 cm

System just critical

Drain

Now have 1 pc of plexiglas 1.0" X24" X24" and 1 pc .50" X24" X24" on top of array. Total of 1.50".

Δh = 3.0 cm Temp °c

Solution ht = 99.80 cm #3 = 26.2

5 + Per 4 = 26.5

C = 154.40 rec = 6.9 ¢ = 2.3 ¢/cm.

1600 Solution ht = 96.80 cm

System just critical

Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	2"	✓	3×10^{-12}
	"	Fast ✓	1"	✓	"
K-2	"	Meter ✓	2"	✓	"
		Fast ✓	1"	✓	"
R-1					
R-2					
PM-1	700v	Alarm ✓	Cont	✓	500v
PM-2	1200v	Low ✓	8"	✓	900v
	"	Alarm ✓	1"	✓	"

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

DUMP WELL PROBE LIGHT ✓

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKR

Source in checked by RKR Source No. M-43

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

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

Red light on by RKR Time 0800

Start-up OK'd by I.D.C. RKR Date 5-31-72

.30" rods.
2.453 cm separation c.c.
VO_2F_2 solution
30 cm lengths.

Have an 9X10 array: Total of 90 rods.

ΔL = .20 cm

Solution ht = 78.05 Temp °C

[1] + Per #3 = 25.1 °C

τ = 108.65 sec = 9.3¢ = 46.5¢/cm 4 = 25.1 °C

0927 Solution ht = ± 77.85

System just critical

Drain.

Removed 5 rods. Now have an 9X9+4 rods on 1 face. Total of 85 rods.

ΔL = .35 cm

Solution ht = 80.70 cm Temp °C

[2] + Per #3 = 25.5 °C

τ = 104.30 sec = 9.5¢ = 27.1¢/cm 4 = 25.7 °C

1400 Solution ht = ± 80.35 cm

System just critical

Drain.

Removed 4 rods, Now have an 9X9 array. Total of 81 rods.

ΔL = .45 cm

Solution ht = 83.40 cm. Temp °C

[3] + Per #3 = 25.7 °C

τ = 108.65 sec = 9.3¢ = 20.7¢/cm 4 = 25.8 °C

[illegible]

1450 Solution ht = ∓ 82.95 cm
System just critical
Drain.

Added 1 rod. Now have an 9X9+1 array.
Total of 82 rods.

Δh = .40 cm

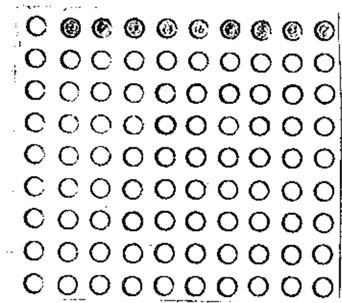
Solution ht = 82.70 cm
+ Per

τ = 104.30 sec = 9.6 ℓ = 240 ¢/cm

Temp °C
#3 = 25.8 °C
4 = 26.0 °C

1531 Solution ht = ∓ 82.30 cm
System just critical
Drain.

5/31/72 9x9 array + 1
Total rods 82 - .30"dia
2.453 cm - Sep. cc P.54



INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	2"	✓	3×10^{-12}
	"	✓	1"	✓	"
K-2	"	Meter ✓	2"	✓	"
	"	✓	1"	✓	"
R-1					
R-2					
PM-1	700 V	Alarm ✓	Cont	–	500 V
PM-2	1200 V	✓	8"	✓	900 V
	"	Alarm ✓	1"	✓	"

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

DUMP WELL PROBE LIGHT ✓

START-UP CHECK LIST

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

Instruments and solution checked and reset by RKM

Source in checked by RKM Source No. M-43

Emergency equipment in control room checked by RKM

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

Red light on by RKM Time 0800

Start-up OK'd by I.D.C. RKM Date 6-1-72

.30" rods.
2.453 cm separation c-c.
UO_2F_2 solution
30 cm length.

Repeat of last experiment. p-54

ab=.25cm

Solution ht = 82.45 cm
+Per
I=149.94 ma = 7.1 f = 28.4 f/cm

Temp °c
#3 = 25.2°c
4 = 25.2°c

1000 Solution ht = ±82.20 cm
System just Criticial
Drain.

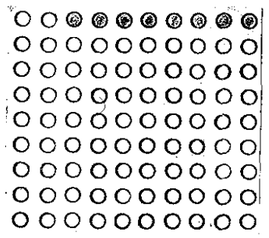
added 1 rod. Now have an 9X9+2 array.
Total of 83 rods.

ab=.35

Solution ht = 81.90 cm
2 +Per
I=126.03 ma = 8.2 f = 23.4 f/cm.
Solution ht = ±81.55 cm.
System just criticial
Drain.

Temp °c
#3 = 25.5°c
4 = 25.5°c

6/1/72 9x9 array + 2
Total rods 83 - .30"dia
2.453 cm - sep. cc P.56



INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	2"	~	3×10^{-12}
	"	Rate ✓	1"	~	"
K-2	"	Meter ~	2"	~	"
	"	Rate ✓	1"	~	"
R-1					
R-2					
PM-1	700 v	Alarm ✓	cent	~	500 v
PM-2	1200 v	Low ~	8"	✓	900 v
	"	Alarm ~	1"	~	"

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

DUMP WELL PROBE LIGHT ~

START-UP CHECK LIST

E.D.C

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

Instruments and safeties checked and reset by RKA

Source in checked by RKA Source No. M-93

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

Instruments in trip circuit: K-1-2 R9-1-2

Red light on by RKA Time 0935

Operation OK'd by E.D.C RKA Date 6-6-72

~~room tem~~
.30" rods.
2.900 cm seperation c-c
UO_2F_2 solution
30 cm length.

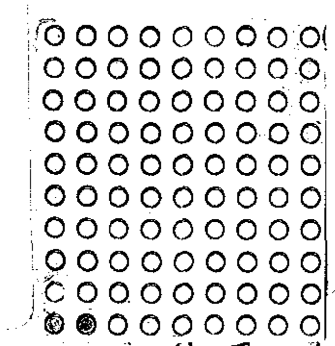
Have an 9X9 array: total of 81 rods.

Solution ht = 83.40 cm $\Delta h = .45$ cm — Temp °c
[1] + Per — #3 = 25.6 °c
t = 117.34 sec = 8.7¢ = 19.3¢/cm. — 4 = 25.7 °c
1101 Solution ht = ± 82.95 cm.
System just critical
Drain.
added 1 rod. Have an 9X9+1 array: total of 82 rods.
1220 System scrammed: K-2 zero knob
not moved when changing scale.

Solution ht = 82.85 cm $\Delta h = .45$ cm — Temp °c
[2] + Per — #3 = 25.8 °c
t = 102.13 sec = 9.7¢ = 21.5¢/cm — 4 = 26.0 °c
Solution ht = ± 82.40 cm
System just critical
Drain

added 1 rod. Have an 9X9+2 array: total of 83 rods.

Solution ht = 82.20 cm $\Delta h = .30$ cm — Temp °c
[3] + Per — #3 = 26.0 °c
t = 97.78 sec = 10.1¢ = 33.7¢/cm. — 4 = 26.2 °c



1347 Solution ht = ± 81.90 cm
System just critical
Drain.

Solution sample taken.

#2 Y-12 Reg #684632	#2-A X-10 Reg # A-54531
G = 161.6 grams	G = 162.6 grams
T = 19.0 "	T = 18.9 "
N = 142.6 " = 31.9	N = 143.7 "
ask for.	ask for.
1 - g U/g. = .223255	1 - g U/g. = .2235
2 - sp. gr. = 1.3479	2 - sp. gr. = 1.3474
3 - density = 1.3440	3 - density = 1.3442
4. Temp °c =	4. Temp °c = 20 °c
300.03 g U/l	301.43 g U/l

300.24 g U/l av.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	2"	✓	3×10^{-12}
	"	Fast ✓	1"	✓	"
K-2	"	Meter ✓	2"	✓	"
	"	Fast ✓	1"	✓	"
R-1					
R-2					
PM-1	700V	Alarm ✓	Cont	✓	500V
PM-2	1200V	Low ✓	8"	✓	900V
	"	Alarm ✓	1"	✓	"

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

DUMP WELL PROBE LIGHT ✓

START-UP CHECK LIST

Equipment checked by R.K.A. / I.O.C. Personnel check by I.O.C.

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

Source in checked by RKA Source No. Pu-43

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

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

Red light on by RKA Time 1255

Start-up OK'd by I.O.C., RKA Date 6-7-72

.516" Rods
2.99 cm separation c-c.
UO_2F_2 solution
30 cm length.

Top of rods = 71.50 cm (avg)

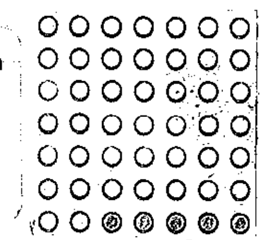
Have an 6 X 7 array. Total of 42 rods.

Solution ht = 85.90 cm $\Delta h = .45$ cm — Temp °C
+Per — #3 = 26.0 °C
t = 108.65 sec = 9.3¢ = 20.7¢/cm — 4 = 26.0 °C
1443 Solution ht = 85.45 cm
System just critical
Drain.

added 2 rods. Now have an 7X7-5 array.
Total of 44 rods.

Solution ht = 82.60 $\Delta h = .40$ cm — Temp °C
+Per — #3 = 26.2 °C
t = 86.92 sec = 11.0¢ = 27.5¢/cm — 4 = 26.2 °C
1533 Solution ht = 82.20 cm
System just critical
Drain.

6/7/72 7x7 array-5
total rods 44 - .516"
dia, 2.99 cm sep.
c-c p.61



INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE	SET	START-UP RANGE
K-1	3X10^{-12}	Meter ✓	2"	✓	3X10^{-12}
	"	Fast ✓	1"	✓	"
K-2	"	Meter ✓	2"	✓	"
	"	Fast ✓	1"	✓	"
K-3					
PM-1	700 V	Alarm ✓	don't	✓	500 V
PM-2	1200 V	Low ✓	8"	✓	900 V
	"	Alarm ✓	1"	✓	"

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

DUMP WELL PROBE LIGHT ✓

START-UP CHECK LIST

Equipment checked by I.V.C. RKL Personnel check by I.V.C

Instruments and safeties checked and reset by RKL

Source in checked by RKL Source No. M-83

Emergency equip. ... checked by I.V.C

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

Rod light on by RKL Time 0810

Start-up OK'd by I.V.C. RKL Date 6-8-72

1.516" rods.
2.99 cm separation C-C.
UO_2F_2 solution
30 cm length.

added 1 rod. Now have an 7X7-4 array. Total of 45 rods.

Solution ht = 81.00 cm. $\Delta h = .35$ cm

Temp °C
#3 = 25.1 °C
4 = 25.9 °C

+ per

T = 89.09 sec = 10.8¢ = 30.9 ¢/cm.

0934 Solution ht = ± 80.65 cm
System just critical
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	2"	—	3×10^{-12}
	"	Fine —	1"	✓	"
K-2	"	Meter ✓	2"	✓	"
	"	" ✓	1"	✓	"
R-1					
R-2					
PM-1	700 V	Alarm ✓	Cent ✓		500 V
PM-2	1200 V	Low ✓	8"	—	900 V
	"	Alarm ✓	1"	—	"

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

DUMP WELL FRODE LIGHT ✓

START-UP CHECK LIST

Equipment checked by R.K.M. F.D.C. Personnel check by I.D.C.

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

Source is checked by R.K.M. Source No. M-93

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

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

Red light on by R.K.M. Time 0920

Start-up OK'd by I.D.C. R.K.M. Date 6-19-72

.516" rods
3.40 cm separation c-c.
O_2 C_2 solution
30 cm length.

Have an 7X7 array. Total of 49 rods.

$\Delta h = .15$ cm

Solution ht = 75.15 cm — Temp °C
+Per — #3 = 25.5°C
C = 78.23 sec = 11.9 ¢ = 79.3 ¢/cm — 4 = 25.7°C

1040 Solution ht = 75.00 cm.
System just critical
Drain

Removed 4 rods. Now have an 7X7-4 array.
Total of 45 rods.

$\Delta h = .35$ cm

Solution ht = 78.10 cm — Temp °C
2 +Per — #3 = 26.0°C
C = 71.71 sec = 12.7 ¢ = 36.3 ¢/cm — 4 = 26.0°C

1108 Solution ht = 77.75 cm.
System just critical
Drain.

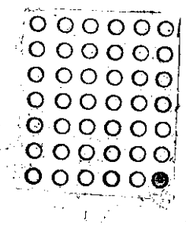
Removed 4 rods. Now have an 6 X 6 + 5 array.
(5 rods on 1 face.) Total of 41 rods.

$\Delta h = .40$ cm

Solution ht = 82.30 cm — Temp °C
3 +Per — #3 = 26.0°C
C = 95.61 sec = 10.2 ¢ = 25.5 ¢/cm. — 4 = 26.0°C

1313 Solution ht = 81.90 cm
System just critical
Drain

6/19/72 6x6 array +
5 rods on 1 face Total
rods 41 .516 Dia
3.40 cm sep. P.65-66



added 1 rod. Now have an 6 X 7 array.
Total of 42 rods.

Δh = 50 cm

Solution ht = 81.10 cm
4 + Per
L = 67.36 cm = 13.3 ¢ = 26.6 ¢/cm

Temp °
#3 = 26.2°
4 = 26.2°

1342 Solution ht = 80.60 cm
System just critical
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 X 10 -12	Meter ✓	2"	✓	3 X 10 -12
	"	Fast ✓	1"	✓	"
K-2	"	Meter ✓	2"	✓	"
	"	Fast ✓	1"	✓	"
R-1					
R-2					
PM-1	700 V	Alarm ✓	cent	✓	500 V
PM-2	1200 V	Low ✓	8"	✓	900 V
	"	Alarm ✓	1"	✓	"

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

DUMP WELL PROBE LIGHT ✓

START-UP CHECK LIST

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

Instruments and safeties checked and reset by BRH

Source in checked by BRH Source No. M-93

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

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

Red light on by BRH Time 1315

Start-up OK'd by I.D.C. BRH Date 6-20-72

.516" rods
3.94 cm separation c - c.
VO_2F_2 solution
30 cm length.

Have on 7 X 7 array. Total of 49 rods.

$\Delta h = .10$

Solution ht = 75.60 cm   Temp °C
+Per
τ = 134.73 sec = 7.84 = 78.4 ¢/cm   #3 = 25.7°C
        4 = 25.7°C
1835 Solution ht $\overset{F}{=}$ 75.50 cm
System just critical
Drain.

Removed 7 rods. Now have an 6 X 7 array.
Total of 42 rods.

$\Delta h = .25$ cm

Solution ht = 81.00 cm   Temp °C
+Per   #3 = 26.0°C
τ = 134.73 sec = 7.84 = 31.2 ¢/cm   4 = 26.0°C
Solution ht $\overset{F}{=}$ 80.75 cm.
System just critical
Drain

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP		SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 X 10^{-12}	Meter	✓	2"	✓	3 X 10^{-12}
	"	Fast	✓	1"	✓	"
K-2	"	Meter	✓	2"	✓	"
	"	Fast	✓	1"	✓	"
R-1						
R-2						
PM-1	700 V	Alarm	✓	Cont	✓	500 V
PM-2	1200 V	Low	✓	8"	✓	900 V
	"	Alarm	✓	1"	✓	"

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

DUMP WELL PROBE LIGHT ✓

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKAL

Source in checked by AKAL Source No. M-93

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

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

Red light on by AKAL Time 0905

Start-up OK'd by I.D.C. AKAL Date 6-21-72

.516" Rods
3.94 cm separation C-C.
VO_2F_2 solution
30 cm lengths.

Removed 2 rods. Now have an 6X6+4 array. Total of 40 rods.

Solution ht = 83.60 cm. Δh = .40 cm

+Per

τ = 130.38 sec = 8.04 = 20.0 ¢/cm

Temp °C
#3 = 25.5°C
4 = 25.7°C

1048 Solution ht = 83.20 cm
System just critical
Drain

INSTRUMENT CHECK

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

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

DUMP WELL PROBE LIGHT ✓

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKK

Source in checked by RKK Source No. M-43

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

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

Red light on by RKK Time 0800

Start-up OK'd by E.D.C. RKK Date 6-22-72

.516" Rods
3.94 cm. separation c-c
UO_2F_2 solution
30 Cm. length

Repeat of last num. p = 70

Δℓ = .40 cm

Solution ht = 83.60 cm
+Per
L = 113.00 cm = 9.0 ℓ = 22.5 ℓ/cm
0940 Solution ht = ±83.20 cm
System just critical
Drain.

Temp °C
Ø3 = 25.5°C
φ = 25.5°C

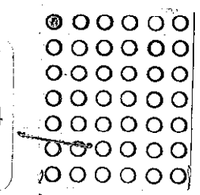
Added 1 rods. Now have an 6 X 6 + 5 array. Total of 41 rods.

Δℓ = .35 cm

Solution ht = 82.10 cm
2 +Per
L = 97.78 cm = 10.0 ℓ = 28.6 ℓ/cm
1016 Solution ht = ±81.75 cm
System just critical
Drain.

Temp °C
Ø3 = 25.5°C
φ = 25.7°C

6/22/72 6x6 array + 5 rods on 1 face total rods 41 .516 Dia. 3.94 cm sep. c-c p.72



6-22-72 Solution sample taken.

Ø3 Y-12 Req #684635
G = 133.8 g
T = 19.5
N = 114.3 = 25.6 g
calc for.
g U/g. = .223930
sp. gr. = 1.3456
density. = 1.3416
Temp °C
= ~301.32 g U/L

Ø3-A X-10 Req # A-5454
G = 126.6
T = 18.9
N = 107.7
calc for.
g U/g. = 0.223
sp. gr. = 1.3496
density. = 1.3467
Temp °C = 20°C
= ~300.90 g U/L

301.14 g U/L average

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE [illegible]	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	3"	✓	3×10^{-12}
	"	Fast ✓	1"	✓	"
K-2	"	Meter ✓	3"	✓	"
	"	Fast ✓	1"	✓	"
R-1					
R-2					
PM-1	700 V ✓	Alarm ✓	.5"	✓	500 V
PM-2	1200 V ✓	Low ✓	8"	✓	900 V
	"	Alarm ✓	1"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ SOURCE No. ✓

DUMP WELL PROBE LIGHT ✓

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKC

Source in checked by RKC 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 RKC Time 0920

Start-up OK'd by F.D.C. RKC Date 7-25-72

.30" rods
3.25 cm separation c-c.
VO_2F_2 solution
30 cm length.

Have a 9 X 10 array: Total of 90 rods.

$\Delta h = .30$ cm

Solution ht = 80.10 cm Temp °C

1 + Per #3 = 26.0°C

τ = 82.57 sec = 11.4¢ = 38.0¢/cm 4 = 26.0°C

1030 Solution ht = ±80.40 cm
System just critical
Drain.

Removed 3 rods: Now have an 9 X 9 + 6 array:
Total of 87 rods.

$\Delta h = .30$ cm

Solution ht = 82.00 cm Temp °C

2 + Per #3 = 26.0°C

τ = 126.03 sec = 8.2¢ = 27.3¢/cm 4 = 26.0°C

1109 Solution ht = ±81.70 cm
System just critical
Drain.

Drew Removed 1 rod. Now have an 9 X 9 + 5 array:
Total of 86 rods.

$\Delta h = .25$ cm

Solution ht = 82.60 cm Temp °C

3 + Per #3 = 26.0°C

τ = 126.03 sec = 8.2¢ = 32.8¢/cm 4 = 26.0°C
avr.

1130 Solution M_t^t = 82.35 cm
Western just critical
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Alert ✓	3"	✓	3×10^{-12}
	"	Rod ✓	1"	✓	"
K-2	"	Alert ✓	3"	✓	"
	"	Rod ✓	1"	✓	"
P-1					
P-2					
PM-1	700 V	Alert ✓	5"	✓	500 V
PM-2	1200 V	Low —	10"	✓	900 V
	"	Alert ✓	Out	✓	"

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

DUKE V'ILL RECIR LIGHT ✓

START-UP CHECK LIST

Experiments checked by I.D.C. A.K.A. Personnel check by I.D.C.

Instruments and controls checked and reset by A.K.A.

Rods to be checked by R.K.A. Source No. M-43

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

Experiments for trip checked: K-1-2 PM-1-2

Test trips run by A.K.A. Time 1235

Shutdown data by I.D.C. & A.K.A. Date 7-26-72

.516" rods
4.40 cm separation c-c.
VO_2F_2 solution
30 cm length.

Have on 6 X 7 array: total of 42 rods.

Solution ht = 83.40 cm — Temp °C
+ Per Void. — #3 = 26.0°C
4 = 26.0°C

1409 System scrammed by K-2 when changing scales from 3×10^{-10} to 10×10^{-10}

$\Delta h = .45$ cm
Solution ht = 83.40 cm — Temp °C
+ Per — #3 = 26.0°C
τ = 89.09 sec = 10.8¢ = 24.0 ¢/cm — #4 = 26.0°C

1432 Solution ht = ± 82.95 cm
System just critical
Drain.

Added 1 rod. Now have on 7X7 − 6 array.
Total of 43 rods.

Solution ht = 82.60 cm — Temp °C
+ Per [2] — $\Delta h = .45$ cm — #3 = 26.2°C
τ = 76.05 sec = 12.2¢ = 27.1¢/cm — 4 = 26.2°C

1505 Solution ht = 82.15
System just critical
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	3"	✓	3×10^{-12}
	"	[illegible] ✓	1"	✓	"
K-2	"	Meter ✓	3"	✓	"
	"	[illegible] ✓	1"	✓	"
[illegible]					
[illegible]					
[illegible]	700 V	Alarm ✓	.54	✓	500 V
[illegible]	1200 V	Low ✓	10"	✓	900 V
	"	Alarm ✓	1.0"	✓	"

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

DUMP WELL PROBE LIGHT ✓

START-UP CHECK LIST

Equipment checked by RKR / F.D.C — Personnel check by F.D.C
Instruments and safeties checked and reset by RKR
[illegible] checked by RKR — [illegible] No. 19-43
[illegible] checked by F.D.C
[illegible] trip circuits K-1-2 PM-1-2
Red light on by RKR — Time 0840
Start-up [illegible] by F.D.C, RKR — Date 7-27-72

, 516" rods.
4.40 cm separation c-c.
UO_2F_2 solution
30 cm length.

Added 1 rod. Now have an 7X7-5 array.
Total of 44 rods.

Δh = .35 cm
Solution ht = 81.35 cm
+Per
C = 104.30 sec = 9.6 ¢ = 27.4 ¢/cm.

Temp °C
#3 = 26.0 °C
4 = 26.0 °C

1008 Solution ht = ± 81.00 cm
System just critical
Drain.

#4 Solution sample taken
Reg. X-12 684636
G = 150.0 g
T = 19.4 g
N = 130.6 g = 29.3 g
ask for.
g U/g = .224610
Sp. gr. = ~~1.70592~~ 1.3492
Density = ~~1.70080~~ 1.3453
Temp °C = ? 25.0 °C
303.04 g U/l

X-10 Reg. A-5455
G = 156.5 g
T = 19.0 g
N = 137.5 g.
g U/g = 0.224
Sp. gr. = 1.3502
Density = 1.3474
Temp °C = 19.5 °C
= 301.8 g U/l

Note see correction sheet attached to Rep sheet.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP		SOURCE DISTANCE	SET	START-UP RANGE
K-1	3X10 -12	Meter	✓	4"	✓	3X10 -12
	"	Fast	✓	1"	✓	"
K-2	"	Meter	✓	4"	✓	"
	"	Fast	✓	1"	✓	"
R-1						
R-2						
PM-1	700 V	Alarm	✓	5"	✓	500 V
PM-2	1200 V	Low	✓	10"	✓	900 V
	"	Alarm	✓	1"	✓	"

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

DUMP WELL PROBE LIGHT ______

START-UP CHECK LIST

Equipment checked by RKL Personnel check by ~~E.D.C.~~ RKL.
Instruments and safeties checked and reset by RKL
Source in checked by RKL Source No. M-43
Emergency equipment in control room checked by E.D.C.
Instruments in trip circuit: K-1-2 PM-1-2
Red light on by RKL Time 0800
Start-up OK'd by E.D.C. RKL Date 8-11-72

.30" Rods. (unclad) (.762) cm
30 cm length.
1.300 cm separation c-c.
H_2O only.

Base plate in "Little Nell." 6" bottom reflector.
Feed rate = 4.6 cm/min.
3" Drain = 27.60 cm/min.
4" dump = 37.50 cm/min.

Top of rods: H_2O = 28.40 cm. (on back scale.)

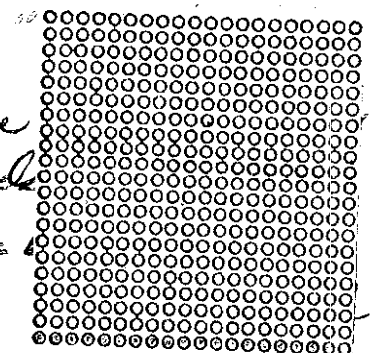
Have an 20x20+4 array. Total of 404 rods
s.l. = 2.90 cm

Water ht = 38.30 cm — Temp °C
1 +Per — #1 = 25.0°C
τ = 60.84 sec = 14.3¢ = 4.9¢/cm — 2 = 25.0°C
1016 Water ht = ±35.40 cm
System just critical
Drain.
Removed 4 rods: Now have an 20x20 array. Total of 400 rods.

1033 Water ht = 43.95 cm
System sub critical
Drain.

p-83

1.30 cm separation c-c
30 cm length

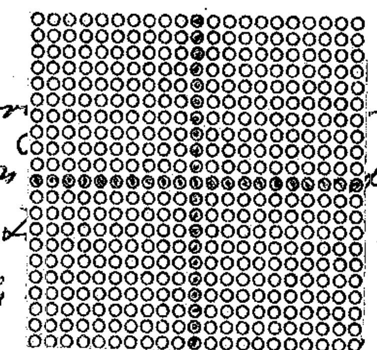


Added 1 rod: Now have array. Total of 401 rods
s.l. =

Water ht = 44.10 cm
2 +Per — #1 = 25.0°C
τ = 230.34 sec = 4.9¢ = .75¢/cm — 2 = 25.0°C
1113 Water ht = ±37.60 cm
System just critical
Drain.

Removed 1 rod: Now have an 20x20 array. Total of 400 rods.

Water ht = 44.15 cm. — Temp °C
3 −Per — #1 = 25.0°C
τ = −1325.53 sec = −1.0¢ — 2 = 25.0°C
1130 Drain.



Now have an 21x21 arr[illegible] row in x ~~direction~~ direction (see attached digram.). [illegible] rods
s.l.

Water ht = 28.90 cm — [Te]mp °C
4 +Per — #1 = 25.1°C
τ = 152.11 sec = 7.0¢ = 140.0¢/cm — 2 = 25.1°C
1512 Water ht = ±28.85 cm
System just critical; Drain: [illegible]

P-83
Log Book #5
20 x 20 + 1 array
Total of 401 rods
30 cm length
1.30 cm - c-c

1.30 cm separation c-c
30 cm length

added 1 rod: Now have an 20 x 20 + 1 array: Total of 401 rods.

0.4 = 6.5 cm

Water Ht = 44.10 cm
2 + Per
ρ = 230.34 mm = 4.9 ¢ = .75 ¢/cm
1113 Water Ht = ± 37.60 cm
System just critical
Drain.

Temp °C
#1 = 25.0°C
2 = 25.0°C

Removed 1 rod: Now have an 20 x 20 array.
Total of 400 rods.

Water Ht = 44.15 cm.
3 - Per
ρ = -1325.53 mm = -1.0 ¢
1130 Drain.

Temp °C
#1 = 25.0°C
2 = 25.0°C

P-83
Log Book #5
21 x 21 array
with 2 rows
removed
Total of
400 rods.

Now have an 21 x 21 array, with 11th row in 2 ~~direction~~ direction removed. (See attached diagram.). Total of 400 rods

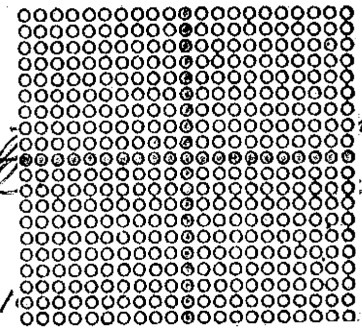
0.4 = 10.5 cm

Water Ht = 28.90 cm
4 + Per
ρ = 152.11 mm = 7.0 ¢ = 140.0 ¢/cm
1512 Water Ht = ± 28.85 cm
System just critical; Drain:

Temp °C
#1 = 25.1°C
2 = 25.1°C

over:

1.30 cm separation c-c.
30 cm length.



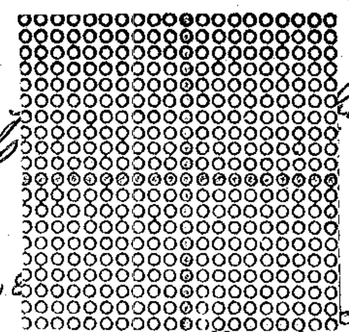
Removed 20 rods from 1 ... have
an 20X21 array. Total ... .
(see diagram.)

δh = .1

Water ht = 30.80 cm
5th Per
τ = 93.99 sec = 10.9 ¢ = 104.0 ¢/cm

28 Temp °c
#1 = 25.1 °c
2 : 25.1 °c

√1424 Water ht = ± 30.70 cm.
System just critical
Drain.



Removed 19 (~~20~~) rods from 1 ... have
an 20X20 array. Total of
(see diagram).

δh = .1

Water ht = 35.10 cm
6th Per
τ = 102.13 sec = 9.74 ¢ = 12.1 ¢/cm

Temp °c
#1 = 25.1 °c
2 = 25.1 °c

√1502 Water ht = ± 34.30 cm
System just critical
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP		SOURCE DISTANCE	SET	START-UP RANGE
K-1	3X10⁻¹²	Meter	✓	4"	✓	3X10⁻¹²
	"	Fast	✓	1"	✓	"
K-2	—	Meter				
	—	Fast				
R-1						
R-2						
PM-1	700 v	Alarm	✓	.5"	✓	500 v
PM-2	1200 v	Low	✓	10"	✓	900 v
	"	Alarm	✓	1"	✓	"

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

DUMP WELL PROBE LIGHT ____

START-UP CHECK LIST

Equipment checked by RKH (I.D.C) Personnel check by I.D.C

Instruments and safeties checked and reset by RKH

Source in checked by RKH Source No. M-43

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

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

Red light on by RKH Time 1310

Start-up OK'd by I.D.C. RKH Date 8-14-72

1.30 cm separation c-c.
30 cm length.

Removed 20 rods from 1 face. Now have an 20 X 21 array. Total of 380 rods. (See diagram.)

$\Delta h = .10$ cm

Water ht = 30.80 cm — Temp °c
5 +Per — #1 = 25.1 °c
τ = 98.99 sec = 10.9 ¢ = 109.0 ¢/cm — 25.1 °c

1424 Water ht = ± 30.70 cm.
System just critical
Drain.

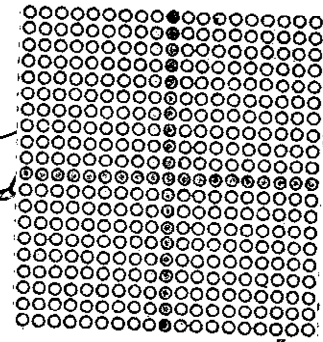
Removed ~~20~~ 19 rods from 1 face. Now have an 20 X 20 array. Total of ~~360~~ 361 rods. (See diagram).

$\Delta h = .80$ cm

Water ht = 35.10 cm — Temp °c
6 +Per — #1 = 25.1 °c
τ = 102.13 sec = 9.74 = 12.1 ¢/cm — 2 = 25.1 °c

1502 Water ht = ± 34.30 cm
System just critical
Drain.

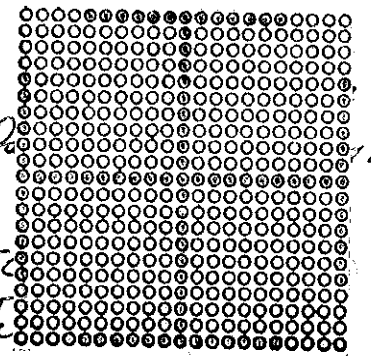
1.30 cm seperation c-c.
30 cm length



Removed 19 rods: Now — x20 array: Total of 342 rods

1340 Water ht = 43.70 cm
System sub critical
Drain.

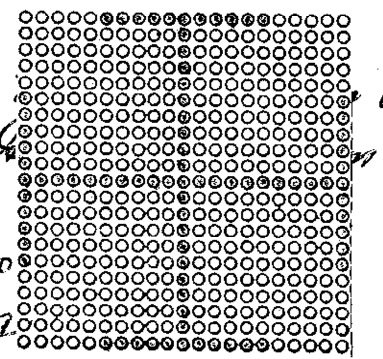
#1 = 25.0 °C
2 = 25.0 °C



added 10 rods: 21 x 21 array:
Total of 352 rods)

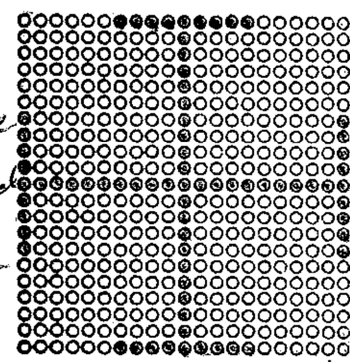
Water ht = 44.5
System sub criti
Drain.

Temp °C
#1 = 25.0 °C
2 = 25.0 °C



added 8 rods: 21 x 21 array:
Total of 360 rods).

1510 Water ht = 44.0
System sub c
Drain.



added 8 rods. Now have ay:
Total of 368 rods. (See

Water ht = 44.10 cm: ΔG =
+Per

p °C
= 25.2 °C
2 = 25.2 °C

I = 499.79 ÷ 2.44 = .54¢/cm

→ 87

1550 Water ht = 39.65 cm
System just critical
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K1	3×10^{-12}	Meter ✓	4"	✓	3×10^{-12}
	"	Fast ✓	1"	✓	"
K2		Meter			
		Fast			
R1					
R2					
RM1	700 V	Alarm ✓	.5"	✓	500 V
RM2	1200 V	Low ✓	10"	✓	800 V
	"	Alarm ✓	1"	✓	"

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

DUMP WELL PROBE LIGHT ____

START-UP CHECK LIST

Equipment checked by RKH I.O.C. Personnel check by E.O.C.

Instruments and safeties checked and reset by RKH

Source in checked by RKH Source No. M-43

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

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

Red light on by RKH Time 0758

Start-up OK'd by E.O.C. RKH Date 8-15-72

1.30 cm seperation c-c.
30 cm length

Removed 19 rods: Now have an 19X20 array: Total of 342 rods.

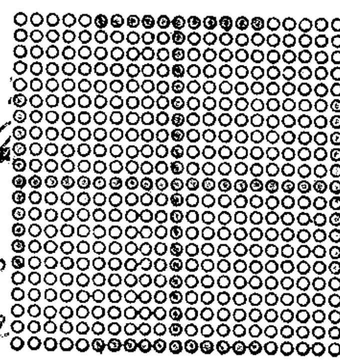
1340 Water ht = 43.70 c
System sub crit
Drain.

Temp °C
#1 = 25.0 °C
2 = 25.0 °C

added 10 rods: [illegible] 21X21 array:
Total of 352 rods: (See diagram:)

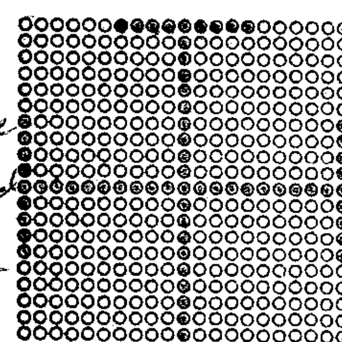
Water ht = 44.50 cm
System sub critical
Drain.

Temp °C
#1 = 25.0 °C
2 = 25.0 °C



added 8 rods: [illegible] 21X21 array:
Total of 360 rods [illegible]).

1510 Water ht = 44.0[illegible]
System sub. c[illegible]
Drain.



added 8 rods. Now have [illegible] ay:
Total of 368 rods. (See d[illegible]

Water ht = 44.10 cm:
+Per
Δh =

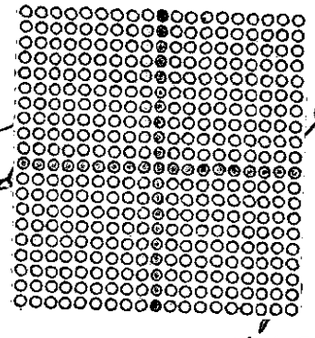
[illegible]p °C
= 25.2 °C
2 = 25.2 °C

I = 499.79 sec = 2.44 = .54¢/cm

87

1.30 cm separation c-c.
30 cm length

Removed 19 rods. Now
array: Total of 342 rod

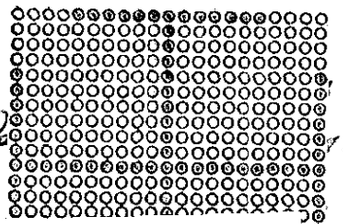


X20

1340 Water ht = 43.70 cm
System sub critical
Drain.

#1 = 25.0°c
2 = 25.0°c

added 10 rods:
Total of 352 rods



21 X 21 array.

Water ht = 44.
System sub crit
Drain.

Pg 86
Log Book #5
21X21 array:
Total of 360 rods

Temp °c
#1 = 25.0°c
2 = 25.0°c

added 8 rods. Now have an 21 X 21 array:
Total of 360 rods. (See diagram).

1510 Water ht = 44.00 cm
System sub critical
Drain.

Pg 86
Log Book #5
21X21 array:
Total of 368 rods.

added 8 rods. Now have an 21 X 21 array:
Total of 368 rods. (See diagram).

Water ht = 44.10 cm;
+Per
L = 499.79 cm = 2.44 = .54 f/cm

δG = 4.45cm

Temp °c
#1 = 25.2°c
2 = 25.2°c

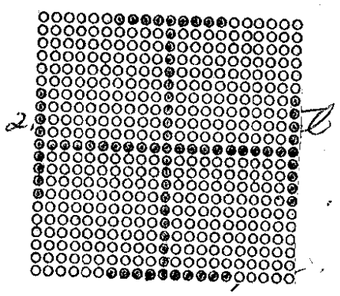
87

1.30 cm separation c-c.
30 cm length

Repeat of last run: (pg 86-87)
σ_4 = 1.9 cm

Water ht = 44.10 cm
+Per
ζ = 2824.9 cm = .46 ϕ = .24 #/cm
0835 Water ht = 42.20 cm
System just critical
Drain

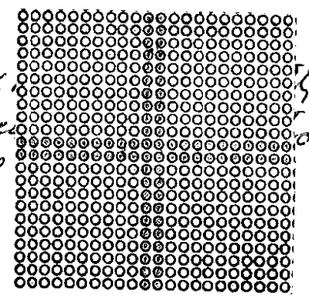
Temp °C
#1 = 25.1°C
2 = 25.1°C



Removed 1 rod. Have an 2, 7 of 367 rods. (See diagram).

Water ht = 44.20 cm
2-Per
ζ = -234.68 cm = -6.7 ϕ
0853 Drain.

#1 = 25.1°C
2 = 25.1°C

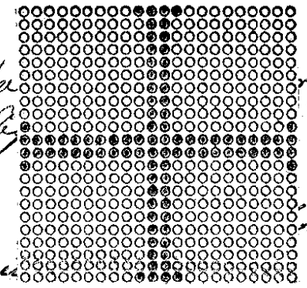


Have have an 22 x 12 array now removed from the 11th diagram). Total of

Water ht = 32.65 cm
3 +Per
ζ = 106.48 cm = 9.4 ϕ = 37.6 #/cm.
0948 Water ht = 32.40 cm
System just critical
Drain.

Temp °C
#1 = 25.1°C
2 = 25.1°C

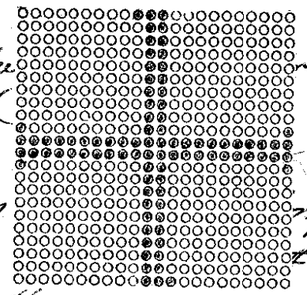
1.30 cm separation c-c.
30 cm length.



Removed 8 rods. Have ... reg. Total of 392 rods. (See diagram).

1040 Water ht = 43.80 cm
System sub critical
Drain

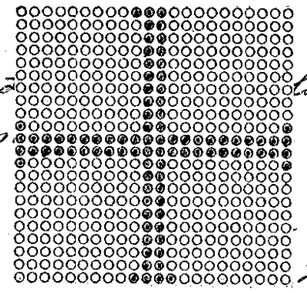
temp °C
#1 = 25.2°C
2 = 25.2°C



added #2 rods. Have ... reg. Total of 394 rods. (

Water ht = 43.80 cm
4+Per
ζ = 328.12 cm = 3.6 ϕ = .72 #/cm
1120 Water ht = 38.80 cm.
System just critical
Drain

temp °C
#1 = 25.2°C
2 = 25.2°C



Removed 1 rod. Have ... Total of 393 rods. (See diagram

1130 Water ht = 44.10 cm
System sub critical
Drain.

25.2°C
2 = 25.2°C

1.30 cm separation c-c.
30 cm length

Repeat of last run. (Pg 86-87)
D ϕ = 1.9 cm

Water ht = 44.10 cm
+Per
C = 2824.9 ml = .46 ϕ = .24 ϕ/cm

0835 Water ht = 42.20 cm
System just critical
Drain.

Temp °C
#1 = 25.1°C
5.1°C

Total of 367 rods.
21 x 21 array.

Removed 1 rod. Have an 21 x 21 array. Total of 367 rods. (See diagram).

Water ht = 44.20 cm
-Per
C = -234.68 ml = -6.7 ϕ

0853 Drain.

Temp °C
#1 = 25.1°C
2 = 25.1°C

Total of 400 rods.
22 x 22 array.

Must have an 22 x 22 array. With the 11th & 12th row removed in 2 directions. (See diagram). Total of 400 rods.

D ϕ = .25 cm

Water ht = 32.65 cm
3+Per
C = 100.48 ml = 9.9 ϕ = 37.6 ϕ/cm.

0948 Water ht = 32.40 cm
System just critical
Drain.

Temp °C
#1 = 25.1°C
2 = 25.1°C

1.30 cm separation c-c.
30 cm length.

Total of 392 rods.
22 x 22 array.

Removed 8 rods. Have an 22 x 22 array. Total of 392 rods. (See diagram).

1040 Water ht = 43.80 cm
System sub critical
Drain

Temp °C
#15 25.2°C
2 = 25.2°C

added # 2 rods. Have array.
Total of 394 rods. (

Water ht = 43.80 cm
4+Per
C = 328.12 ml = 3.6 ϕ = .72 ϕ/cm

Temp °C
#1 = 25.2°C
2 = 25.2°C

1120 Water ht = 38.80 cm.
System just critical
Drain

Removed 1 rod. Have an tal
of 393 rods. (See diagram

1130 Water ht = 44.10 cm
System sub critical
Drain.

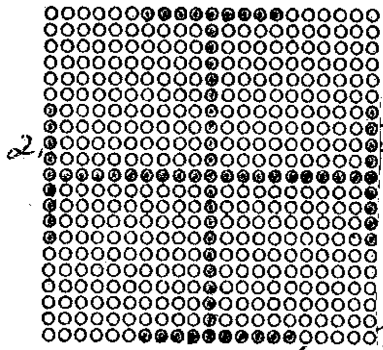
25.2°C
2 = 25.2°C

1.30 cm separation c-c.
30 cm length

Repeat of last run: (pg 86-87)
δh = 1.9 cm

Water ht = 44.10 cm — Temp °C
[1] + Per — #1 = 25.1 °C
τ = 2824.9 sec = .46 ¢ = .24 ¢/cm — 2 = 25.1 °C

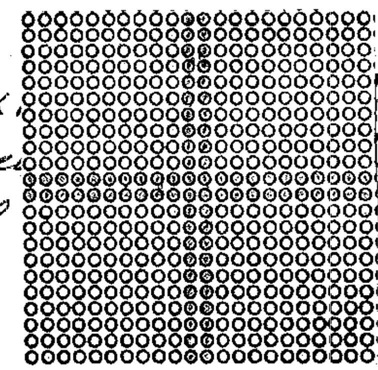
0835 Water ht = 42.20 cm
System just critical
Drain.



Removed 1 rod: Have an 2[…] [tota]l of 367 rods. (See diagram).

Water ht = 44.20 cm
[2] − Per — #1 = 25.1 °C
τ = −234.68 sec = −6.7 ¢ — 2 = 25.1 °C

0853 Drain.

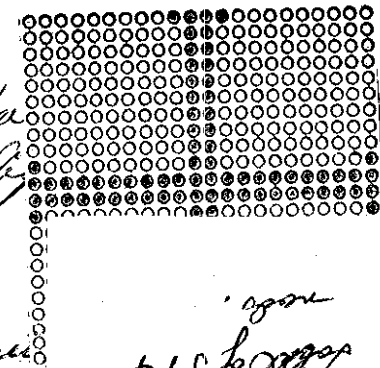


Now have an 22 X […] the 11th & 12th row removed […] (See diagram). Total of […]

Water ht = 32.65 cm — Temp °C
[3] + Per — #1 = 25.1 °C
τ = 106.48 sec = 9.4 ¢ = 37.6 ¢/cm. — 2 = 25.1 °C

0948 Water ht = 32.40 cm
System just critical
Drain.

1.30 cm separation c-c.
30 cm length.



Removed 8 rods: Ha[ve …]ray. Total of 392 rods. (See di[agram])

1040 Water ht = 43.80 cm — [Te]mp °C
System sub critica[l] — #1 = 25.2 °C
Drain — 2 = 25.2 °C

added #2 rods: Have an 22 X 22 array. Total of 394 rods. (See diagram).
δh = 5.0 cm

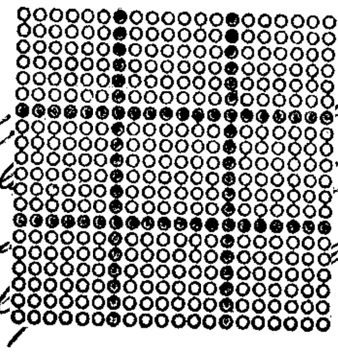
Water ht = 43.80 cm — Temp °C
[4] + Per — #1 = 25.2 °C
τ = 328.12 sec = 3.6 ¢ = .72 ¢/cm — 25.2 °C

1120 Water ht = 38.80 cm.
System just critical
Drain

Removed 1 rod. Have an 22 X 22 array. Total of 393 rods. (See diagram)

1130 Water ht = 44.10 cm — Temp °C
System sub critical — #1 = 25.2 °C
Drain. — 2 = 25.2 °C

1.30 cm separation c.c.
30 cm length.



Now have an 20 X 20 array, ... & 14 th row removed in 2 direct... ...eing on 3 X 3 array, with 36 ... ...piece. Total of 324 rods. (See d...

Δℓ = 6.6 cm

Water ht = 44.00 cm
5 + Per

τ = 149.94 sec = 7.14 = 1.07 ¢/cm.

Temp °C
#1 = 25.2 °C
2 = 25.2 °C

1343 Water ht = 31.40 cm
System just critical
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Motor ✓	4'	✓	3×10^{-12}
	"	Fast ✓	1"	✓	"
K-2		Motor			
		Fast			
R-1					
R-2					
PM-1	700 v	Alarm ✓	.5"	✓	500 v
PM-2	1200 v	Low ✓	10.0"	✓	900 v
	"	Alarm ✓	1.0"	✓	"

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

DUMP WELL PROBE LIGHT ________

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKAL

Source in checked by RKAL Source No. M-43

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

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

Red light on by RKAL Time 1320

Start-up OK'd by I.D.C. RKAL Date 8-16-72

1.30 cm separation c.c.
30 cm length.

20X20 array; 7th & 14th rows in 2 direction removed. Total of 324 rods.

Now have an 20 x 20 array, with the 7th & 14th row removed in 2 directions, thus giving an 3 x 3 array, with 36 rods in each square. Total of 324 rods. (See diagram).

$\Delta l = 6.6$ cm

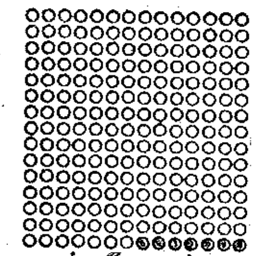
Water ht = 44.00 cm — Temp °C

5 + Per — #1 = 25.2°C

$\tau = 149.94$ sec = 7.1¢ = 1.07¢/cm. — 2 = 25.2°C

1343 Water ht = 37.40 cm
System just critical
Drain.

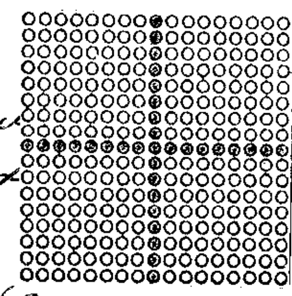
2.050 cm separation c-c.
30 cm length.
.30" rods. (unclad)
H_2O only.



Have an 14×14+7 array. (7 rods on 1 face.)
Total of 203 rods.

Δh = 6.15 cm

Water ht = 43.85 cm — Temp °c
1 +Per — #1 = 25.5°c
τ = 304.22 sec = 3.8¢ = .62¢/cm — 2 = 25.7°c
1358 Water ht = 37.70 cm
System just critical
Drain.

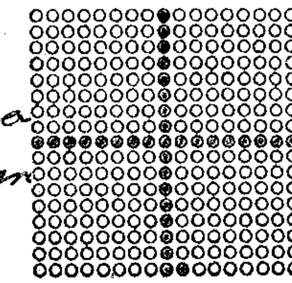


Now have an 17×17 array, w... th row removed in 2 directio... 256 rods.

Δh = 6.6 cm

Water ht = 43.80 cm — Temp °c
2 +Per — #1 = 25.6°c
τ = 197.74 sec = 5.6¢ = .85¢/cm — 2 = 25.7°c
1505 Water ht = 37.20 cm
System just critical
Drain.

2.050 cm separation c-c.
30 cm length



Removed 1 rod. Have a ...: Total of 255 rods. (See diagram)

Water ht = 44.00 cm — Temp °c
3 -Per — #1 = 25.3°c
τ = -162.97 sec = -10.8¢. — 2 = 25.1°c

2,050 cm separation c-c.
30 cm length.
.30" rods. (unclad)
H_2O only.

Page 92
Log #5
14X14 array

Have an 14X14+7 array. (7 rods on 1 face.)
Total of 203 rods.

ob = 6.15 cm

Water ht = 43.85 cm
1 +Per
T = 304.22 sec = 3.8¢ = .62¢/cm

Temp °c	
#1 = 25.5 °c	
= 25.7 °c	

1358 Water ht = 37.70 cm
System just critical
Drain.

Log Book #5
17X17 array
256 rods

Now have an 17X17 array, with the 9th row removed in 2 directions. Total of 256 rods.

ob = 6.6 cm

Water ht = 43.80 cm
2 +Per
T = 197.74 sec = 5.6¢ = .85¢/cm

Temp °c	
#1 = 25.6 °c	
2 = 25.7 °c	

1505 Water ht = 37.20 cm
System just critical
Drain.

2,050 cm separation c-c.
30 cm length

Pg 93
Log Book #5
17X17 array
255 rods.

Removed 1 rod. Have an 17X17 array. Total of 255 rods. (See diagram).

Water ht = 44.00 cm
3 -Per
T = -162.97 sec = -10.8¢.

Temp °c	
#1 = 25.3 °c	
2 = 25.1 °c	

INSTRUMENT CHECK

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

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

DUMP WELL PROBE LIGHT ______

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKA

Source in checked by RKA Source No. M-43

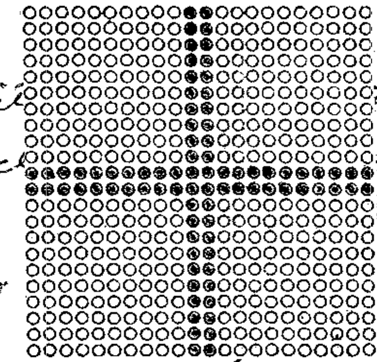
Emergency equipment in control room checked by I.D.C.

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

Red light on by RKA Time 0830

Start-up OK'd by I.D.C. RKA Date 8-17-72

2.050 cm separation c-c.
30 cm length.



Have an 22 x 22 array, wit[h] ... [ro]d
now removed in 2 direc[tions] ...)
Total of 400 rods.

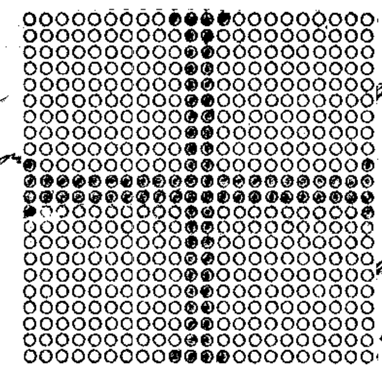
$\Delta h = .05$ cm

Water ht = 31.80 cm
+Per

C = 126.03 sec = 8.2¢ = 164.0¢/cm

#1 = 25.6°C
2 = 25.7°C

0910 Water ht = ‡31.75 cm
System just critical
Drain.



Removed 8 rods: Have ... [arra]y. Total
of 392 rods. (See diagr[am])

$\Delta h = 8.25$ cm

Water ht = 44.00 cm
+Per

C = 71.71 sec = 12.7¢ = 1.54¢/cm

... °C
1 = 25.6°C
2 = 25.7°C

0930 Water ht = 35.75 cm
System just critical
Drain.

Removed 2 rods: Have an 22 x 22 array.
Total of 390 rods. (See diagram).

over

2.050 cm spacing
30 cm length

95

Have an 22 x 22 array, with the 11th & 12th rows removed in x direction (see digram)
Total of 400 rods.

$\Delta\phi = .05$ cm

Water ht = 31.80 cm
+per
C = 126.03 mm = 8.2% = 164.0%

Temp °C
T1 = 25.6 °C
2 = 25.7 °C

0910 Water ht = ± 31.75 cm
System just critical
Drain.

Removed 8 rods. Have an 22 x 22 array. Total of 392 rods. (see digram).

$\Delta\phi = 8.25$ cm

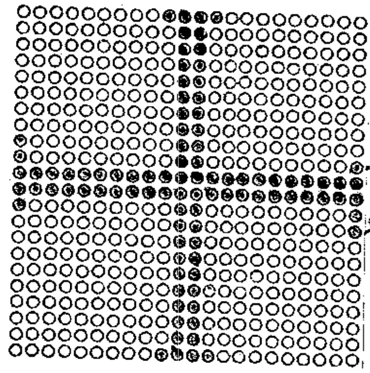
Water ht = 44.00 cm
2 +per
C = 71.71 mm = 12.7% = 1.5%/cm

Temp °C
T1 = 25.6 °C
2 = 25.7 °C

0930 Water ht = 35.75 cm
System just critical
Drain.

Removed 2 rods: Have an 22 x 22 array.
Total of 390 rods. (see digram).

2.050 cm separation c-c
30 cm length

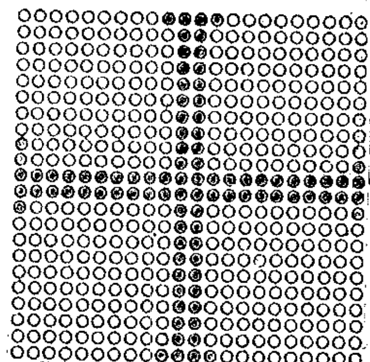


3 Water ht = 44.10 cm
-Per
τ = -415.04 sec = -3.1¢

5.7°c
5.7°c

Added 1 rod: Have an 22X22 array. Total of 391 rods. (See diagram).

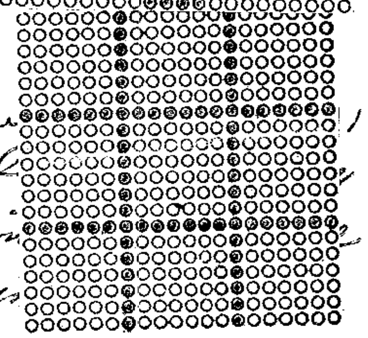
Δh = 6.1 cm



4 Water ht = 44.10 cm
+Per
τ = 252.41 sec = 4.5¢ = .74¢/cm

5.7°c
5.7°c

1024 Water ht = 38.00 cm.
System just critical
Drain.



Now have an 20X20 array, w[illegible] 14th
row in 2 direction removed [illegible] an
3X3 array, with 36 rods i[illegible].
Total of 324 rods. (See diag[illegible]

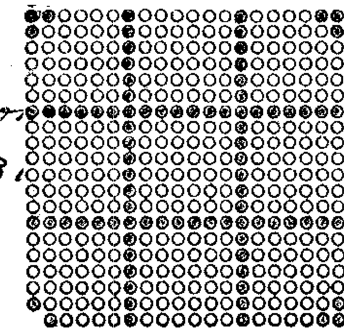
Δh = .05 cm

? 5 Water ht = 29.90 cm
+Per
τ = 197.74 sec = 5.6¢ = 112.0¢/cm

Temp °c
#1 = 25.5°c
2 = 25.5°c

1325 Water ht = 29.85 cm
System just critical
Drain.

2.050 cm separation c-c
30 cm length.



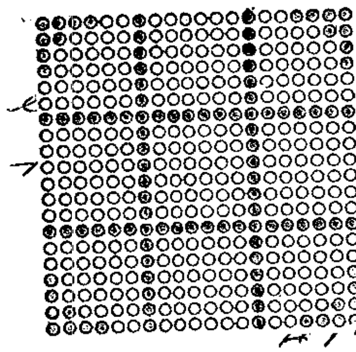
Removed 12 rods: 3 from [illegible]
20X20 array: Total of 3[illegible] [illegible]diagram).

Δh = .05 cm

? 6 Water ht = 30.40 cm
+Per
τ = 99.96 sec = 9.9¢ = 198.0¢/cm

#1 = 25.5°c
2 = 25.6°c

1340 Water ht = 30.35 cm.
System just critical
Drain.



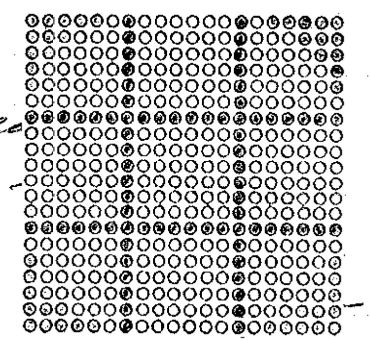
Removed 20 rods, 5 from e[illegible]
20X20 array: Total of 292 r[illegible]ram).

Δh = .20 cm

7 Water ht = 32.30 cm
+Per
τ = 126.03 = 8.2¢ = 41.0¢/cm

#1 = 25.5°c
2 = 25.6°c

1400 Water ht = 32.10 cm
System just critical
Drain.



Removed 16 rods: 4 from e[illegible]
20X20 array. Total of 276 -

Water ht = 44.20 cm
8 -Per
τ = -219.47 sec = -7.3¢

#1 = 25.6°c
2 = 25.7°c

avr.

2.050 cm separation c-c
30 cm length

Log Book #5
22X22 array
Total of
390 rods.

Water ht = 44.10 cm — Temp °C
3 -Per — #1 = 25.7°C
τ = -415.04 sec = -3.1¢ — 2 = 25.7°C

Added 1 rod: Have an 22 of 391 rods. (See diagram).

p-96
Log Book #5
22X22 array
Total of 391
rods.

Δh = 6.1 cm

Water ht = 44.10 cm
4 +Per — #1 = 25.7°C
τ = 252.41 sec = 4.5¢ = .74¢/cm — 2 = 25.7°C

1024 Water ht = 38.00 cm.
System just critical
Drain.

Log Book
20X20 array
324 rods.

Now have an 20x20 array, with the 7th & 14th row in 2 directions removed. Thus giving an 3X3 array, with 36 rods in each square. Total of 324 rods. (See diagram)

Δh = .05 cm

? Water ht = 29.90 cm — Temp °C
5 +Per — #1 = 25.5°C
τ = 197.74 sec = 5.6¢ = 112.0¢/cm — 2 = 25.5°C

1325 Water ht = 29.85 cm
System just critical
Drain.

2.050 cm separation c-c
30 cm length.

Log Book #5
20X20 array
Total of 312
rods.

Removed 12 rods: 3 from each corner. 20X20 array: Total of 312 rods. (See diagram).

Δh = .050 cm

? Water ht = 30.40 cm — Temp °C
6 +Per — #1 = 25.5°C
τ = 99.96 sec = 9.9¢ = 198.0¢/cm — -- 25.6°C

1340 Water ht = 30.35 cm.
System just critical
Drain.

Log Book #5
20X20 array
Total of 292
rods.

Removed 20 rods. 5 from each corner. 20X20 array: Total of 292 rods. (See diagram).

Δh = .20 cm

Water ht = 32.30 cm — Temp °C
7 +Per — #1 = 25.5°C
τ = 126.03 = 8.2¢ = 41.0¢/cm — -- 25.6°C

1400 Water ht = 32.10 cm
System just critical
Drain.

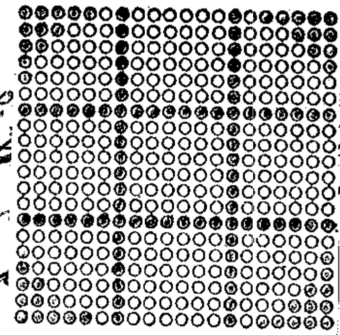
Log Book
20X20 array
Total of
276 rods.

Removed 16 rods: 4 from each corner. 20X20 array: Total of 276 rods.

Water ht = 44.20 cm — Temp °C
8 -Per — #1 = 25.6°C
τ = -219.47 sec = -7.3¢ — 2 = 25.7°C

avr.

2,050 cm separation c-c.
30 cm length.



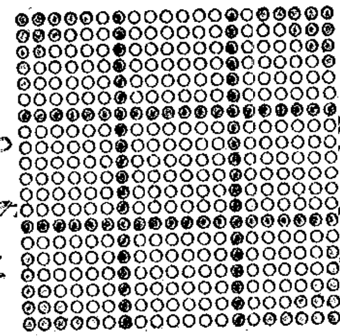
Added 2 rods. 1 each to oppo[site] ... Have an 20 X 20 array with ... from 2 corners and ~~15~~ 11 rods re[moved from] ... corners. Total of 278 rods (See d[iagram])

Δh = 6.6 cm

Water ht = 44.00 cm
9+ Per
T = 302.05 sec = 3.9¢ = .59¢/cm

Temp °c
#1 = 25.5
2 = 25.7°c

1502 Water ht = 37.50 cm
System just critical
Drain.



Removed 1 rod. Have an 20 ... 12 rods removed from 3 co[rners] ... 11 rods removed from 1 corner. ... rods (See digram)

Water ht = 44.50 cm
10 Per
T = -760.55 sec = -1.8¢

Temp °c
#1 = 25.5°c
2 = 25.7°c

1522 Drain

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP		SOURCE DISTANCE	SET	START-UP RANGE
K-1	3X10⁻¹²	Meter	✓	4"	✓	3X10⁻¹²
	"	Fast	✓	1"	✓	"
K-2		Meter				
		Fast				
R-1						
R-2						
PM-1	700 V	Alarm	✓	5"	✓	600 V+
PM-2	1200V	Low	✓	10"	✓	900 V+
	"	Alarm	✓	1"	✓	"

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

DUMP WELL PROBE LIGHT ______

START-UP CHECK LIST

Equipment checked by FIDC RKA Personnel check by RKA

Instruments and safeties checked and reset by RKA

Source in checked by RKA Source No. M-43

Emergency equipment in control room checked by RKA

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

Red light on by RKA Time 0905

Start-up OK'd by I.D.C. RKA Date 8-18-72

2,050 cm separation c-c.
30 cm length.

Added 2 rods. 1 each to opposite corners. Have an 20 X 20 array with ~~15~~ 12 rods removed from 2 corners and ~~15~~ 11 rods removed from 2 corners. Total of 278 rods (see digram).

D.ζ = 6.6 cm

Water ht = 44.00 cm

9 + Per

Temp °c

#1 = 25.5

2 = 25.7°c

τ = 302.05 sec = 3.9¢ = .59¢/cm

1502 Water ht = 37.50 cm

System just critical

Drain.

Removed 1 rod. Have an 20 x 20 array, with 12 rods removed from 3 corners, and 11 rods removed from 1 corner. Total of 277 rods (see digram)

Water ht = 44.50 cm

10 - Per

Temp °c

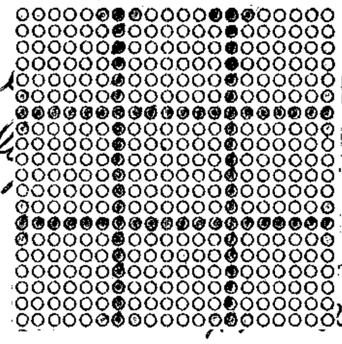
#1 = 25.5°c

2 = 25.7°c

τ = - 760.55 sec = -1.8¢

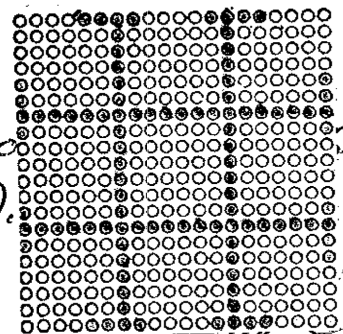
1522 Drain

2.050 cm separation c.c.
30 cm length.



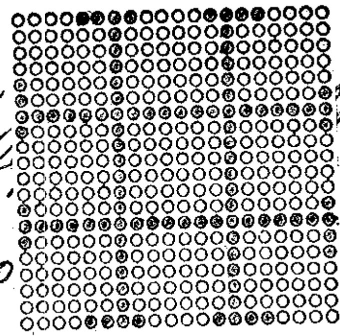
Have an 20X20 array; wi… …oved
Total of 308 rods. (See d…
Δ L = .40 cm

Water ht = 33.80 cm
1 + Per …5.5°c
τ = 158.63 sec = 6.8¢ = 17.0¢/cm   2 = 25.5°c
0941 Water ht = ~~33.45~~ 33.40 cm
System just critical
Drain.



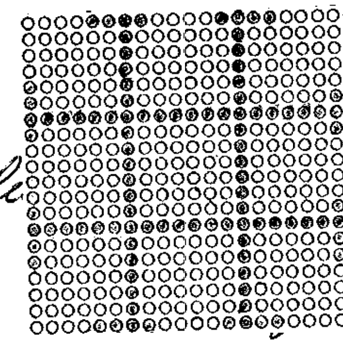
Removed 8 rods: Have an 20… …tal
of 300 rods. (See digram).

Water ht = 44.10 cm
2 - Per   #1 = 25.5°c
τ = 171.67 sec = -10.0¢   2 = 25.5°c



Added 2 rods: Have … …ay: Total of
302 rods. (See d…
Δ L = 5.20 cm

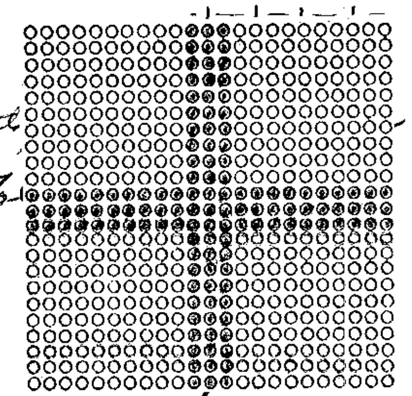
Water ht = 44.10   Temp °c
3 + Per   #1 = 25.6°c
τ = 397.66 sec = 3.0¢ = .58¢/cm   2 = 25.7°c
1051 Water ht = 38.90 cm
System just critical
Drain



Removed ~~[illegible]~~ 1 rod. …0 array.
Total of 301 rods. (See…

Water ht = 44.60 cm   …mp °c
4 - Per   #1 = 25.7°c
τ = -299.87 sec = -5.0¢   2 = 25.8°c
1115 Drain

.30" rods.
1.300 cm separation c-c.
30 cm length.
H_2O Only.



Have an 23 X 23 array, 11th removed in 2 directions, To…
(See digram.)

1404 Water ht = 44.10 cm   #1 = 25.7°c
System sub critical
Drain   2 = 25.8°c

2.050 cm separation c.c.
30 cm length.

Have an 20×20 array with 16 rods removed
Total of 308 rods. (See diagram.)

Water Ht = 33.80 cm
+Per
ξ = 158.63 mm = 6.8¢ = 17.0¢/cm

Temp °C
#1 = 25.5°C
5.5°C

0941 Water Ht = ~~33.45~~ 33.40 cm
System just critical
Drain.

Removed 8 rods. Have an 20×20 array. Total of 300 rods. (See diagram).

Water Ht = 44.10 cm
-Per
ξ = 171.67 mm = -10.0¢

Temp °C
#1 = 25.5°C
2 = 25.5°C

Added 2 rods. Have an 20×20 array. Total of 302 rods. (See diagram)

Water Ht = 44.10 cm
+Per
ξ = 397.66 mm = 3.0¢ = .58¢/cm

Temp °C
#1 = 25.6°C
2 = 25.7°C

1051 Water Ht = 38.90 cm
System just critical
Drain

Removed ~~1~~ 1 rods. Have an 20×20 array.
Total of 301 rods. (See diagram).

Water Ht = 44.60 cm
4-Per
ξ = -299.87 mm = -5.0¢

Temp °C
#1 = 25.7°C
2 = 25.8°C

1115 Drain

.30" rods.
1.300 cm separation
30 cm length.
H_2O Only.

Have an 23×23 array, 11th, 12th, 13th row removed in 2 directions, Total of 400 rods.
(See diagram.)

1404 Water Ht = 44.10 cm
System sub critical
Drain

Temp °C
#1 = 25.7°C
2 = 25.8°C

INSTRUMENT CHECK

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

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

DUMP WELL PROBE LIGHT ______

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKK

Source in checked by RKK Source No. M-93

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

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

Red light on by RKK Time 0920

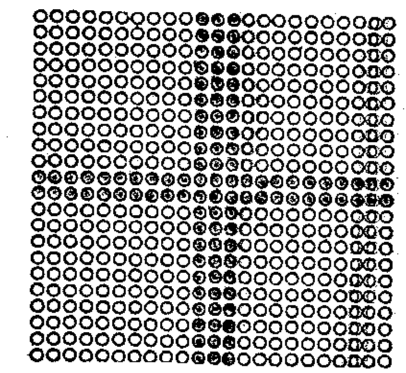
Start-up OK'd by F.D.C. RKK Date 8-21-72

.30" rods
1.30 cm separation c-c.
30 cm length.
H_2O only.

Have an 22 X 23 array. 11th, 12, 13th row removed in one (1) direction, and the 11th & 12th row removed in the other. Total of 400 rods. (See digram).

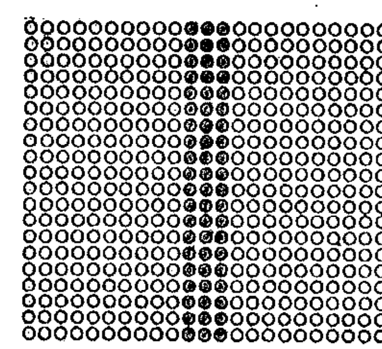
0953 Water ht = 44.00 cm
System sub critical
Drain

Temp °C
#1 = 25.5°
2 = 25.5°C



Now have an 20 X 23 array, with the 11th, 12th, 13th row removed in one direction. Total of 400 rods. (See digram).

Water ht = 44.30 cm
System sub critical
Drain.



5.5°C
5°C

RKK.

.30" rods.
1.30 cm separation c-c.
30 cm length.
H_2O only.

Have an 22X23 array. 11th, 12, 13th row removed in one (1) direction, and the 11th & 12th row removed in the other. Total of 400 rods. (See diagram).

0953 Water ht = 44.00 cm
System sub critical
Drain

Temp °C
Fog bank #5 5.5°
23 X 22 array 5.5°
Total rods 400

Now have an 20 X 23 array,
12th, 13th row removed.
Total of 400 rods. (See d

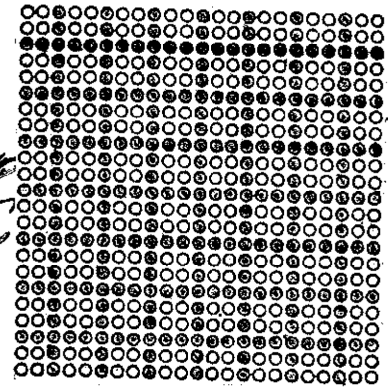
Water ht = 44.30 cm
System sub critical
Drain.

of the 11th
cm.

$\alpha_1 = 25.5°C$
$\alpha = 25.5°C$

ave.

1.30 cm separation c-c.
30 cm length.



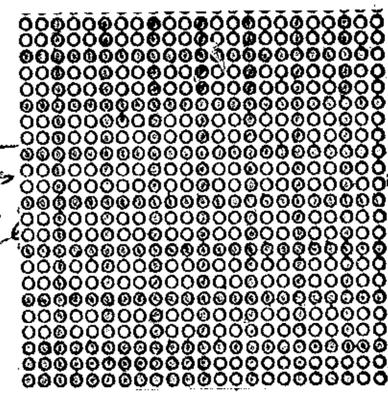
Now have an 23 X 23 array; ...th,
9th, 12th, 15th, 18th, & 21st ...
in 2 direction; Total of ...
(See diagram).

Δh = .10 cm

Water ht = 30.05 cm
1 +Per
τ = 169.49 sec = 6.4¢ = 64.0¢/cm.

Temp °C
#1 = 25.5°C
2 = 25.5°C

1403 Water ht = 29.95 cm
System just critical
Drain.



Removed 4 of the 2X2 clusters (... of
16 rods) See diagram. Tot...

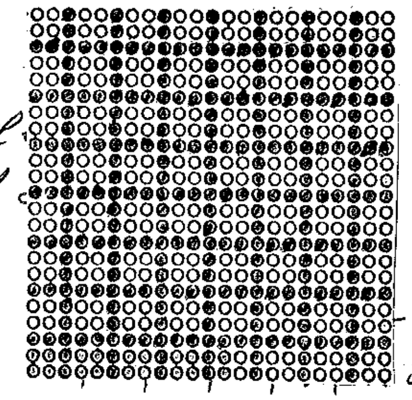
Δh = 7.5 cm

Water ht = ~~43~~ 43.80 cm
2 + Per
τ = 113.00 sec = 9.0¢ = 1.2¢/cm.

#1 = 25.2°C
2 = 25.5°C

1435 Water ht = 36.30 cm
System just critical
Drain.

1.30 cm separation c-c.
30 cm length.

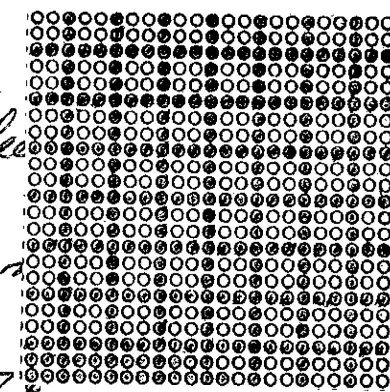


Removed 2 rods (1/2 of ...
(See diagram) Total of ...

Water ht = 44.20 cm
3 -Per
N.C.

25.2°C
2 = 25.5°C

1450 Drain.



Added 1 rod. (See ... of 239 rods.

Water ht = 44.20 cm
4 -Per
τ = -814.87 sec = -1.7...

Temp °C
#1 = 25.5°C
2 = 25.5°C

1.30 cm separation c-c.
30 cm length

(inverted label) Pg 104 / Top Shelf #5 / 23X23 array / Total of / 256 rods

Now have an 23 X 23 array; with the 3th, 6th, 9th, 12th, 15th, 18th, & 21st rows removed in 2 direction; total of 256 rods. (See digram).

$\Delta h = .10$ cm

Water ht = 30.05 cm — Temp °C

1 +Per — #1 = 25.5 °C

2 = 25.5 °C

τ = 169.49 sec = 6.4¢ = 64.0¢/cm.

1403 Water ht = 29.95 cm
System just critical
Drain.

(inverted label) Top Shelf #5 / 23 X 23 array; / Total of 240 / rods.

Removed 4 of the 2X2 clusters of rods (Total of 16 rods) see digram; total of 240 rods.

$\Delta h = 7.5$ cm

Water ht = ~~43~~ 43.80 cm — Temp °C

2 + Per — #1 = 25.2 °C

2 = 25.5 °C

τ = 113.00 sec = 9.0¢ = 1.2¢/cm.

1435 Water ht = 36.30 cm
System just critical
Drain.

1.30 cm separation c-c.
30 cm length.

(inverted label) Top Shelf #5 / 23 X 23 array; / Total of 238 / rods.

Removed 2 rods (1/2 of an 2X2 cluster). (See digram) Total of 238 rods.

Water ht = 44.20 c — Temp °C

3 -Per — #1 = 25.2 °C

N.G. — 2 = 25.5 °C

1450 Drain:

(inverted label) 23 X 23 array. / Total of 239 rods

Added 1 rod. (See digram) Total of 239 rods.

Water ht = 44.20 cm — Temp °C

4 -Per — #1 = 25.5 °C

τ = −814.87 sec = −1.7¢ — 2 = 25.5 °C

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	4"	✓	3×10^{-12}
"	"	Light ✓	1"	✓	"
K-2		Meter			
		Light			
R-1					
R-2					
PM-1	700 ✓	Alarm ✓	5"	✓	500 ✓
PM-2	1200 ✓	" ✓	10"	✓	900 ✓
"	"	Alarm ✓	1"	✓	"

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

DUMP WELL PROBE LIGHT _____

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKM

Source in checked by RKM Source No. M-43

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

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

Red light on by RKM Time 1300

Start-up OK'd by I.D.C. RKM Date 8-24-72

1.30 cm separation c-c.
30 cm length
.30" rods.
H_2O only.

In | Nell (cm)

Support for lattices rebuilt to hold Pb

Top of rods = 25.60 cm

Have an 20 x 20 array. Total of 400 rods.

Δh = 7.80 cm

Water ht = 41.30 cm

1 + Per

τ = 71.71 sec = 12.7¢ = 1.6¢/cm

1425 Water ht = 33.50 cm — 7.90 cm. 2¢ p. 63 — 3.1" reflector (top)

System just critical

Drain.

Removed 2 rods: Have an 20 x 20 - 2 array.

Total of 398 rods.

Δh = 5.65 cm

Water ht = 41.50 cm

2 + Per

τ = 358.54 sec = 3.3¢ = .6¢/cm

Temp °C
#1 = 25.0 °C
2 = 25.1 °C

1446 Water ht = 35.85 cm — 8.25 cm

System just critical

Drain.

6" top reflector = 40.8 cm (measured on [illegible] scale)

INSTRUMENT CHECK

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

LOG N CALIBRATE ✓ OPERATE ✓ SOURCE No. M-43

DUMP WELL PROBE LIGHT ✓

START-UP CHECK LIST

Equipment checked by V.T. BKR Personnel check by D.E. BKR

Instruments and safeties checked and reset by BKR

Source in checked by BKR Source No. M-93

Emergency equipment in control room checked by R. HR

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

Red light on by AKR Time 0920

Start-up OK'd by J.T.E.R.R. BKR Date 8-25-72

30" Rods.
1.30 cm separation c-c.
30 cm length.
H_2O ~~only~~ + Pb

I have an 20 x 20 - 2 array. (See diagram). Total of 398 rods. Have on 1 face (spaced .269 cm from face.) on 8" X 10" X 16" lead reflector.

30.25 cm 0.40

Water ht = ~~31.00 cm~~ Temp °C
1 + Per #1 = 25.0°C
I = 78.23 cm = 11.9 ¢ = 29.7 ¢/cm 2 = 25.0°C
11:15 Water ht = ± 29.85 cm = 4.25 cm.
System just critical
Drain

Repeat of above.

P. 20 cm

Water ht = 30.95 cm Temp °C
2 + Per #1 = 25.0°C
I = 91.27 = 10.6 ¢ = 53.0 ¢/cm 2 = 25.0°C
Water ht = 30.75 cm = 5.15 cm.
System just critical
Drain.
Repeat of above .05?
Water ht = 30.75 cm Temp °C
3 + Per #1 = 25.2°C
I = 302.05 cm = 3.9 ¢ = 78.0 ¢/cm 2 = 25.5°C
Water ht = 30.70 cm = 5.10 cm.
System just critical
Drain.

ans.

Repeat:

Δh = .60 cm

Water ht = 31.15 cm

4 + Pen

τ = 49.98 sec = 16.4¢ = 27.3¢/cm

Water ht = 30.55 = 4.95 cm

OK System just critical

Drain.

Repeat: Δh = .20 cm

Water ht = 30.70 cm

OK 5 + Pen

τ = 102.13 sec = 9.7¢ = 48.5¢/cm

1525 Water ht = 30.50 = 4.90 cm

System just critical

Drain.

INSTRUMENT CHECK

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

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

DUMP WELL PROBE LIGHT _____

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKM

Source in checked by AKM Source No. M-93

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

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

Red light on by AKM Time 1400

Start-up OK'd by F.I.D.C. AKM Date 8-28-72

Reading of zero (top of rod) = 25.60 cm.

Repeat of last experiment Po-109-110.
Pb = .40 cm Pb one face

Water ht = 31.30 cm Temp °C

ok +Per #1 = 25.5°

T = 123.86 sec = 8.3¢ = 20.7¢/cm 2 = 25.5°

1530 Water ht = 30.90 cm = 5.30 cm

System just critical

Drain

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3X10-12	Meter ✓	3"	✓	3X10-12
	"	Fast ✓	1"	✓	"
K-2		Meter ✓			
		Fast ✓			
R-1					
R-2					
PM-1	700 V	Alarm ✓	.5"	✓	500 V
PM-2	1200 V	Low ✓	10"	✓	900 V
	"	Alarm ✓	1"	✓	"

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

DUMP WELL PROBE LIGHT _____

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKH

Source in checked by AKH Source No. M-93

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

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

Rod light on by AKH Time 0810

Start-up OK'd by I.D.C AKH Date 8-29-72

Repeat of last run (p-112). Pb one face

ΔL: .40 cm

Water ht = 31.10 cm | Temp °C

+Pos | #1 = 25.1°C

T = 71.71 sec = 12.7¢ = 31.7 ¢/cm | 2 = 25.1°C

0847 Water ht = 30.70 cm = 5.10 cm

System just critical

Drain.

Repeat of experiment described on bottom of p-107. (20x20-2) N. Pb

ΔL = 4.4 cm

Water ht = 41.40 cm | Temp °C

2 +Pos | #1 = 25.0°C

T = 321.60 sec = 3.7¢ = .84 ¢/cm | 2 = 25.0°C

1018 Water ht = 37.00 cm (1.15 cm diff) = 11.40 cm

System just critical

Drain.

Repeat of above:

ΔL = 5.4 cm

Water ht = 41.40 cm | Temp °C

3 +Pos | #1 = 25.1°C

T = 471.54 sec = 2.6¢ = .5 ¢/cm | 2 = 25.1°C

1513 Water ht = 36.00 cm (1.0 cm diff) = 10.40 cm

System just critical

Drain.

INSTRUMENT CHECK

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

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

DUMP WELL PROBE LIGHT

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKA

Source in checked by RKA Source No. M-93

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

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

Red light on by RKA Time 0820

Start-up OK'd by F.D.C. RKA Date 8-30-72

Repeat of last experiment (p-114). (w/Pb; 20"0)
Δh = 4.8 cm

Water ht = 41.40 cm — Temp °C
1 ṫ per — #1 = 25.1°C
τ = 562.81 sec = 2.2¢ = .46¢/cm — 2 = 25.1°C
0920 Water ht = 36.60 cm = 11.00 cm.
OK · System just critical
Drain.

Removed 7 rods: Now have an 20 X 20 - 9 array. (See diagram). Have on 1 face ~~on~~ (spaced .269 cm from face) an lead reflector 8" X 10" X 16".

Δh = 7.4 cm
Water ht = 41.40 cm — Temp °C
2 ṫ per — #1 = 25.1°C
τ = 102.13 sec = 9.7¢ = 1.3¢/cm. — 2 = 25.1°C
Water ht = 34.00 cm = 8.40 cm.
System just critical
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	9"	✓	3×10^{-12}
	"	Fast ✓	1"	✓	"
K-2		Meter			
		Fast			
R-1					
R-2					
PM-1	700 ✓	Alarm ✓	5"	—	500 ✓
PM-2	1200 ✓	Low ✓	12"	—	900 ✓
	"	Alarm ✓	1"	—	"

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

DUMP WELL PROBE LIGHT

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKL

Source in checked by RKL Source No. 12-83

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

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

Red light on by RKL Time 0810

Start-up OK'd by I.D.C. RKL Date 8-31-72

(115×209)+Pb

Repeat of last run. (p-116.).

ΔL 7.0cm

Water ht = 41.50cm | Temp °C
+Ber | #1 = 25.1°C
τ = 123.86 sec = 8.34 = 1.24/cm | 2 = 25.1°C

0858 Water ht = 34.50 cm = 8.90cm
System just critical
Drain.

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1		Meter			
K-2		Post			
K-3		Meter			
[illegible]		Post			
[illegible]					
[illegible]		Alarm			
[illegible]		Alarm			
[illegible]		Alarm			

LOG N CALIBRATE ____ OPERATE ____ SOURCE No. ____

DUAL WELL PROBE LIGHT ____

START-UP CHECK LIST

Equipment checked by ____ Personnel check by ____

Instruments and safeties checked and reset by ____

[illegible] safeties checked and reset by ____

Source [illegible] checked by ____ Source No. ____

Emergency equipment in control room checked by ____

[illegible] in trip circuit: ____

[illegible] by ____ Date ____

[illegible] by ____ Date ____

120

9/6/72

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12} ✓	Meter ✓	3"	✓	3×10^{-12} ✓
		Fast ✓	1/2"	✓	—
K-2	—	Meter ✗			—
		Fast			—
R-1	—				—
R-2	—				—
PM-1	700 V	Alarm ✓	1/2"	✓	500 V
PM-2	1000 V	Low ✓	12"	✓	900 V
		Alarm ✓	1"	✓	—

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

DUMP & PURGE LIGHT —

START-UP CHECK LIST

Equipment checked by IDC, EJ Personnel check by IDC

Instruments and safeties checked and reset by EJ

Source in checked by ✓ Source No. M-43

Emergency equipment in control room checked by IDC

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

Red light on by EJ Time 1330

Start-up OK'd by EJ, IDC Date 9/6/72

9/6/72

Will try to repeat p. 118, then go on to evaluate the 7 rods removed since only H_2O reflector.
T = 3 = 3.3 in = 3.4

1423 Water @ 44.6 + Period #1 T = 25.0°C (102)
Attempted to level. Water @ 44.5 cm, neg period.
Inspection of array showed no visible air bubbles.
Lowered water H ≈ 40 cm, no further change in neg. period. Water up to 45 cm, no change in neg period.

1450 Drain to ≈ bottom of rods.

1530 Repeat.

1540 Water @ 44.7 cm. Removed source. Level on K-1 dropped from ≈ 30 (3×10⁻¹⁰) to ≈ 26 (3×10⁻¹⁰). Neutron pop. constant? Essentially a repeat of above. Same result, only difference was in source removal. After ≈ 7 min drifted up to ≈ 29 on K-1. Log N agrees qualitatively. Let level alone for >10 min. Slow upward drift. No change in water level.
Drain. Level started to decrease ≈ 34 cm.
Inspection showed nothing amiss.
Did a rough check of water height from ring in tank. Confirmed an effectively infinite reflector.

122

9/8/72

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE OR TANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Main ✓	3'	✓	$\cdot 3 \times 10^{-12}$ ✓
		Test ✓	Contact	✓	
K-2	—	Main			
	—	Test			
R-1	—				
R-2	—				
PM-1	700 V	Alarm ✓	½"	✓	700 V
PM-2	1200 V	Low ✓	12"	✓	1200 V
		Alarm ✓	1"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ SOURCE No. B80

DUMP WELL PROBE LIGHT —

9

START-UP CHECK LIST

Equipment checked by IDC, EJ Personnel check by IDC

Instruments and safeties checked and reset by EJ

Source in checked by EJ Source No. M43

Emergency equipment in control room checked by IDC

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

Red light on by EJ Time 1430

Start-up OK'd by EJ, IDC Date 9/8/72 ✓

9/8/72

Same lattice as p. 121 Recheck.

1515 Water @ 37.5 cm; too long a period

1516 " @ 38.8 cm; + Period #1 4.4 c[illegible] ∴ T = 25.0 °C

1527 Water @ 35.55 cm. Critical. T = 277.5 sec 4.4 c

1529 Drain water to 34.5 cm. Subcritical, too much for my period

1531 Dump.

By direct measurement of ring on tank, water was 52.0 cm from bottom of tank. Top of rods 43.7 from bottom of tank. ∴ By direct measurement, the top reflector was 8.3 cm and by manometer was 11.5 cm. ∴ trouble is in manometer line somewhere.

~~Removing 19 rods; 15 x 20 lattice.~~

9/12/72 Ran test in "well" checking reproducibility of H_2O ht., by reading manometer and by direct measure (meter stick). Results showed no significant error in manometer reading. The greatest difference in direct reading .2 cm.

9-14-72 Installed and calibrated probe. To promote direct read-out of H_2O Ht. Difference between probe reading + direct reading (meter stick) was less than .1 cm. These measurements can be found in activity log book page-20.

9/22/72

INSTRUMENT [illegible]

INSTRUMENT	RANGE	T[illegible]		[illegible]	SET	START-UP RANGE
K-1	3×10^{-12}	Meter	✓	4"	✓	3×10^{-12}
	"	Fast	✓	1"	✓	"
K-2	—	Meter	✓			
		Fast				
R-1	—					
R-2	—					
PM-1	700V	Alarm	✓	2"	✓	500V
PM-2	1200V	Low	✓	10"	✓	900V
		Alarm	✓	1"	✓	

LOG N CALIBRATE ✓ OPERATE ✓ SOURCE No. B 80

DUMP WELL PROBE LIGHT —

START-UP [illegible]

Equipment checked by IDC, EQ [illegible] check by IDC

Instruments and safeties [illegible] by EQ

Source in checked by EQ [illegible] 14-43

Emergency equipment [illegible] by IDC

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

[illegible] light on by ~~10:50~~ IDC [illegible] 10:50

Start-up [illegible] by EQ, IDC [illegible] 9/22/72

9/22/72

Restored rods removed 9/12 for checking manometer. Now have same lattice as reported last run, p.123, on 9/8/72; i.e., 20x20-9 rods.

11:24 Water @ 41.5 cm. + Period #1 — T = 25.0°C
Probe 37.73 in. T = 356 sec = 3.0¢ — 2 = 25.0°C
37.71" (too deep)
37.735 ← Use

11:40 Water @ 36.5 cm; critical
Probe 35.73 in. Good?
Dump

2:03p Tot/DC Start water.

2:20p Water (manometer) 41.5 cm. — Period #2

Probe	Contact	no contact	
	37.61 in	37.78	T = 154/sec
	57	72	= 7.0¢
	61	77	
	62	~~82~~ → X	
	67	74	
	61	74	
	67	78	
	37.62 in	37.76 in	
	41.2 cm	41.5 cm	

2:40p ~~2:40p~~ Near Critical Water (manometer) = 34.65 cm — Slightly super. — T_1 = 25.0
(Drain) 34.50 ~~35.50~~ — Slightly sub — T_2 = 25.1 °C
2:45 (add) 34.60 — Slightly super.
2:46 (Drain) 34.55 Critical

(Cont)

126 9/22/72 [TDC/DC] (cont.)

2:52p Critical Water (manometer) (no valve operation) 34.55 cm

Probe	Contact	no contact	
	34.93 in	34.98 in	
	34.89	35.03	Avg 1.3
	34.88	34.98	
	34.92	35.03	
	34.89 / 34.90	35.02 / 35.00 cm	
(no valve action) fi	34.3 cm	34.6 in	

2:57p Water (Manometer) 34.55 cm

3:11p Added water. Critical H (Manometer) 34.60 cm

3:13p Drain to ~21 cm. (Not dump!). Source in.

:15p Added water to ~34.5 cm (Actual 34.80)

:43 T_1 = 25.0°C T_2 = 25.1°C.

ln N = 1.2 1.4.

Removed source slowly. Slightly super

:45 Drain to H_w ≡ ~~34.5~~ 34.65 cm super

:46 Drain to = 34.50 cm sub

48 Add to = 34.55 cm Critical (a)

53 Actually slightly sub

3:58p Added water to 34.55 ⊕ cm manometer

Probe	Contact	no contact	
	34.92 in	34.98 cm	
	34.86	34.97	
	34.87	34.99	
	34.91	35.03	
	34.90 / 34.89 cm	35.03 / 35.00 cm	
	34.3 cm	34.6 in	

35[illegible] Shut down — Drain Water.

9/25/72

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 X 10 ✓	Meter	4" low Control Light		3 X 10 ✓
	✓	Fast			
K-2		Meter	4" low		3 X 10 ✓
		Fast	1" high		
R-1					
R-2					
PM-1	700 ✓	Alarm	1/2 in		700 ✓
PM-2	1000 ✓	Low	10 in		900 ✓
		Alarm	1"		

LOG N CALIBRATE _____ OPERATE _____ SOURCE No. B80

DUMP WELL PROBE LIGHT _____

START-UP CHECK LIST

Equipment checked by RE Personnel check by DC

Instruments and safeties checked and reset by EJ

Source in checked by DC Source No. M43

Emergency equipment in control room checked by TDC

Instruments in trip circuit: (EJ) PM 1+2, K 1+2.

Red light on by DC Time 2 30 p

Start-up OK'd by DC Date 9/25/72

Boc Es DC

9/22/72

2:30 p Start water

2:55 H_w = 42.2 cm P1 — Source cut.
C = 279.4 ...
T_1 = 24.5°C T_2 = 25.0°C = 4.24

3:03 Drain
H_w = 35.4 cm manometer - Sub.

	contact	no contact
Probe	35.11 in	—
	35.15	35.31
	35.15	35.29

3:09 H_w = 35.50 cm Plexiglas out

Probe	~~34.1~~ 35.19* in.	35.44 in.
	—	35.39
	35.19*	35.42
	35.29	35.42
	35.31	35.44
	35.29	35.42
	35.22 35.30	35.44

3:15 H_w = 35.50 cm manometer
3:17 = 35.60 ✓ Critical

Probe	35.21 in.	35.45 in.
	35.30	35.41
	35.28	35.41
	35.24	35.50
	35.32	35.47
	35.27	35.45

3:23 H_w = 35.65 cm 35.53 cm Plexiglas paper

35.26 in.	35.40 in.
35.26	35.50
35.28	35.43
35.28	35.43
35.27	35.44

Conversion of probe to Sight Glass:
P(2.54) - 543 = S.G. in cm

Probe U.L. # = 46.325 (direct reading)

≈ 1535 Drained to ≈ 30 cm, shook grid plate

1550 Water @ 41.7 cm + Period #2

Probe: In Out   t = 156.46 sec = 6.9 f

In	Out
37.72	37.63
.74	.63
.76	.84
.77	.82
.76	.80
.76	.80
.78	
37.76	37.82

= 41.66 cm

1600 Water @ 34.65 cm. manometer

Probe 34.98 = 34.55 cm   T = 24.7 °C 25.0

{ Water 34.65 cm
Probe = 34.51 = } | Slight leg

In	Out
34.92	34.97
.91	.965
.91 ~~.92~~	.95
	.96

Water @ 34.65 cm Level

In	Out
34.91	34.975
.94	.98
.92	.98
.92	.98
.925	.975
.92	.98
.93	

1615 Drain   34.92 = 34.50 and 34.98

INSTRUMENT CHECK

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

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

DUMP WELL PROBE LIGHT /

START-UP CHECK LIST

Equipment checked by AKA Personnel check by I.O.C. (I.O.C)

Instruments and safeties checked and reset by AKA

Source in checked by AKA Source No. 19-43

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

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

Red light on by AKA Time 1410

Start-up OK'd by I.O.C. AKA Date 9-27-72

Repeat of last run: (Now have rods wedge in place with small pc of wood at top tube sheet.)

Water ht = 40.90 cm (Δh = 6.5 cm) probe 37.48, 40.90 Temp °C
+Per #1: 25.0°C
τ = 132.55 sec = 7.9¢ = 1.2¢/cm. 2: 25.0°C

1505 Water ht = ±34.40 cm — probe 34.86 in. 34.24 cm
System just critical
Drain.

Repeat of above:

Water ht = 40.90 cm (Δh = 7.2 cm) probe 37.49 in 40.92 cm Temp °C
+Per #1: 25.1°C
τ = 82.57 sec = 11.6¢ = 1.6¢/cm. 2: 25.2°C

1548 Water ht = ±33.70 cm — probe 34.59 in 33.56 cm
System just critical
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	4.0"	✓	3×10^{-12}
	"	Fast ✓	.50"	✓	"
K-2	"	Meter ✓	4.0"	✓	"
	"	Fast ✓	1.0"	✓	"
R-1					
R-2					
PM-1	700 v	Alarm ✓	15"	✓	500 v
PM-2	1200 v	Low ✓	10"	✓	900 v
	"	Alarm ✓	1.0"	✓	"

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

DUMP WELL PROBE LIGHT ______

START-UP CHECK LIST

Equipment checked by RKR / I.O.C Personnel check by I.O.C

Instruments and safeties checked and reset by RKR

Source in checked by RKR Source No. M-43

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

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

Red light on by RKR Time 1310

Start-up OK'd by I.O.C RKR Date 9-28-72

1.30 cm separation c-c.
30 cm lengths.
.30" rods.

H_2O only: (No Lead)

Repeat of experiment described on bottom of p-107 and 114. 20x20-2 array: total of 398 rods.

Δh = 6.1 cm

Water ht = 40.90 cm — Probe (in) — Temp °C
+Per — 37.49 — #1 = 25.0°C
τ = 193.40 sec = 5.7¢ = .9¢/cm — 40.92 — 2 = 25.0°C

1359 Water ht = 34.80 cm — Probe (in)
System just critical — 34.99 = 34.57
Drain to ~26.20 cm: above grid plate: some small air bubbles.

Δh = 6.5 cm

Water ht = 40.90 cm — Probe (in) — Temp °C
2 +Per — 37.45 — #1 = 25.0°C
40.82
τ = 149.59 sec = 7.1¢ = 1.1¢/cm — 2 = 25.0°C

1430 Water ht = 34.40 cm — Probe (in)
System just critical — 34.87
34.27
Drain all H_2O.
Repeat of above:

Δh = 6.05 cm

Water ht = 40.90 cm — Probe (in) — Temp °C
3 +Per — 37.48 — #1 = 25.0°C
τ = 184.70 sec = 6.0¢ = 1.0¢/cm. — 2 = 25.0°C

1512 Water ht = 34.85 cm — Probe (in)
System just critical — ?
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 X 10^-12	Meter ✓	4"	✓	10 X 10^-12
	"	Set ✓	1"	✓	"
K-2	"	Meter ✓	4"	✓	10 X 10^-12
	"	Set ✓	1"	✓	"
R-1					
R-2					
PM-1	700 V	Alarm ✓	5"	✓	500 V
PM-2	1200 V	Low ✓	10"	✓	900 V
	"	Alarm ✓	1"	✓	"

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

DUMP WELL PROBE LIGHT ______

START-UP CHECK LIST

Equipment checked by F.O.C. RKA Personnel check by F.O.C.

Instruments and safeties checked and reset by RKA

Source in checked by RKA Source No. M-43

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

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

Red light on by RKA Time 1408

Start-up OK'd by F.O.C. RKA Date 10-5-72

1.30 cm seperation c-c.
30 cm length.
.30" rods.

Have an 20 X 20 - 9 array. Total of 391 rods. Have on 1 face (spaced .269 cm from face) an 8" X 10" X 16" lead reflector. (This is made by using 2" X 4" X 8" lead bricks.) All joints are filled with an "adhesive sealant." Trade name is Silastic 731 R.T.V. Made ~~for~~ by Dow Corning. Pb on west face.

Δh = 2.0 cm

Water ht = 40.90 cm	Probe (in)	Temp °C
+Per	37.45	#1 = 24.0 °C
τ = 1282.0 sec = .99¢ = .49¢/cm.		2 = 24.5 °C
1535 Water ht = 38.90 cm	Probe (in)	
System just critical	36.64	
Drain		

INSTRUMENT CHECK

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

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

DUMP WELL PROBE LIGHT _____

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKH

Source in checked by RKH Source No. M-43

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

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

Red light on by RKH Time 0805

Start-up OK'd by E.A.C. RKH Date 10-6-72

Repeat of last run: P-135.

D-4 = 1.9 cm

Water ht = 40.90 cm Probe (in) Temp °C

+Per τ = 738.82 mm = 1.7% 37.41 #1 = 29.5°C

0920 Water ht = 39.00 cm 36.62 #2 = 29.5°C

System first critical

Drain.

INSTRUMENT CHECK

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

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

DUMP WELL PROBE LIGHT _____

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKA

Source in checked by RKA 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 RKA Time 0820

Start-up OK'd by F.D.C, RKA Date 10-9-72

1,30 cm separation c-c.
30 cm lengths.
.30" rods.

Have an 20X20-9 array. Total of 391 rods.
Now have an 8" X10" X16" lead reflector on 2 faces. (spaced .269cm from face).
Pb on west & north face.

$\Delta L = .10$ cm

Water lvl = 30.80cm Probe (in) Temp °C
+Per 33.53" #1 = 24.2°C
E = 145.59 cm = 7.3 f = 73.0 f/cm 2 = 24.2°C

0920 Water lvl = 30.70cm Probe (in)
System just critical 33.43"
Drain.

Removed 5 rods. Have an 20X20-14 array.
Total of 386 rods.

$\Delta L = 1.45$ cm

Water lvl = 34.90cm Probe (in) Temp °C
2+Per 35.10" #1 = 24.2°C
E = 134.73 cm 7.8 f = 5.4 f/cm 2 = 24.2°C

0945 Water lvl = 33.45cm Probe (in)
System just critical 34.50"
Drain.

Removed 3 rods. Have an 20X20-17 array.
Total of 383 rods.

0958 Water lvl = 40.20 cm Probe (in) Temp °C
System sub critical 37.60" #1 = 24.2°C
Drain. #2 = 24.2°C

added 1 rod. Now have an 20 x 20 - 16 array.
Total of 384 rods.

1012 Water lvl = 41.30 cm Probe (in) Temp °C
System just critical 37.60" #1 = 24.3°C
Drain #2 = 24.3°C

Filled in the North West corner of lead reflector with lead bricks (2" x 8" x 10"). Thus giving 8" thick reflector on this corner.

Δk = 5.3

3 + Per Water lvl = 41.00 cm Probe (in) Temp °C
37.50 #1 = 24.3°C
L = 206.43 cm = 5.4 ¢ = 1.02 ¢/cm #2 = 24.5°C

1450 Water lvl = 35.10 cm Probe (in)
System just critical 35.92
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 x 10⁻¹²	Meter ✓	4"	✓	10 x 10⁻¹²
	"	Fast ✓	1"	✓	"
K-2	"	Meter ✓	4"	✓	"
	"	Fast ✓	1"	✓	"
R-1					
R-2					
PM-1	700 v	Alarm ✓	5"	✓	500 v
PM-2	1200 v	Low ✓	10"	✓	900 v
	"	Alarm ✓	1"	✓	"

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

DUMP WELL PROBE LIGHT _____

START-UP CHECK LIST

Equipment checked by I.V.C RKM Personnel check by I.V.C

Instruments and safeties checked and reset by RKM.

Source in checked by RKM Source No. M-93

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

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

Rod light on by RKM Time 1225

Start-up OK'd by I.V.C RKM Date 10-11-72

1.30 cm separation c-c.
30 cm length.
.130" rods.

Have an 19 X 19 + 4 array. Total of 365 rods. Each face of array has an 8" X 10" X 26" lead reflector (spaced .269 cm from face). This is made by using 2" X 4" X 8" lead bricks. All joints are filled with an adhesive sealant. Trade name Silastic 731 R.T.V. Made by Dow Corning.

δl: .00 cm

Water ht = 32.50 cm — Temp °C
+Per — #1: 24.5°C
τ = 210.18 sec = 5.3¢ = 17.7¢/cm — 2: 24.7°C

1330 Water ht = 32.20 cm — Probe (in)
System just critical — 33.21"
Drain.

Removed 4 rods. Now have an 19 X 19 array. Total of 361 rods. Lead reflector spaced .269 cm on 3 faces. ~~an~~ 1.58 cm on 1 face.

δl = 5.9 cm

Water ht - 40.90 cm — Probe (in) — Temp °C
2 +Per. — 36.67" — #1 = 24.6°C
τ = 176.01 sec = 6.2¢ = 1.05¢/cm. — 2 = 24.9°C

1358 Water ht = 35.00 cm — Probe (in)
System just critical — 34.28"
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 X 10^-12	Meter ✓	4"	✓	10 X 10^-12
	"	Fast ✓	1"	✓	"
K-2	"	Meter ✓	4"	✓	"
	"	Fast ✓	1"	✓	"
R-1					
R-2					
PM-1	700 v	Alarm ✓	5"	✓	500 v
PM-2	1200 v	Low ✓	10"	✓	900 v
	"	Alarm ✓	1"	✓	"

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

DUMP WELL PROBE LIGHT ______

START-UP CHECK LIST

Equipment checked by 2, R.C / RKR Personnel check by R.K.R.

Instruments and safeties checked and reset by RKR

Source in checked by RKR Source No. M-43

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

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

Rod light on by R.K.R. Time 0800

Start-up OK'd by F.R.C. RKR Date 10-12-72

Lead wt Kg

North Face

259.1 Kg

EAST Face

259.5 Kg

South Face

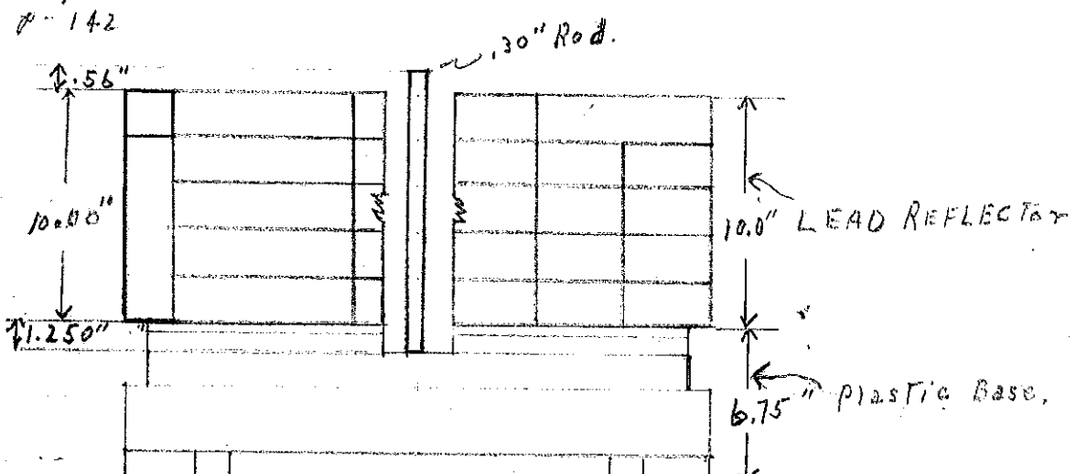
259.0 Kg.

west Face

259.2 Kg.

Total = 1036.8 Kg.

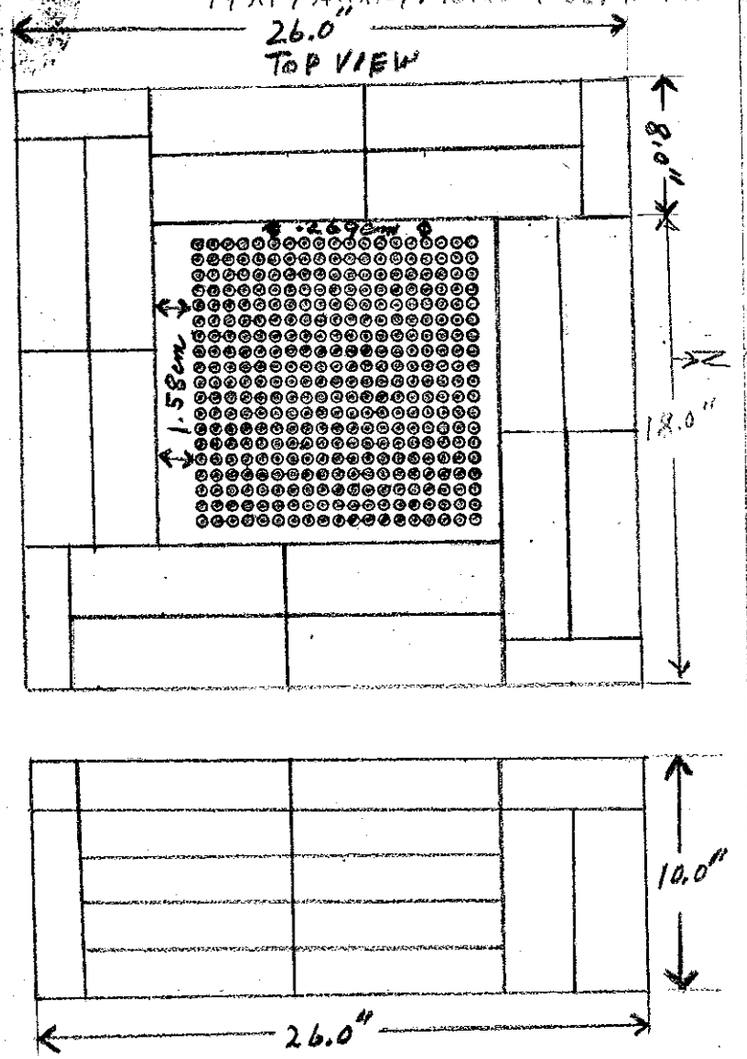
Logos
P-142



Position of Rod's. To LEAD REFELECTOR.

Logos
P-142

1.30 cm SEPERATION C-C.
30 cm LENGth.
.30" Rods.
19 X 19 ARRAY. TOTAL OF 361 Rod's.



TYPICAL SIDE VIEW.

Repeat of last num: P142-143.

Δ4 = 5.9

Water ht = 40.90 cm Probe (in) Temp. °C

E = 171.68 sec = 6.4 ℓ = 1.08 ℓ/cm. 36.59" #1 = 24.5°C

2 = 24.5°C

0850 Water ht = 35.00 cm Probe (in)

System just critical 34.25"

Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 [10 ^12	Meter ✓	4"	✓	3 [10 ^12
	"	Fast ✓	1"	✓	"
K-2	"	Meter ✓	4"	✓	"
	"	Fast ✓	1"	✓	"
R-1					
R-2					
PM-1	700 V	Alarm ✓	.5"	✓	500 V+
PM-2	1200 V	Low ✓	10"	✓	900 V+
	"	Alarm ✓	1"	✓	"

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

DUMP WELL PROBE LIGHT _____

START-UP CHECK LIST

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

Instruments and safeties checked and reset by ARR

Source in checked by ARR Source No. M-93

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

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

Red light on by ARR Time 10:30

Start-up OK'd by I.D.C. ARR Date 10-23-72

1.30 cm seperation c-c.
30 cm length.
.30" rods.
H_2O + Lead reflector.

H_2O = 25.60 cm = Top of rods.
Now have on each face (for an 23 X 23 lattice) an lead reflector 8.0" X 10.0" X 28.2". The lead is spaced one half-cell width, ± .250". The .250" space will allow for insertion of stainless steel plates for some arrays.

For box run: Have an 19 X 19 array. Total of 361 rods.

1108 Water Ht = 41.30 cm Probe (in) 37.62" Temp °c #1 = 23.7°c, 2 = 23.1°c
System sub critical
Drain.

added 2 rods; Now have an 19 X 19 + 2 array.
Total of 363 rods.

Water Ht = 41.60 cm Probe (in) 37.80" Temp °c #1 = 24.0°c, 2 = 24.0°c
- Per
- 380.12 sec = -3.8¢

1300 Drain.
added 2 rods: Now have an 19 X 19 + 4 array.
Total of 365 rods.

Δh = 7.3 cm
Water Ht = 41.20 cm Probe (in) 37.59" Temp °c #1 = 24.0°c, 2 = 24.0°c
2 + Per
C = 106.48 sec = 9.4¢ = 1.3 ¢/cm

1333 Water Ht = ± 33.90 cm Probe (in) 34.65"
System just critical
Drain.

Removed 1 rod: Now have an 19 X 19 + 3 array.
Total of 364 rods.

Δh = 4.9 cm
Water Ht = 41.10 cm Probe (in) 37.56" Temp °c #1 = 24.0°c, 2 = 24.0°c
3 + Per
C = 454.16 sec = 2.7¢ = .55 ¢/cm

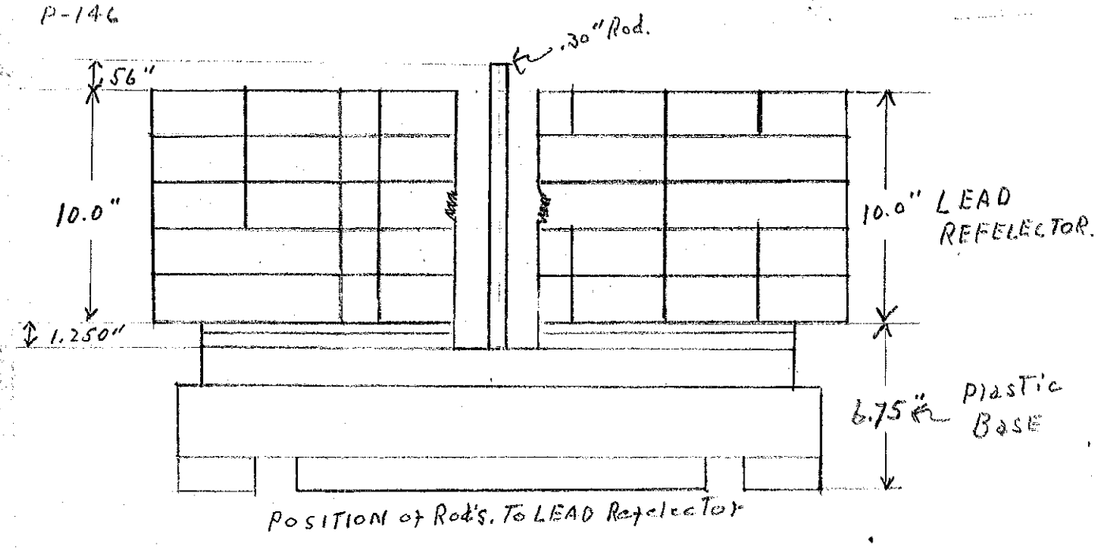
1422 Water Ht = 36.20 cm Probe (in)
System just critical
Drain

Repeat of last run:

Δh = 4.8 cm
Water Ht = 41.10 cm Probe (in) 37.46" Temp °c #1 = 24.0°c, 2 = 24.0°c
4 + Per
C = 564.98 sec = 2.2¢ = .46 ¢/cm.

1505 Water Ht = 36.30 cm. Probe (in) 35.65"
System just critical
Drain.

Log #5
P-146



POSITION of Rod's. To LEAD Reflector

Lead wt. Kg.

North Face

290.3 Kg.

EAST Face

289.8 Kg.

South Face

289.7 Kg.

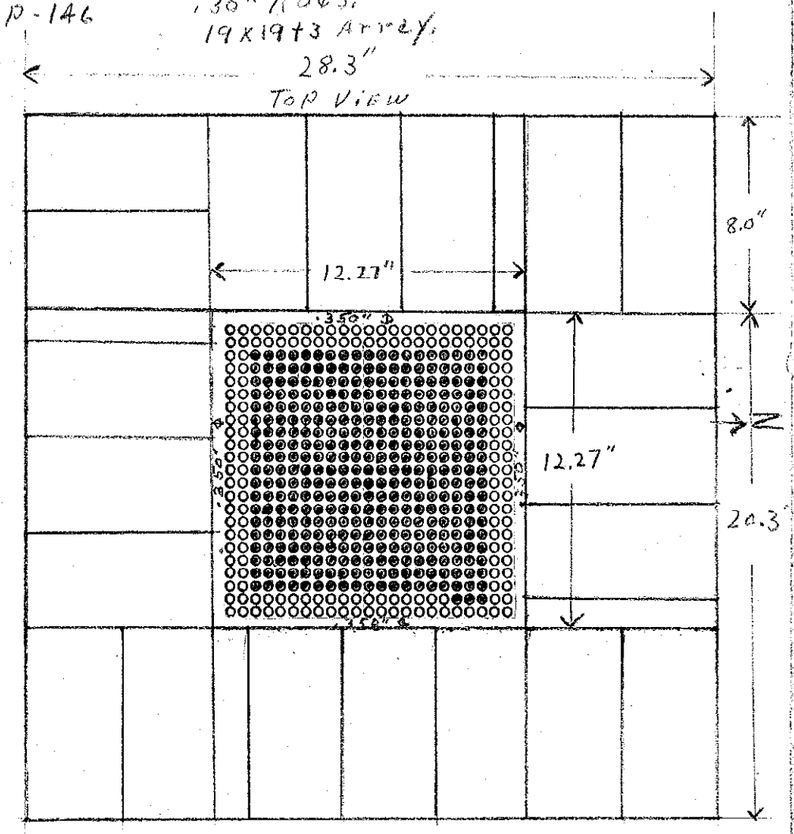
west Face

290.8 Kg.

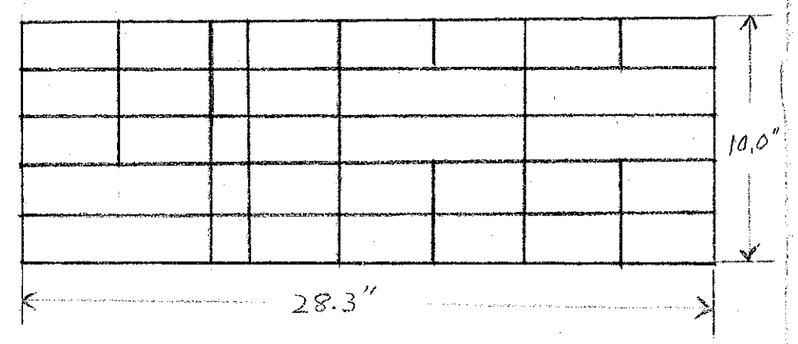
Total = 1160.6 Kg.

Log #5
P-146

1,30 cm SEPERATION, C. C.
30 cm LENGTH.
.30" Rod's.
19x19+3 Array.



LEAD REFLECTOR. 4 SIDES.



TYPICAL SIDE VIEW.

10-24-72 Water sample taken from well.
0800

C = 1,650.0 grams
T = 102.0 grams
N = 1,548.0 grams
ask for.
g/g.
Rpro 40

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3x10^-12	Meter	4"	✓	10x10^-12
	"	Fast ✓	1"	✓	"
K-2	"	Meter ✓	4"	✓	"
	"	Fast ✓	1"	✓	"
R-1					
R-2					
PM-1	700 V ✓	Alarm ✓	5"	✓	500 V
PM-2	1200 V ✓	Low ✓	10.0"	✓	900 V
	"	Alarm ✓	1.0"	✓	"

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

DUMP WELL PROBE LIGHT ✓

1.30 cm separation c-c.
30 cm length
.30" rods.

START-UP CHECK LIST
7, D.C

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

Instruments and safeties checked and reset by BKR

Source in checked by BKR Source No. M-63

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

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

Rod Light on by BKR Time 1245

Start-up OK'd by F.D.C. BKR Date 10-24-72

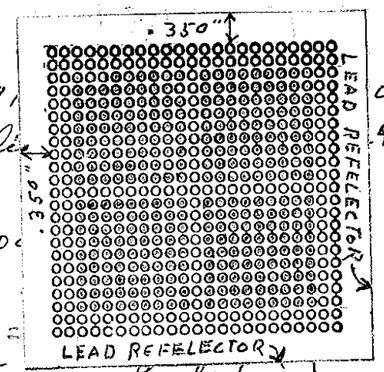
H_2O + Lead reflector (4 sides see p-146).

Now have an 21 x 21 array, with the 11th row removed in 2 directions. Total of 400 rods.

1300 Water ht = 22.60 cm
System just critical
Drain.

Temp °c
#1 = 24.2°c
2 = 24.2°c

Now have an 19 x 19 array removed in 2 directions. Total of 324 rods.



Water ht = 41.30 cm
+ Ref.
C = 493.27 sec = 2.54 =

Temp °c
#1 = 24.2°c
2 = 24.2°c

1449 Water ht = 36.15 cm Probe (en)
System just critical 35.52"
Drain.

1.30 cm separation c-c.
30 cm length
.30" rods.

START-UP CHECK LIST

7, D.C

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

Instruments and safeties checked and reset by BKR

Source in checked by BKR Source No. M-43

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

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

Red light on by BKR Time 1245

Start-up OK'd by E.D.C. BKR Date 10-24-72

H_2O + 2 ... ee p-146).

Log Book #5
p-149
Total of 324 rods
19X19 array.
.30" rods.
30 cm length.
1.30 cm separation c-c.

Now have an 21 ... th row removed in 2 d... o rods.

1300 Water ht = 22.60 cm ... Temp °C
System just criti... #1 = 24.2°C
Drain. 2 = 24.2°C

Now have an 19X19 array, with the 10th row removed in 2 directions. Total of 324 rods.

Water ht = 41.30 cm Probe (in) Temp °C
+ Per. Δh = 5.15 cm 37.59" #1 = 24.2°C
C = 493.27 sec = 2.54 = .48¢/cm 2 = 24.2°C

1449 Water ht = 36.15 cm Probe (in)
System just critical 35.52"
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Alarm ✓	4"	✓	10×10^{-12}
	"	[illegible] ✓	1"	✓	"
K-2	"	Alarm ✓	4"	✓	"
	"	[illegible] ✓	1"	✓	"
R-1					
R-2					
PM-1	700 V	Alarm ✓	5"	✓	500 V
PM-2	1200 V	Low ✓	10"	✓	900 V
	"	Alarm ✓	1"	✓	"

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

DUMP WELL PROBE LIGHT _____

START-UP CHECK LIST

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

Instruments and safetics checked and reset by RKM

Source in checked by RKM Source No. M-93

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

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

Red light on by RKM Time 0800

Start-up OK'd by I.D.C RKM Date 10-25-72

1.30 cm separation c-c.
30 cm. length.
.30" rods.
H_2O + Lead reflector.

Repeat of last run p-149. Total of 324 rods.

0847 Water ht = 41.40 cm — Probe (in) 37.67" — Temp °C #1 = 28.0°C, 2 = 28.2°C
System just critical
Drain.

Repeat of above.

$\Delta L = 2.85$ cm

Water ht = 41.30 cm — Probe (in) 37.62" — Temp °C #1 = 28.0°C, 2 = 28.2°C
+Per
$E = 1803.7$ cm = .71 f = .25 f/cm.

1024 Water ht = 38.45 cm — Probe (in) 36.45
System just critical
Drain

Have an 20 X 20 array, with the 10th & 11th row of rods removed in x direction.
Total of 324 rods.

1338 Water ht = 41.60 cm — Probe (in) 37.75" — Temp °C #1 = 24.2°C, 2 = 24.2°C
System subcritical
Drain.

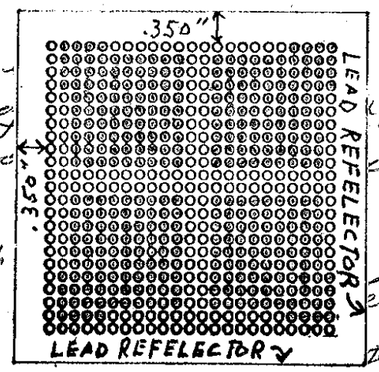
ave.

added 20 rods. 5 to each corner.
Now have 22X22 array, with 11th & 12th
row of rods removed in 2 directions
Total of 344 rods.

1406 Water Lvl = 41.40 cm
System sub critical
Drain.

Temp °c
#1 = 24.2°c
2 = 24.2°c

added 8 rods. 2 to
Have an 22X22 arra
row of rods remo
Total of 352 rods.



11/2 th

Water Lvl = 41.30 cm
2 + Per

Temp °c
#1 = 24.2°c
2 = 24.3°c

C = 282.49 cm = 4.1 ¢ = .67 ¢/cm

1450 Water Lvl = 35.20 cm
System first critical
Drain.

Probe (in)
35.19"

ad. = 6.3 cm

Repeat of above.
Water Lvl = 41.40 cm
+ Per.

Probe (in)
37.68"

Temp °c
#1 = 24.3°c
2 = 24.3°c

C = 247.72 cm = 4.6 ¢ = .73 ¢/cm.

1531 Water Lvl = 35.10 cm
System first Critical:

Probe (in)
35.11"

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	4"	✓	10×10^{-12}
	"	Fwd ✓	1"	✓	"
K-2	"	Meter ✓	4"	✓	"
	"	Fwd ✓	1"	✓	"
R-1					
R-2					
PM-1	100 v	Alarm ✓	5"	✓	500 v
PM-2	1200 v	Low ✓	10"	✓	900 v
	"	Alarm ✓	10"	✓	"

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

DUMP WELL PROBE LIGHT ———

START-UP CHECK LIST

Equipment checked by E.V.C Personnel check by E.V.C

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

Bench is checked by R.K.M Source No. M-83

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

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

Red light on by R.K.M Time 0840

Reviewed by E.V.C. R.K.M Date 10-26-72

Added 20 rods. 5 to ... corner.
Now have 22X22 ar... 2 th
row of rods remo... o
Total of 344 rods.

Tops 4-152
Total of 352 rods
22X22 array:
.30" rods.
30 cm spacing,
1.3 cm separation c.c.

1406 Water ht = 41.40 cm ... Temp °C
System sub critic... #1 = 24.2°C
Drain. 2 = 24.2°C

Added 8 rods. 2 to each corner.
Have an 22X22 array, with the 11th & 12th
row of rods removed in 2 directions.
Total of 352 rods.

Δh = 6.1 cm

Water ht = 41.30 cm Probe (in) Temp °C
+ Per 37.66" #1 = 24.2°C
τ = 282.49 sec = 4.1¢ = .67¢/cm 2 = 24.3°C
1450 Water ht = 35.20 cm Probe (in)
System just critical 35.19"
Drain.

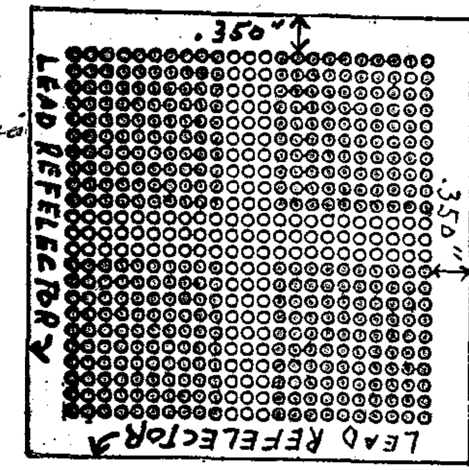
Δh = 6.3 cm

Repeat of above: Probe (in) Temp °C
Water ht = 41.40 cm 37.68" #1 = 24.3°C
+ Per. 2 = 24.3°C
τ = 247.72 sec = 4.6¢ = .73¢/cm.
1531 Water ht = 35.10 cm Probe (in)
System just Critical: 35.11"

1.30 cm separation c-c.
30 cm length.
.30" rods.
H_2O + lead reflector.

Have an 23 X 23 array, with the 11th, 12th & 13th row removed in 2 directions. Total of 400 rods.

0914 Water ht = 41.30 cm.
System sub critical
Drain.



Temp °c
#1 = 24.2°c
2 : 24.2°c

Have an 23 X 23 array. with the 4th, 8th, 12th, 16th & 20th row removed in 2 directions, Total of 324 rods.

1035 Water ht = ± 20.80 cm
System just critical
Drain.

Probe (in) 29.63

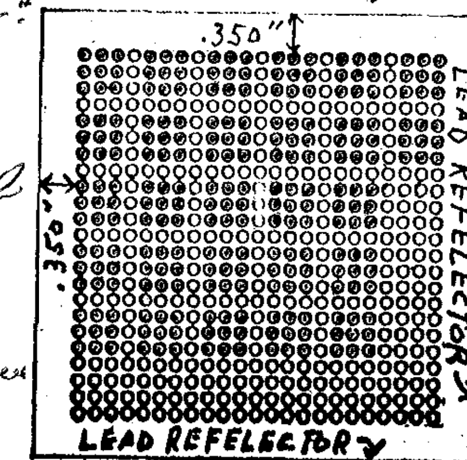
Temp °c
#1 : 24.2°c
2 : 24.2°c

Removed 1 column of rods: Total of 54 removed.
Water ht = 26.0 cm
System just critical
Drain.

Probe (in) 31.67"

Temp °c
#1 = 24.2°c
2 : 24.3°c

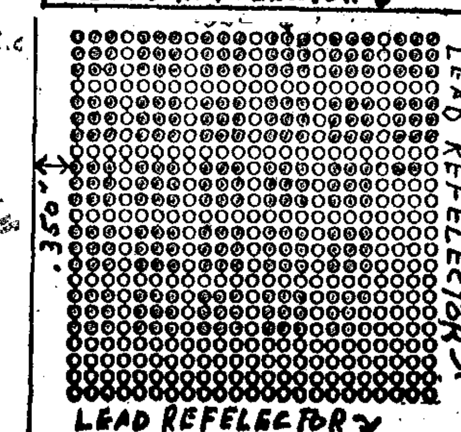
Removed 3 clusters of rods from 1 face: Total of 27 rods: Now have a total of 243 rods. See diagram #1



1315 Water ht = 41.20 cm
System sub critical
Drain.

°c
4.5°c
4.5°c

Added 2 rods: Now have See diagram. #2

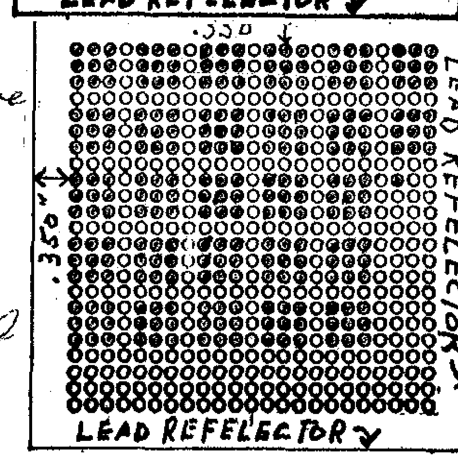


Δλ = 6.c

Water ht = 41.0 cm
+ Per
I = 275.97 au = 4.24 = .69 ¢/cm
Water ht = 34.95 cm.
System just critical

°c
4.5°c
4.5°c

Removed 1 rod: Now have See diagram. #3



Water ht = 41.40 cm
System sub critical
Drain.

°c
4.5°c
4.5°c

over:

1.30 cm
30 cm
.30" ra
H_2O +

Have an 23 X 23 arra[y] ... 13th
row removed in ... of 400 rods

Figure p-154
Total of 400 rods
23X23 array
.30" rods
30 cm length
1.30 cm aperture o.c.

0914 Water ht = 41.30 cm. Probe (in) Temp °C
System sub critical 37.65" #1 = 24.2°C
Drain. 2: 24.2°C

Have an 23 X 23 array. with the 4th, 8th, 12th, 16th & 20th row removed in 2 directions, Total of 324 rods.

1035 Water ht = ~~4~~ 20.80 cm Probe (in) Temp °C
System just critical 29.63 #1 24.2°C
Drain. 2: 24.2°C

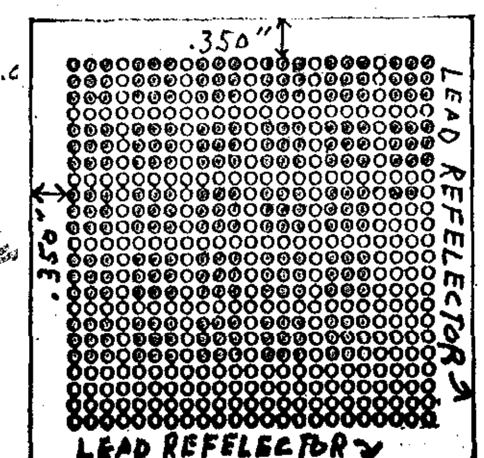
Removed 1 column of rods: Total of 54 removed
Water ht = 26.0 cm Probe (in) Temp °C
System just critical 31.67" #1 = 24.2°C
Drain. 2: 24.3°C

Figure p-155
Total of 243 rods
.30" rods
30 cm length
1.30 cm aperture o.c.

Removed 3 clusters of ... Total of 27 rods. Now ... rods. See diagram #1

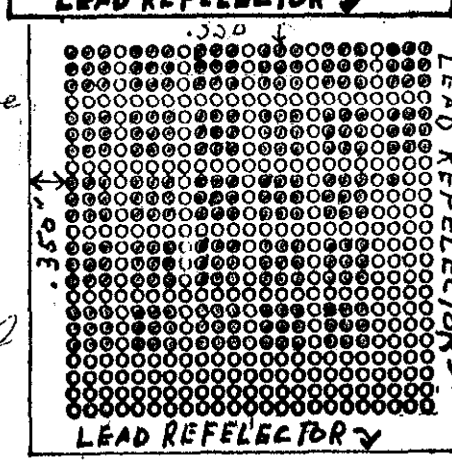
1315 Water ht = 41.20 cm Probe (in) Temp °C
System sub critical 37.60" #1 = 24.5°C
Drain 2 = 24.5°C

Added 2 rods. Now have a total of 245 rods. See diagram #2



Water ht = 41.0 cm
+Per
I = 275.97 sec = 4.24 = .69 $/s
Water ht = 34.95 cm.
System just critical

Removed 1 rod. Now have ... See diagram #3



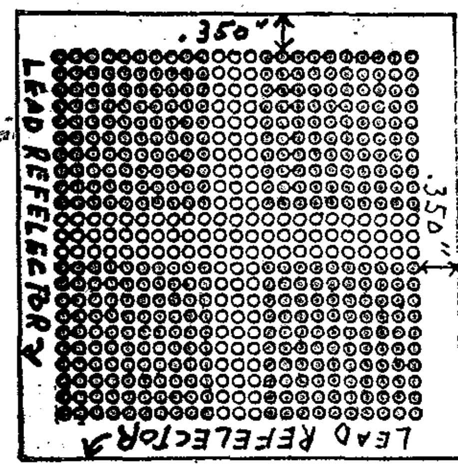
Water ht = 41.40 cm
System sub critical
Drain.

aws.

1.30 cm separation c-c.
30 cm length.
.30" rods.
H_2O + lead reflector.

Have an 23 X 23 array, with the 11th, 12th & 13th row removed in 2 directions. Total of 400 rods

0914 Water ht = 41.30 cm. System sub critical Drain.



Temp °c
#1 = 24.2°c
2 : 24.2°c

Have an 23 X 23 array. with the 4th, 8th, 12th, 16th & 20th row removed in 2 directions. Total of 324 rods.

1035	Water ht = ± 20.80 cm System just critical Drain.	Probe (in) 29.63	Temp °c #1 24.2°c 2 : 24.2°c

Removed 1 column of rods: Total of 54 removed

Water ht = 26.0 cm System just critical Drain.	Probe (in) 31.67"	Temp °c #1 = 24.2°c 2 : 24.3°c

Removed 3 clusters of Total of 27 rods: Have rods. See digram

1315 Water ht = 41.20 cm System sub critical Drain.

Temp °c
24.5°c
4.5°c

Added 2 rods; Now have See digram. #2

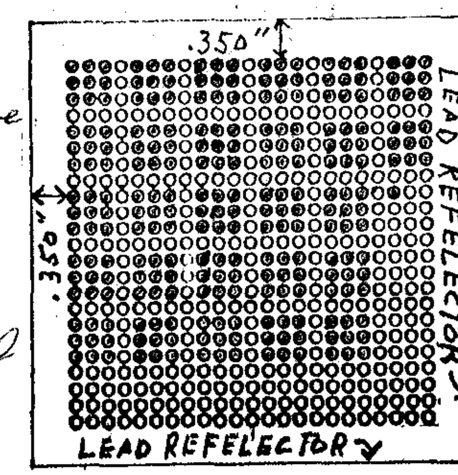
$\Delta\lambda$ = 6.05 cm

Water ht = 41.0 cm +Per	Probe (in) 37.58"	Temp °c #1 = 24.5°c 2 = 24.5°c

I = 275.97 nu = 4.24 = .69 ¢/cm.

Water ht = 34.95 cm. System just critical	Probe (in) 35.06"

Removed 1 rod: Now have See digram. #3



Water ht = 41.40 cm
System sub critical
Drain.

°c
4.5°c
4.5°c

cues:

17

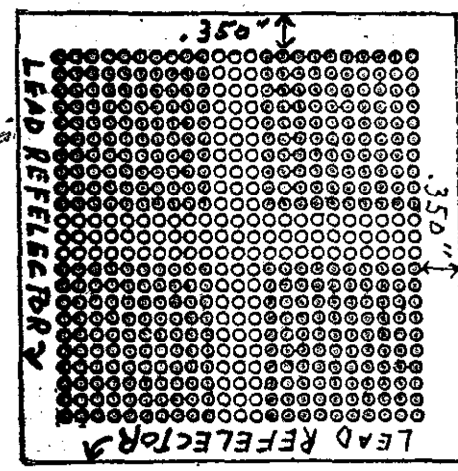
1.30 cm separation c.c.
30 cm length.
.30" rods.
Total of 243 rods
Fig #4 - p - 155

1.30 cm separation c.c.
30 cm length.
.30" rods.
Total of 245 rods
Fig #5 - page 155
II

1.30 cm separation c-c.
30 cm length.
.30" rods.
H_2O + lead reflector.

Have an 23 X 23 array. with the 11th, 12th & 13th row removed in 2 directions. Total of 400 rods

0914 Water ht = 41.30 cm. System sub critical Drain.



Temp °c
#1 = 24.2 °c
2 : 24.2 °c

Have an 23 X 23 array. with the 4th, 8th, 12th, 16th & 20th row removed in 2 directions, Total of 324 rods.

1035	Water ht = ± 20.80 cm System just critical Drain.	Probe (in) 29.63	Temp °c #1 = 24.2 °c 2 : 24.2 °c

Removed 1 column of rods: Total of 54 removed

Water ht = 26.0 cm System just critical Drain.	Probe (in) 31.67"	Temp °c #1 = 24.2 °c 2 : 24.3 °c

Removed 3 clusters of ... Total of 27 rods. Have ... rods. See diagram

1315 Water ht = 41.20 cm System sub critical Drain.

Temp °c
24.5 °c
24.5 °c

Added 2 rods. Now have ... See diagram. #2

Δλ = 6.05

Water ht = 41.0 cm
+ Per
I = 275.97 mw = 4.24 = .69 ¢/cm
Water ht = 34.95 cm.
System just critical

Removed 1 rod: Now have a total of 244 rods. See diagram. #3

Water ht = 41.40 cm System sub critical Drain.	Probe (in)	Temp °c #1 = 24.5 °c 2 = 24.5 °c

Over:

#1
Fig #5, p-155
Total of 243 rods
.30" rods
30 cm length
1.30 cm separation c-c

#2
Fig #5 - page 155
Total of 245 rods
.30" rods
30 cm length
1.30 cm separation c-c

#3
Fig #5, p-155
Total of 244 rods
.30" rods
30 cm length
1.30 cm separation c-c

Now have an 19X19 array, with the 4th, 8th, 12th & 16th row removed in 2 directions. Total of 225 rods.

1545 Water ht = 41.30 cm — Probe (in) 37.74" — Temp °C #1 = 24.5 °C, 2 = 24.5 °C

System sub critical

Drain.

INSTRUMENT CHECK

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

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

DUMP WELL PROBE LIGHT ______

1.30 cm separation c-c
30 cm length.
.30" rods.
H_2O + lead reflector.

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKM

Source in checked by RKM Source No. M-43

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

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

Red Light on by RKM Time 0820

Start-up OK'd by I.D.C, RKM Date 10-27-72

Have an 19X19 array, with the 4th, 8th, 12th & 16th row removed in 2 directions, Plus 4 rods on each corner. Total of 241 rods. See diagram.

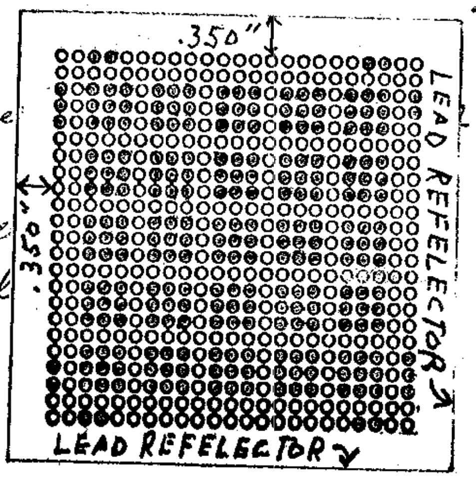
Water ht = 41.40 cm — Probe (in) 37.71" — Temp °C #1 = 24.3 °C, 2 = 24.5 °C

— Per

N.C.

0945 Drain.

added 2 rods. Now 243 rods.



1016 Water ht = 41.40 c — Temp °C

System just crit

Drain.

over.

1.30 cm separation c-c
30 cm length.
.30" rods.
H_2O + side reflector.

START-UP CHECK LIST

Equipment checked by ZIDC / RKW   Personnel check by ZIDC

Instruments and safeties checked and reset by RKW

Source in checked by RKW   Source No. M-43

Emergency equipment in control room checked by ZIDC

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

Red light on by RKW   Time 0820

Start-up OK'd by ZIDC, RKW   Date 10-27-72

Have on 19 X 19 array, row removed in on each corner. See diagram.

2 rd + 16 rd
4 rods

Left #5 p-157
total of 243 rods
.30" rods
30 cm length
1.3 cm separation c-c

Water ht = 41.40 c
- Per
NC.

Temp °C
#1 = 24.0 °C
2 = 24.5 °C

0945 Drain.
added 2 rods. Now have a total of 243 rods.

1016 Water ht = 41.40 cm   Probe (in) 37.71"   Temp °C
System just critical
Drain.

over.

Now have an 17×17 array, with the 3rd, 6th, 9th, 12th, & 15th row removed in 2 directions. Total of 144 rods.

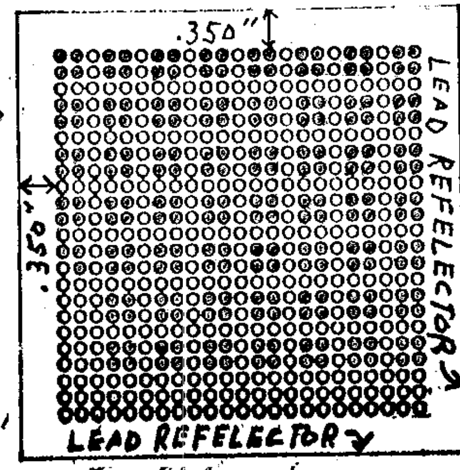
1315 Water ht = 41.50 cm   Probe (in)   Temp °C
System sub critical   37.73"   #1 = 24.5°
Drain.   2 = 24.5°

1350 added 52 rods: Now have an 20×20 array, with the 3rd, 6th, 9th, 12th, 15th & 18th row removed. Total of 196 rods.
Water ht = 41.20 cm   Probe (in)   Temp °C
System sub critical   37.55"   #1 = 24.5°C
Drain   2 = 24.5°C

Now have an 20×23 array, with 2½ cluster of rods removed from 1 row: added a total of 18 rods. Total number of rods = 214 rods. See digram:

Water ht = 41.30 cm   Probe (in)   Temp °C
2 −Per   37.66   #1 = 24.4°C
τ = −297.7 sec = −5.0¢   2 = 24.4°C
1528 Drain

added 1 rod: Now ... 5 rods
See digram:



Water ht = 41.50" ... Temp °C
3 +Per
τ = 106.98 sec = 9.4¢ = ... #1 = 24.5°C
2 = 24.5°C
1548 Water ht = ±33.55 cm   Probe (in)
System just critical   34.51"
Drain.

added 1 rod. Now have a total of 215 ~~rod~~ rods
See diagram:

Δd = 1.95 cm

Water ht = 41.50"	Probe (in)	Temp °C
3 + Per	37.71"	#1 = 24.5°C
T = 106.98 min = 9.4¢ = 1.2¢/cm.		2 = 24.5°C

1548 Water ht = ±33.55 cm Probe (in)
System just critical 34.51"
Drain.

Fig #5 p-159
Total of 215 rods.
.30" Rods.
30 cm length.
1.30 cm separation c-c.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3X10⁻¹²	High ✓	4"	✓	10X10⁻¹²
	"	Per ✓	1"	✓	"
K-2	"	High ✓	4"	—	"
	"	Per ✓	1"	✓	"
R-1					
R-2					
PM-1	700 V	Alarm ✓	.5"	✓	500 V
PM-2	1200 V	Low ✓	10"	✓	900 V
	"	Alarm ✓	1"	✓	"

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

DUMP WELL PROBE LIGHT

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKAJ

Source in checked by AKAJ Source No. M-43

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

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

Red light on by AKAJ Time 0804

Start-up OK'd by I.D.C, AKAJ Date 10-30-72

1.30 cm separation c-c.
30 cm lengths.
.30" rods.
H_2O + Lead Reflector.

Repeat of last run: p-159.

Water ht = 41.10 cm (Δ = 7.1 cm) Probe (in) 37.59" Temp °C #1 = 24.2°C

+ Per

C = 145.59 ¢ = 7.3 ¢ = 1.03 ¢/cm 2 = 24.2°C

0900 Water ht = 34.00 cm Probe (in) 34.71"

System just critical

Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3x10⁻¹²	Man ✓	4"	–	10x10⁻¹²
	"	Fast ✓	1"	–	" "
K-2	"	Man ✓	4"	–	"
	"	Fast ✓	1"	–	"
R-1					
R-2					
PM-1	700 v	Alarm ✓	5"	–	500 v
PM-2	1200 v	Low ✓	10"	–	900 v
	"	Alarm ✓	1"	–	"

LOG N CALIBRATE ✓ OPERATE ✓ SOURCE No. 13-80

DUMP WELL PROBE LIGHT ______

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKH

Source in checked by RKH Source No. M-43

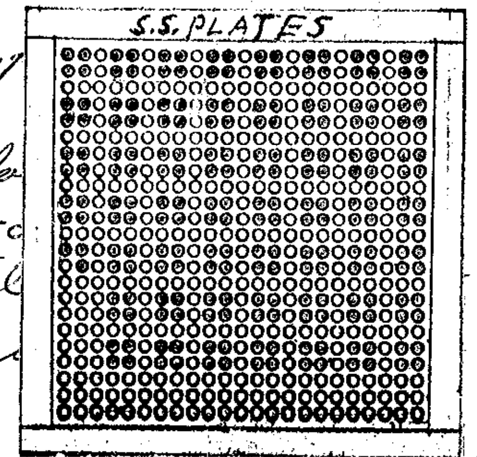
Emergency equipment in control room checked by I.D.C.

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

Red light on by RKH Time 1325

Start-up OK'd by I.D.C. RKH Date 11-1-72

1.3 cm separation c-c.
30 cm length.
.30" rods.
H_2O + Lead & .250" S.S.



Now have on each inner fa[ce]
2 - .250" x 10.0" x 12.27". 2 - .250
Type 304L Stainless Steel
is spaced at half-cell [...]
See diagram:

Have an 20 x 23 array with a double plus 1 rod removed from 1 row. Total of 215 rods. (See p-159 without S.S.)

		Probe (in)	Temp °C
1352	Water ht = 41.10 cm		
	System sub critical	37.54"	#1 = 24.3 °C
	Drain.		2 = 24.3 °C

added 9 rods: Now have a full 20 x 23 array with the 3rd, 6th, 9th, 12th, 15th, 18th row removed in 1 direction, on the 3rd, 6th, 9th, 12th, 15th, 18th & 21st in 1 direction. Total of 224 rods.

		Probe (in)	Temp °C
1550	Water ht = 41.20 cm		
	System sub critical	37.63"	#1 = 24.2 °C
	Drain.		2 = 24.2 °C

1.30 cm separation c-c
30 cm length.
.30" rods.
H_2O + lead & S.S. plate.

Now have on each inner face of lead, 4 pc
2 - .250" X 10.0" X 12.27". 2 - .250" X 10.0" X 11.77"
Type 304L Stainless steel plate. Each plate
is spaced at half-cell width from array.
See diagram.
Have an 20 X 23 array. with 2 detectors plus 1 rod removed
from 1 row. Total of 215 rods. (See p-159 without S.S.)

1352 Water ht = 41.10 cm — Probe (in) — Temp °C
System sub Critical — 37.54" — #1 = 24.3°C
Drain. — #2 = 24.1°C

added 9 rods. Now have a full 20 X 23 array.
with the 3rd, 6th, 9th, 12th, 15th, 18th row removed
in 1 direction, on the 3rd, 6th, 9th, 12th, 15th, 18th
& 21st in 1 direction. Total of 229 rods.

1550 Water ht = 41.20 cm — Probe (in) — Temp °C
System sub critical — 37.63" — #1 = 24.2°C
Drain. — #2 = 24.2°C

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3x10^-12	✓	4"	✓	10x10^-12
	"	✓	1"	✓	"
K-2	"	✓	4"	✓	"
	"	✓	1"	✓	"
R-1					
R-2					
PM-1	700 V	Alarm ✓	5"	✓	500 V
PM-2	1200 V	Low ✓	10"	✓	900 V
	"	Alarm ✓	1"	✓	"

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

DUMP WELL PROBE LIGHT

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKA

Source in checked by RKA Source No. M-43

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

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

Red light on by RKA Time 0925

Start-up OK'd by I.P.C. RKA Date 11-2-72

1.30 cm separation c-c.
30 cm length.
.30" rods.
H_2O + Lead + .250" S.S. plates.

Added 8 rods. Now have an 23 x 23 array, with 6 clusters of rods removed from 1 row. Total of 232 rods.

Water ht = 41.20 cm Probe (in) Temp °C
− Per 37.53" #1 = 24.3 °C
τ = −130.38 sec = −15.24 2 = 24.3 °C

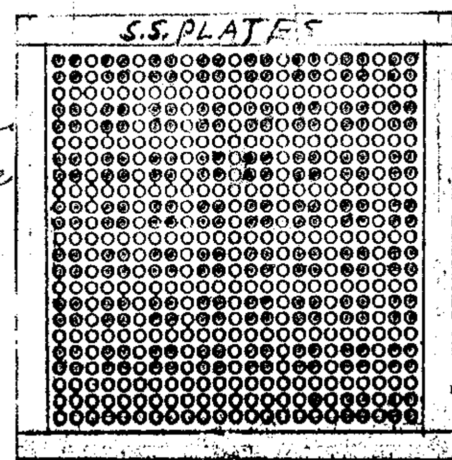
1027 Drain.

Added 2 rods: Now have an 23 x 23 array: with 5½ clusters of rods removed from 1 row. Total of 234 rods.

Δh = 8.0 cm
Water ht = 41.20 cm Probe (in) Temp °C
+ Per 37.53" #1 = 24.3 °C
τ = 76.05 sec = 12.1¢ = 1.5¢/cm. 2 = 24.3 °C

1108 Water ht = 33.20 cm Probe (in)
System just critical 34.30"
Drain.

over.



Removed 1 rod. Have ... with
5 3/4 clusters of rods ... row.
Total of 233 rods.

Water ht = 41.40 cm
+ Per
T = 847.47 cc = 1.5 ¢ ... 24.3 °C
2 = 24.3 °C

1327 Water ht = 37.00 cm Probe (in)
System just critical 35.82"
Drain.

Repeat of above:

Water ht = 41.40 cm Probe (in) Temp °C
+ Per 37.62" #1 = 24.3 °C
~~#~~ T = 825.74 cc = 1.5 ¢ 2 = 24.3 °C

1448 Water ht = ~~35.6~~ 36.50 cm Probe (in)
System just critical 35.64"
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP		SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 x 10^-12	Meter	✓	3"	✓	10 x 10^-12
	"	Fast	✓	1"	✓	
K-2	"	Meter	✓	4"	✓	10 x 10^-12
	"	Fast	✓	1"	✓	
P-1						
P-2						
PM-1	700 V ✓	Alarm	✓	1/2"	✓	500 V ✓
PM-2	1200 V ✓	Low	✓	18"	✓	500 V ✓
	"	Alarm	✓	1"	✓	

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

DUMP WELL PROBE LIGHT ✓

START-UP CHECK LIST

Equipment checked by R.K.R.J. Personnel check by R.K.R.J.

Instruments and safeties checked and reset by E.B.T. RKRJ

Source is checked by RKRJ Source No. M-43

Emergency equipment ... checked by RKRJ.

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

Rod light on by RKRJ Time 0914

Start-up OK'd by E.B.T. RKRJ Date 11-6-72

Removed 1 rack. Have an 23 x 23 array, with 5 3/4 clusters of rods removed from 1 ~~rod~~ row. Total of 233 rods.

Water ht = 41.40 cm
+Per
Σ = 847.47 cm = 1.5 f

Probe (in)
37.62"

Temp °c
#1 = 24.3°c
2 = 24.3°c

1327 Water ht = 37.00 cm
System just critical
Drain.

Probe (in)
35.82"

Repeat of above.

Water ht = 41.40 cm
+Per
~~#~~ Σ = 825.74 cm = 1.5 f

Probe (in)
37.62"

Temp °c
#1 = 24.3°c
2 = 24.3°c

1448 Water ht = ~~35.6~~ 36.50 cm
System just critical
Drain.

Probe (in)
35.64"

1.30 cm separation c-c.
30 cm length.
30 rods
H_2O + Lead and S.S. plate centered in array: viz S.S. plate = .250" x 10.0" x 12.27".

Have an 20 x 23 array: with the 3rd, 6th, 9th, 12th, 15th & 18th row removed in 1 direction, and the 3rd, 6th, 9th, 12th, 15th & 21st row removed in 1 direction. With 1 cluster of rod removed in 1 row. Total of 220 rods.

0943 Water Ht = 40.80 cm — Probe (in) 37.58" — Temp °c #1 = 23.9°c, 2 = 24.1°c
System sub critical
Drain.

added 12 rods. Now have an 23 x 23 array, with the 3rd, 6th, 9th, 12th, 15th, 18th & 21st row removed in 2 directions. With 6 clusters removed from 1 row. Total of 232 rods.

1010 Water Ht = 41.00 cm — Probe (in) 37.70" — Temp °c #1 = 24.0°c, 2 = 24.1°c
System sub critical
Drain.

added 12 rods. Now have 3 clusters removed from 1 row. Total of 244 rods.

1040 Water Ht = 41.60 cm — Probe (in) 37.69" — Temp °c #1 = 24.0°c, 2 = 24.1°c
System sub critical
Drain.

added 12 rods. Now have an full 23 x 23 array, with the 3rd, 6th, 9th, 12th, 15th, 18th & 21st row removed in 2 directions. Total of 256 rods.

$\Delta_2 = 6.6$ cm

Water Ht = 41.70 cm — Probe (in) 37.71 — Temp °c #1 = 24.0°c, 2 = 24.0°c
+ Pu
C = 239.03 cm = 4.9¢ = .72 ¢/cm.

1120 Water Ht = 35.05 cm — Probe (in) 35.00"
System just critical
Drain.

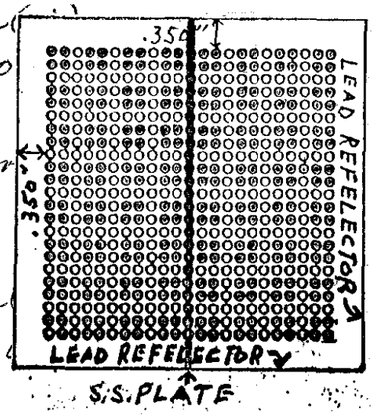
Repeat of above:

$\Delta_2 = 6.6$ cm

Water Ht = 41.60 cm — Probe (in) 37.67" — Temp °c #1 = 24.0°c, 2 = 24.1°c
2 + Pu
C = 239.03 cm = 4.8¢ = .73 ¢/cm.

1325 Water Ht = 35.00 cm — Probe (in) 35.0
System just critical
Drain.
Removed 1 rod from corner
number of rod = 255.

1337 Water Ht = 41.60 cm — Probe
System just critical 37.
Drain.



added 12 rods. Now have a full 23×23 array. with the 3rd, 6th, 9th, 12th, 15th, 18th + 21st rows removed in 2 directions; total of 256 rods.

$\Delta h = 6.65$ cm

		Probe (in)	Temp °C
	Water ht = 41.70 cm	37.71	#1 = 24.0 °C
	1 Per		2 = 24.0 °C
	C = 239.03 sec = 4.94 = .72 ¢/cm		
1120	Water ht = 35.05 cm	Probe (in) 35.	
	System just critical		
	Drain.		

130 cm Aquarium o.d.
30 cm length
130" rods
H_2O + lead + 1.S.S. plate
Fig #5 p-169
255 rods.

Repeat of above:

$\Delta h = 6.6$ cm

		Probe	
	Water ht = 41.60 cm	37.6	
	2 Per		
	C = 239.03 sec = 4.8 ¢ = .73 ¢/cm		
1325	Water ht = 35.00 cm	Probe (in) 35.04"	
	System just critical		
	Drain.		

Removed 1 rod from corner cluster. Total number of rods = 255.

		Probe (in)	Temp °C
1337	Water ht = 41.60 cm		
	System just critical	37.63"	#1 = 24.0 °C
	Drain.		2 = 24.0 °C

INSTRUMENT CHECK

INSTRUMENT	RANGE		SOURCE DISTANCE	SET	STARTUP RANGE
K-1	3×10^{-12}	–	4"	✓	10×10^{-12}
	"		1"	–	"
K-2	"	✓	4"	✓	"
	"	✓	1"	–	"
B-1					
B-2					
PM-1	700 V	✓	5"	–	500 V
PM-2	1200 V	✓	10"	–	900 V
	" Alarm	✓	1"	–	"

LOG N CALIBRATE ✓ OPERATE ✓ SOURCE No. 42-80

DUMP WELL FROCE LIGHT _____

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKK

Source in checked by AKK Source No. M-93

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

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

Rod light on by AKK Time 0920

Start-up OK'd by I.P.C. AKK Date 11-7-72

1.3 cm separation a-c.
30 cm length.
.30" rods.

H_2O + lead and S.S plate centered in array.
size of S.S. plate = .250" X 10.00" X 12.27".

Have an 23 X 23 array, with the 4th, 8th, 12th, 16th & 20th rows removed in x & y directions.
plus 4 clusters of rods removed from 1 row.
total of 288 rods.

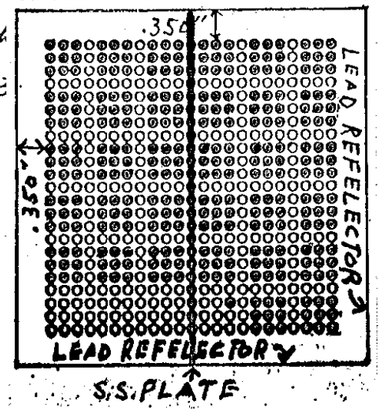
1006 Water Ht = 41.50 cm Probe (in) Temp °c
System sub critical 37.69" #1 = 24.2°c
Drain. #2 = 24.2°c

added 1 rod: total number of rods = 289.
see diagram.

$\Delta H = 6.0$ cm

Water Ht = 41.80 Probe (in) Temp °c
1 + Per 37.74" #1 = 24.2°c
$\Gamma = 295.53$ sec = 3.94 = .594/cm #2 = 24.2°c

1055 Water Ht = 35.20 cm Prob
System just critical
Drain.



1.30 cm separation c-c.
30 cm length.
.30" rods.

H_2O + lead and 1 S.S plate centred in array.
size of S.S. plate = .250" x 10.00" x 12.27".

Have an 23 x 23 array, with the 4th, 8th, 12th, 16th & 20th rows removed in 2 directions. plus 4 clusters of rods removed from 1 row. Total of 288 rods.

1006 Water ht = 41.50 cm Probe (in) Temp °C
System sub critical 3
Drain.

added 1 rod: total number, see digram.

289 rods
Exp #5 p-171
H_2O + lead + 1 SS plate
.30" Rods
30 cm length
1.30 cm separation

Δh = 6.6 cm

Water ht = 41.80 Probe
+ Per 37.
T = 295.53 sec = 3.94 = .59¢/cm

1055 Water ht = 35.20 cm Probe (in)
System just critical 35.16"
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K1	3×10^{-12}	✓	4"	✓	1.0×10^{-12}
	"	✓	1"	✓	"
K2	"	✓	4"	✓	"
	"	✓	1"	✓	"
K1					
K2					
PM	700 v	✓	5"	✓	500 v
PM	1200 v	✓	10"	✓	900 v
	"	✓	1"	✓	"

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

BUMP WELL PROBE LIGHT ______

START-UP CHECK LIST

Equipment checked by ARKC (I.D.C.) Personnel check by I.D.C.

Instruments and safeties checked and reset by ARKC

Source in checked by ARK Source No. M-43

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

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

Red light on by RKH Time 1030

Start-up OK'd by I.D.C. RKH Date 11-9-72

1.30 cm separation c-c.
30 cm length.
.30" rods.

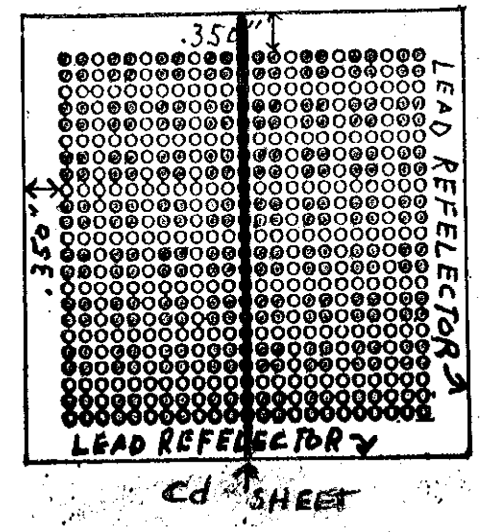
H_2O + lead and 1 Cd sheet centered in array: Cd sheet size = .035" X 10.00" X 12.27" (Cd sheet is enclosed with 2 sheets of .056" X 10.00" X 12.27" plexiglas for strength.).

Have an 23 X 23 array, with the 3rd, 6th, 9th 12th, 15th, 18th, 21st row removed in 2 directions. Total of 256 rods.

11/11 Water Ht = 41.70 cm — Probe (in) 37.72" — Temp °C #1 = 24.0 °C, #2 = 24.0 °C

System sub critical

Drain.



ew.

1.30 cm separation c-c.
30 cm length.
.30" rods.

H_2O + lead and 1 Cd sheet centred in array:
Cd sheet size = .035" X 10.00" X 12.27" (Cd sheet is enclosed with 2 sheets of .056" X 10.00" X 12.27" plexiglas for strength.).

Have an 23 X 23 c | | 6th, 9th
12th, 15th, 18th, | | 2 in 2
directions. Tak

1.30 cm. separation
30 cm. length
.30" rods
H_2O + lead + 1 CAD. plate
Log #5 P-173
256 rods.

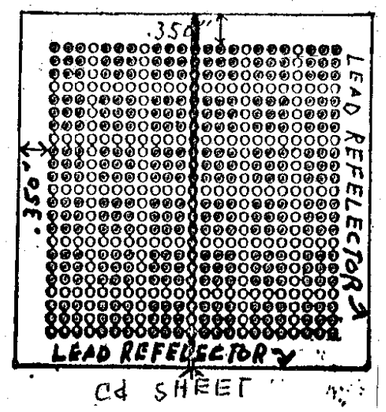
11 11 Water Ht = 41.70 cm
System sub-critic.
Drain.

Temp °C
#1 = 24.0°C
2 = 24.0°C

avr.

H_2O + Lead and 1 Cd sheet (centered in array).
Have an 23 x 23 array, with the ~~4th~~ 8th, 12th, 16th, & 20th row removed in 2 directions.
Total of 324 rods.

1305. Water Lt = 41.60 cm Probe (in) Temp °C
System sub critical 37.70 Z1 = 24.2°C
Drain. Z2 = 24.2°C



INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	✓	4"	✓	3×10^{-12}
	"	✓	1"	✓	"
K-2	"	✓	4"	✓	"
	"	✓	1"	✓	"
K-3					
K-4					
P.M.1	700 V	✓	15"	✓	500 V
P.M.2	1200 V	✓	10"	✓	900 V
	"	✓	1"	✓	"

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

DUMP WELL PROBE LIGHT —

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKH

Source in checked by RKH Source No. M-93

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

Instruments in help standby K-1-2 PM 1-2

Rod lights on by RKH Time 1215

Start-up OK'd by F.D.C. RKH Date 12-9-72

H_2O + lead and
Have an 23 x:
16th, + 20th,
Total of 324.

1.30 cm. separation
30 cm. length
.30" mesh
H_2O + lead + isolated.
Fig # 5 p-174
32 mesh.

array.)
th, 8th, 12th,
[illegible]ilections.

1315. Water ht = 41.
System sub
Drain.

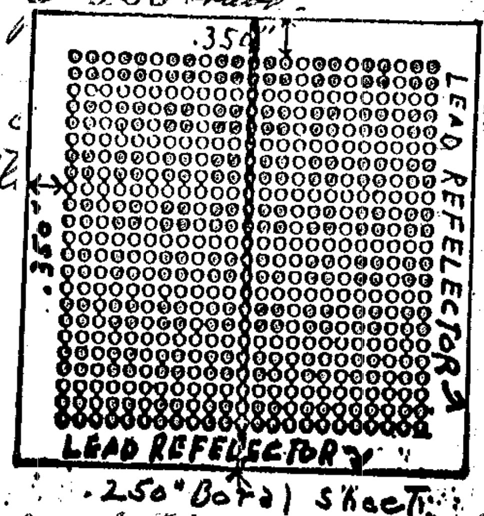
Temp °C
#1 = 24.2°C
2 = 24.2°C

1.3 cm separation c-c.
30 cm length.
.30" Rods.

H_2O + Lead reflector: 1 boral sheet centered in array: Boral sheet = .250" X 10.0" X 12.27" (50% B₄C boral).

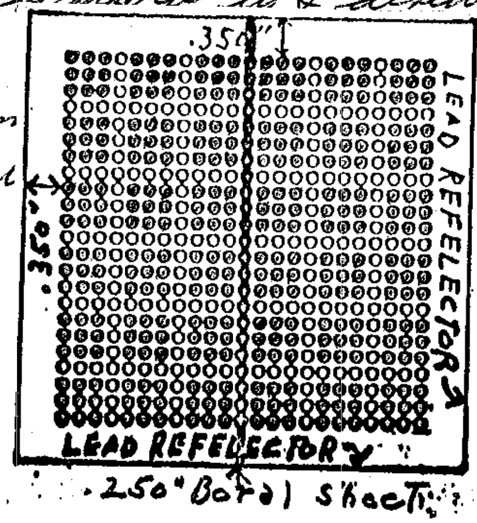
Have an 23 X 23 array, with the 3rd, 6th, 9th, 12th, 15th, 18th, 21st row removed in 2 directions; Total of 256 rods.

1247. Water ht = 41.70 c[m] … Temp °C
System sub crit … #1 = 23.2 °C
Drain. … 2 = 23.2 °C



H_2O + Lead and boral sheet: Same as above.
Have an 23 X 23 array, with the 4th, 8th, 12th, 16th & 20th row removed in 2 directions.
Total rods 324.

1332 Water ht = 41.60 cm … Temp °C
System sub crit … #1 = 23.2 °C
Drain. … 2 = 23.2 °C



INSTRUMENT CHECK

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

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

DUMP WELL PROBE LIGHT ______

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKH

Source in checked by AKH Source No. M-93

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

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

Red light on by AKH Time 0925

Start-up OK'd by I.W.C. AKH Date 12-5-72

1.3 cm separation c-c.
30 cm length.
.30" Rods.

H_2O + lead reflector: 1 boral sheet centered in array: Boral sheet = [illegible] x [illegible] x .27" (50% B_4C boral).

.30" rods
30 cm. length
1.3 cm. sep. c-c
H_2O + lead reflector
1 boral sheet centered
in array.
fig #5 P-176
256 rods

Have an 23 x 23 [illegible] [illegible] th, 9 th,
12 th, 15 th, 18 th, [illegible] is 2
directions; Total [illegible]

1247. Water ht = 41.70 cm — Temp °C
System sub critical — #1 = 23.2°C
Drain. — 2 = 23.2°C

.30" rods 30 cm. length
1.3 cm sep. c-c
H_2O, lead, and 1 boral
sheet in center of array.
fig # 5 P-176
324 rods

H_2O + lead and boral [illegible]
Have an 23 x 23 [illegible] 8 th, 12 th
16 th & 20 th row. [illegible]
Total rods 324.

1332 Water ht = 41.60 cm — Temp °C
System sub critical — #1 = 23.2°C
Drain. — 2 = 23.2°C

1.3cm separation c-c.
30 cm length.
.30" rods.

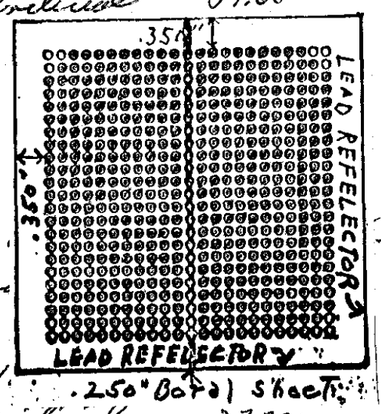
H_2O + Lead end bond sheet (centered in array.)

Have an 23 x 23 array, with the center row removed in 1 direction, and 3 rods removed from each corner. Total of 494 rods.
(Note: this is all of un-clad rods.)

1800 Water ht = 41.50 cm — System sub Critical — Drain.

Probe(in) 37.60"

Temp °c
#1 = 23.2°c
2 = 23.2°c

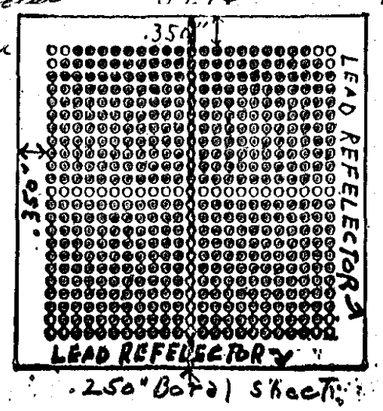


Remove the [illegible] (see diagram).
Total of 472 rods.

Water ht = 41.[illegible]
System sub critical
Drain: (No increase

37.74

Temp °c
#1 = 23.2°c
2 = 23.2°c



Have an 20 x 20 array. With the .250" x 10.0" x 12.27" boron plate centered on 1 row next to 1 face of array. Total of 400 rods.

1523 Water ht = 41.80 cm — System sub critical — Drain.

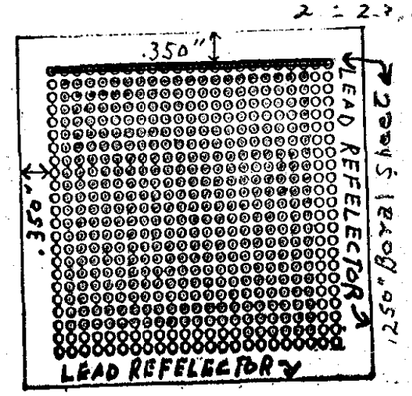
Temp °c
#1 = 23.5°c
2 = 23.5°c

Added 6 rods to 1 face: See diagram.
Total of 406 rods.

Δ4 = 7.8cm

Water ht = 42.80 cm
1 + Per.
L = 206.43 cm = 5.4 f
Water ht = 35.00 cm
System just critical
Drain.

Temp °c
#1 = 23.5°c
2 = 23.5°c



1.3 cm separation c-c.
30 cm length.
.30" rods.

H_2O + lead and boral sheet (centered in array.)

Have an 23 X 23 array, with the center row removed in 1 [...] be removed from each co[...] 4 rods. (Note this is all [...]

.30" rods 30 cm. length
1.3 cm. sep. c-c
H_2O + lead and boral sheet centered in array.
23 X 23 array with center row removed in 1 direction
3 rods removed from each corner. Total rods 494.
Log # 5 Page 178

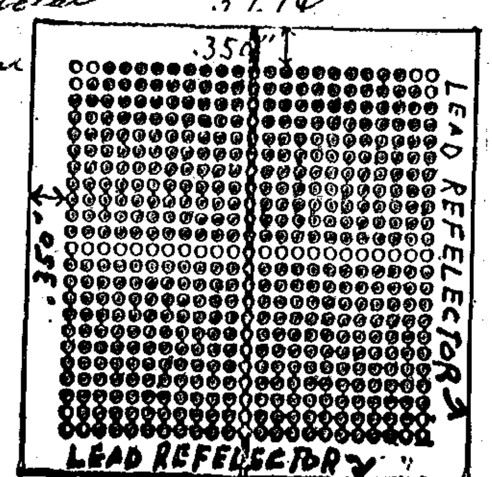
1000 Water ht = 41.[...]
System sub c[...]
Drain.

Temp °C
#1 = 23.2°C
2 = 23.2°C

Removed the 12 th row of rods: (See diagram).
Total of 472 rods.

Water ht = 41.90 cm · Probe (in)
System sub critical
Drain: (No [...]

Temp °C
#1 = 23.2°C
2 = 23.2°C



Have an 20 X 20 array: with the .250" X 10.0" X 12.27" boron plate centered on 1 row next to 1 face of array: Total of 400 rods.

1523 Water ht = 41.80 cm
System sub critical
Drain.

Temp °C
#1 = 23.5°C
2 = 23.5°C

Added 6 rods to 1 face: See diagram.
Total of 406 rods.

.30" Rods 30 cm. length
1.3 cm Sep. c-c
20 X 20 array + 6 rods on 1 face. Boron plate centered on 1 face
Total rods 406
Log # 5 P-179

Water ht = 42.80 cm
+ Per.
L: 206.43 [...] = 5.4 [...]
Water ht = 35.00 cm
System just critical
Drain.

[...]5°C
[...]5°C

1.3 cm seperation c-c.
30 cm length.
.30" rods.

H_2O + lead and boral sheet (centered in array.)

Have an 23 X 23 array, with the center row removed in 1 [illegible] to removed from each co[illegible] 4 rods.
(Note this is all [illegible]

.30" rods 30 cm. length
1.3 cm. sep. c-c
H_2O + lead and boral sheet centered in array.
23 X 23 array with center row removed in 1 direction
3 rods removed from each corner. Total rods 494.
Log # 5 Page 178

1000 Water ht = 41.[illegible]
System sub-c[illegible]
Drain.

Temp °c
#1 = 23.2°c
2 = 23.2°c

Removed the 12 [illegible] (see digram).
Total of 472 rods

.30" rods 30 cm length
1.3 cm. sep. c-c
H_2O + lead and boral sheet center of array.
23 X 23 array with center row removed in 2 direction
total rods 472
Log # 5 P. 178

Water ht = 41.90
System sub critic[al]
Drain: (No enormous [illegible]

Temp °c
#1 = 23.2°c
2 = 23.2°c

Have an 20 X 20 array. With the .250" X 10.0" X 12.27" boron plate centered on 1 row next to 1 face of array. Total of 400 rods.

1523 Water ht = 41.80 cm
System sub critical
Drain.

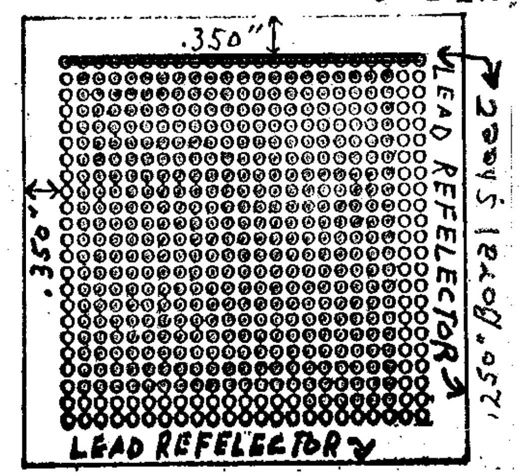
Temp °c
#1 = 23.5°c
2 = 23.5°c

Added 6 rods to 1 face. See digram.
Total of 406 rods.

Water ht = 42.80 cm   Δh = 7.8 cm
+ Per.

Temp °c
#1 = 23.5°c
2 = 23.5°c

T = 206.43 [illegible] = 5.4 f
Water ht = 35.00 cm
System just critical
Drain.



INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	✓	4"	✓	3×10^{-12}
	"	✓	1"	✓	"
K-2	"	✓	4"	✓	"
	"	✓	1"	✓	"
F-1					
F-2					
PM-1	700 v	✓	15"	✓	500 v
PM-2	1200 v	✓	10"	✓	900 v
	"	✓	1"	✓	"

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

SUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by RRL, F.D.C. Personnel check by RRL

Instruments and safeties checked and reset by RRL

Source is checked by RRL Source No. M-4-3

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

Instruments on duty checklist K-1-2 RRL 1-2

Red light on by RRL Time 0928

Start-up OK'd by F.D.C. R.R.L. Date 12-6-72

1.30 cm separation c-c.
30 cm length.
1.30" rods.

Same array described on p-179.
Removed 2 rods: Total of 404 rods.

Water ht = 42.0 cm	Probe (in)	Temp °C
1 - Per	37.77"	#1 = 23.5°C
τ = -319.43 sec = -4.6 ¢		2 = 23.5°C

1052 Drain:

added 1 rod: Total of 405 rods:

Water ht = 41.90 cm	Probe (in)	Temp °C
2 - Per	37.69"	#1 = 23.5°C
τ = -706.22 sec = -1.9 ¢		2 = 23.5°C

1019 Drain.

START-UP CHECK LIST

Equipment checked by ~~RKM~~ E.I.C. Personnel check by E.I.C.

Instruments and safeties checked and reset by RKM

Source in checked by RKM Source No. M-93

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

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

Red light on by RKM Time 1330

Start-up OK'd by E.I.C. RKM Date 12-11-72

INSTRUMENT CHECK

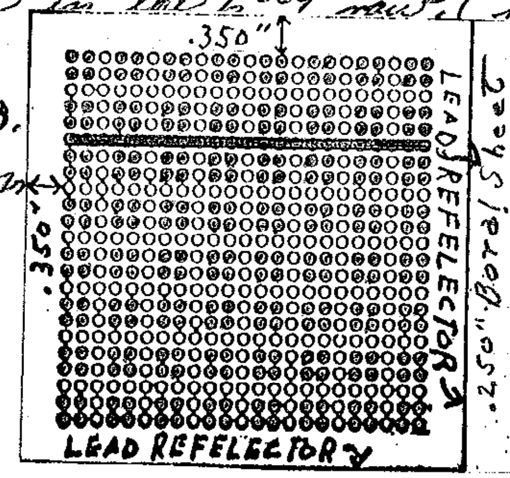
INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3x10⁻¹²	Meter ✓	4"	✓	3x10⁻¹²
	"	Fast ✓	1"	✓	"
K-2	"	Meter ✓	4"	✓	"
	"	Fast ✓	1"	✓	"
R-1					
R-2					
PM-1	700 V	Alarm ✓	5"	–	500 V
PM-2	1200 V	Fast ✓	10"	–	900 V
	"	Alarm ✓	1"	✓	"

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

DUMP WELL PROBE LIGHT ______

1.30 cm separation c-c,
30 cm length.
.30" rods.

Have an 23 X 23 array, with the 3rd, 6th, 9th, 12th, 15th, 18th, & 21st row removed in 2 directions. Have the .250" X 10.0" X 12.27" boral plate centered in the 6th row. (See diagram)
256 rods.



1350 Water ht = 43. System sub on. Drain.

Temp °C
#1 = 23.5°C
2 = 23.5°C

Now have an 23 X 23 array, with the 6th row removed in 1 direction (Boral plate centered in that row), and 3 rods removed from each corner. Total of 494 rods. (This is all of un-clad rods).

1440 Water ht = 30.40 cm System just critical Drain.

Temp °C
#1 = 23.4°C
2 = 23.5°C

-aw.

1.30 cm separation c-c.
3 1.30 cm sep.-c c
.3 1.30" rods 30 cm long
23 X 23 array with Boron plate in 6th row
Log #5 p-183

Have an 23 X 2[...] 6th, 9th, 12th, 15th, 18th [...]ed in 2 directions. [...] 2.27" Boral plate centered [...] (see diagram) 256 rods.

1350 Water ht = 43.00 cm — Temp °C
System sub critical — #1 = 23.5 °C
Drain. — 2 = 23.5 °C

Now have an 23 X 23 array, with the 6th row removed in 1 direction (Boral plate centered in that row). and 3 rods removed from each corner. Total of 494 rods. (This is all of un-clad rods).

1440 Water ht = 130.40 cm — Temp °C
System just critical — #1 = 23.4 °C
Drain. — 2 = 23.5 °C

over.

Removed 12 rods from 1 face: (see diagram p. 185)
Now have a total of 482 rods.

1525 Water ht = 42.00 cm — Temp °C
System sub critical — #1 = 23.5 °C
Drain. — 2 = 23.5 °C

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP		SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 x 10^-12	Meter	✓	4"	✓	3 x 10^-12
	"	Fast	✓	1"	✓	"
K-2	"	Meter	✓	4"	✓	"
	"	Fast	✓	1"	✓	"
R-1						
R-2						
PM-1	700 V	Alarm	✓	5"	✓	500 V
PM-2	1200 V	Low	✓	10"	✓	900 V
	"	Alarm	✓	1"	✓	"

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

DUMP WELL PROBE LIGHT

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKH.

Source in checked by RKH Source No. M-43

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

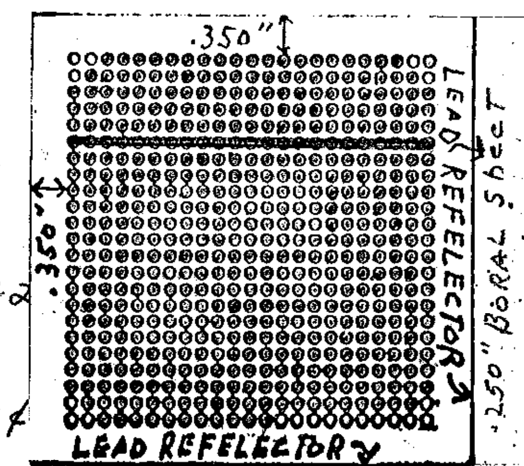
Instruments in trip circuit: K-1-2 PM 1-2

Rod Start on by RKH Time 1043

Start-up OK'd by F.D.C. RKH Date 12-12-72

added 2 rods: total number of rods = 484.

Water ht = 42.10 cm Probe (in) — Temp °C
1-Per — #1 = 23.2 °C
N.C. — 2 = 23.5 °C
1105 Drain



added 2 rods: 486.

Water ht = 42 — Temp °C
2-Per — #1 = 23.5 °C
τ = 315.08 = 3.7¢ — 2 = 23.5 °C
1309 Water ht = 36.00 cm
System just critical
Drain.

awr.

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKM.

Source in checked by RKM Source No. M-43

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

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

Red light on by RKM Time 1043

Startup OK'd by F.D.C. RKM Date 12-12-72

added 2 rods: .30" rods 30 cm length
1.30 cm. sep. c.c.
23 x 23 array with
boron plate in 6th row
Total rods 486
Log #5 P-185

484.

Water ht = 42.1
1-Per
N.C
1105 Drain

Temp °C
1 = 23.2 °C
2 = 23.5 °C

added 2 rods: Total number of rods = 486.

Water ht = 42.10 cm   Δh = 6.1 cm   Probe (in) 37.73   Temp °C
2-Per   #1 = 23.5 °C
t = 315.08 sec = 3.14   2 = 23.5 °C
1309 Water ht = 36.00 cm
System just critical
Drain.

avr.

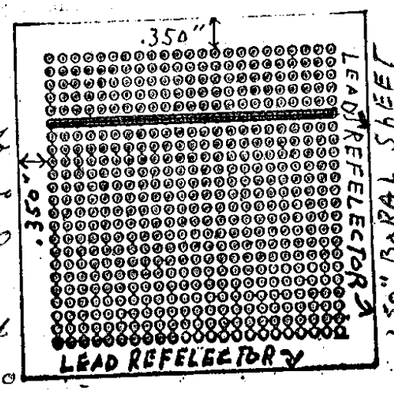
Removed 1 rod: Total number of rods = 485.

Water Ht = 42.90 cm Probe (in) Temp °C
3-Per 37.85 #1 = 23.5°
E = −230.33 mm = −6.8¢ #2 = 23.5°C

1330 Drain.

Now have an 23 X 23 array, with the C-D row removed in 1 direction (Bond plate centered in this row.) With 15 rod removal from 1 face. (See diagram). Total of 491 rods.

Water ht = 42.10 cm Temp °C
4-Per #1 = 23.5°C
N.C. #2 = 23.5°C
1430 Drain.



added 2 rods. To
See diagram). 13 mo
Water ht = 42.80
5+Per
E = 204.26 mm = 5.6 ¢
1500 Water ht = 35.40
Systems just critical
Drain.

#1 = 23.5°C
#2 = 23.5°C

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	STARTUP RANGE
SR	3X10⁻¹²	Alarm ✓	4"	✓	3X10⁻¹²
"		High ✓	1"	✓	"
IR	"	Alarm ✓	4"	✓	"
"		High ✓	1"	✓	"
P1					
P2					
PM-1	700 V	Alarm ✓	.5"	✓	500 V
PM-2	1200 V	Low ✓	10"	✓	900 V
"		Alarm ✓	1"	✓	"

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

BUMP WELL PROBE LIGHT _____

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKM

Source in checked by AKM Source No. M-43

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

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

Rod Light on by AKM Time 0824

Start-up O.K'd by F.D.C. AKM Date 12-13-72

Removed 1 rod: Total number of rods = 485.

Water ht = 42.90 cm Probe (cm) Temp °C
3 - Rev 37.85 #1 = 23.5°
E = -230.33 cm = -6.8 ϕ 2 = 23.5°C

1330 Drain:

Now have an 23 X 23 array, with the 6 d
rows removed in 1 direction (Bond plate
centered in the from 1 face. (see

• 30" rods 30 cm long.
1.30 cm. sep. c-c
23 X 23 array with Bond
plate centered in 4th row
and 13 rods removed from
1 row. Total rods 493
Jog #5 P-186

removed
491 rods.

Water ht = 42.10 cm
2 - Rev
N.C.

Temp °C
#1 = 23.5°C
2 = 23.5°C

1430 Drain.

added 2 rods: Total number of rods = 493.
(see diagram). 13 rods removed from 1 row.
Water ht = 42.80 cm Dif: 7.1 cm Probe (cm) Temp °C
5 + Rev 38.04 #1 = 23.5°C
E = 204.26 cm = 5.6 ϕ 2 = 23.5°C

1500 Water ht = 35.40 cm
Lysteria first critical
Drain.

Repeat of last num. p-186.

Water ht = 42.00 cm Probe (in) Temp °C
+Per 37.77 #1 = 23.5°C
C = 184.70 sec = 6.0 ¢ 2 = 23.5°C
0850 Water ht = 35.39 cm
System just critical
Drain

Removed 1 rod. Total number of rods = 492.

Water ht = 41.90 cm Probe (in) Temp °C
2-Per 37.66 #1 = 23.5°C
C = -325.95 sec = -4.5¢ 2 = 23.5°C
0910 Drain.

Now have an 23 X 23 ~~array~~, with the 6 th row removed in 1 direction, (.035" X 10.0" X 12.27" Cd sheet centered in this row). With 12 rods removed from 1 face. (See digram) Total of 499 rods.

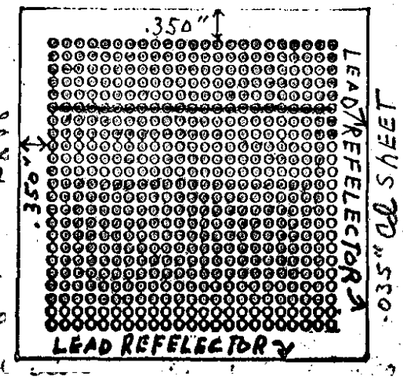
1302 Water ht = 26.10 cm Probe (in) Temp °C
System just critical 31.46 #1 = 23.5°C
Drain. 2 = 23.7°C

Removed 34 rods. Now have an 21 X 23 array.
Total of 460 rods.

1340 Water ht = 30.10 cm
System just critical
Drain.

Removed 15 rods. Now have an 21 X 22 array, plus 5 rods on 1 face. (see digram). Total of 445 rods.

Water ht = 42.10 cm Probe (in) Temp °C
3-Per. 37.70 #1 = 23.7°C
N.C. 2 = 23.7°C
1405 Drain.



added 2 rods. To
Water ht = 42.2
+Per.
C = 693.36 sec = 1.
1447 Water ht = 36.90
System just crit
Drain

mp °C
#1 = 23.7°C
2 = 23.7°C

Removed 34 rods: Now have an 21 X 23 array.
Total of 460 rods.

1340 Water ht = 30.10 cm
System just critical
Drain.

Removed 15 rods: ...ray, plus
5 rods on 1 face. 445 rods.

.31" rods 30 cm long
1.30 cm separation c-c
21 X 22 array + 9 rods on
1 face Total rods 447
Bone cd. sheet centered
in 4 th row.
Log #5 P- 189

Water ht = 42.10 c — Temp °C
3 - Per. — #1 = 23.7 °C
2 : 23.7 °C

N.G.

1805 Drain.

added 2 rods: Total of 447 rods.
Water ht = 42.20 cm (Δh = 5.30 cm) Probe (in) — Temp °C
4 + Per. 37.19 — #1 = 23.7 °C
2 = 23.7 °C
τ = 695.36 sec = 1.84

1447 Water ht = 36.90 cm Probe (in)
System just critical
Drain

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-12}	Meter ✓	4"	✓	10×10^{-12}
		Fast ✓	1"	✓	"
K-2	3×10^{-12}	Meter ✓	4"	✓	"
		Fast ✓	2"	✓	"
PM-1	700 V	Alarm ✓	25"	✓	500 V
PM-2	1200 V	Low ✓	10"	✓	900 V
		Alarm ✓	1"	✓	"

LOG N CALIBRATE ___ OPERATE ✓ DUMP WELL PROBE LIGHT ___

RADIATION ALARM: A ___ B ___ C ___ SOURCE NUMBER B-86

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKK

Source in checked by AKK Source No. M-93

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

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

Red light on by AKK Time 0920

Start-up OK'd by I.D.C. AKK Date 1-10-73

1.30 cm operation c.c.
30 cm longet.
130" rods.

H_2O = 25.60 cm = top of rod.

Now have on 1 face (west face) spaced .269 cm from array 1 pc of Depleted Uranium
width height length
8.625" X 10.1875" X 23.875". Total mass = 640 Kg.

Average of 4 measurements by M.E. Wilms

8.55" (21.72 cm) x 10.14" (25.55 cm) x 23.7825" (60.4 cm)

Have an 20 X 20 - 2 array. Total 398 rods.

Δk = .60 cm

Water Ht = 31.70 cm
+Pu
C = 65.19 mc = 13.6 f = 22.7 f/cm
0955 water ht = 31.10 cm
System just critical
Drain.

Temp °C
#1 = 23.0°C
2 = 23.0°C

Removed 6 rods. Now have an 20X20-8 array.
Total of 392 rods.

Depleted Uranium
8.625" X 10.1375" X 23.875"
.269 cm

Water ht = ~~42.30~~ 42.30 cm
+Pu
Δk = 6.5 cm
C = 347.68 mc = 3.4 f = .52 f/cm
1033 Water ht = 35.80 cm
System just critical
Drain.

1.30 cm separation c.c,
30 cm length.
.30" rods,

H_2O = 25.60 cm = top of rods.

Now have on 1 face (west face) spaced .269 cm from array 1 pc of Depleted Uranium
width / height / length
8.625" x 10.1875" x 23.875". Total mass = 640 Kg.

Average of 4 measurements by M.E. 7/1/75 | ~ 8.55" (21.72 cm) x 10.48" (25.55 cm) x 23.7825" (60.4 cm)
Have an 20 x 20 - 2 array. Total 398 rods.

Δh = .60 cm

Water ht = 31.70 cm — Temp °C
+Per — #1 = 23.0 °C
T = 65.19 sec = 13.6¢ = 22.7¢/cm

0855 Water ht = 31.10 cm
System just critical
Drain.

Removed 6 rods. Now have an total of 392 rods.

P-191 — 23.0 °C
20 x 20 array - 8 Log #5
Total 392 rods.
1.30 cm sep. c-c
30 cm. length
.30" dia.
1 Pc depleted Uranium
8.625" x 10.1875 x 23.875, 640 Kg.

Water ht = ~~42.30~~ 42.30 cm — Probe (in) — Temp °C
+Per. — Δh = 6.5 cm 37.83" — #1 = 23.2 °C
C = 347.68 sec = 3.4¢ = .52¢/cm — 2 = 23.2 °C

1033 Water ht = 35.80 cm — Probe (in)
System just critical — 35.23"
Drain.

over:

Standard Spacing

(H_2O ref only)

Removed 1 rod. Now have an 20X20-9 array.
Total of 391 rods.

1050 Water lvl = 41.90 cm — Temp °C
System sub critical — #1 = 23.2°C
Drain. — #2 = 23.2°C

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-12}	Meter ✓	4"	✓	10×10^{-12}
		Fast ✓	1"	✓	"
K-2	3×10^{-12}	Meter ✓	4"	✓	"
		Fast ✓	3"	✓	"
PM-1	700 ✓	Alarm ✓	5"	✓	500 ✓
PM-2	1200	Low ✓	10"	✓	900 ✓
		Alarm ✓	1"	✓	"

LOG N CALIBRATE ___ OPERATE ___ DUMP WELL PROBE LIGHT ___

RADIATION ALARM: A ___ B ___ C ___ SOURCE NUMBER B-30

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKV

Source in checked by RKV Source No. M-93

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

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

Red light on by RKV Time 0540

Start-up OK'd by F.V.C. RKV Date 1-11-72

1.3 cm separation c-c
30 cm length.
30 Rods.
Depleted Uranium reflector.

Have an 19 X 23 array: will the 4th, 8th, 12th & 16th row removed in 1 direction and the 4th, 8th 12th & 16th & 20th row in 1 direction. Have 1 cluster in 1 row removed and 3 rods in 1 cluster removed. Total of 258 rods.

Water lvl = 35.30 cm — Probe(in) — Temp °C
+Per — 35.10" — #1 = 23.0°
C = 71.71 rem — #2 = 23.0°

0920 Water lvl = 32.60 cm — Probe(in)
System just critical — 34.00
Drain.

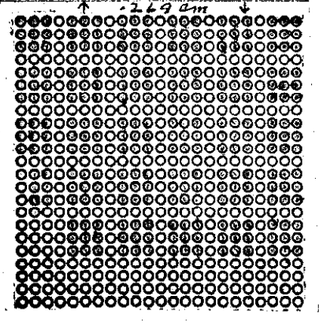
over.

Removed 2 rods. Total of 256 rods.

Water ht = 41.90 cm Probe (in) Temp °c
2-Per 37.65" #1 = 23.0°c
N.G. 2 = 23.0°c
0940 Drain.

added 1 rod. Total of 257 rods.
4 rods in 1 cluster removed.
Water ht = 42.00 cm Δh = 7.85 cm Probe (in) Temp °c
3+Per 37.74" #1 = 23.0°c
C = 154.28 rem. 6.9¢ 2 = 23.0°c
Water ht = 34.15 cm Probe (in)
System just critical 34.61"
Drain

Depleted Uranium
8.625" X 10.1375" X 23.875"
↑ 26.9 cm ↓



Now have an 20 x 23 array, with the 3rd, 6th, 9th, 12th, 15th, 18th, rows removed in 1 direction and the 3rd, 6th, 9th, 12th, 15th, 18th & 21st rows in 1 direction. Total of 224 rods.

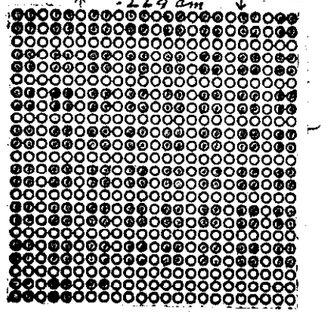
1332 Water ht = 42.00 cm Probe (in) Temp °c
System sub-critical 37.05" #1 = 23.0°c
Drain. 2 = 23.0°c

added 8 rods (2 clusters). Now have an 23 x 23 array as describe above, with 6 clusters removed from 1 row. Total of 232 rods.

1350 Water ht = 41.90 cm Temp °c
System sub critical #1 = 23.0°c
Drain. 2 = 23.0°c

added 2 rods. Total of 234 rods
Water ht = 42.30 cm Δh = 7.1 cm Probe
4+Per 37.
C = 310.74 rem = 3.8¢
1417 Water ht = 35.20 cm Probe (in)
System just critical 35.07"
Drain.

Depleted Uranium
8.625" X 10.1375" X 23.875"
↑ 26.9 cm ↓



Removed 2 rods. Total of 256 rods.

Water ht = 41.90 cm Probe (in) Temp °C
2 - Per 37.65" #1 = 23.0°C
N.G. 2 = 23.0°C
0940 Drain.

added 1 rod. Total of 257 rods.
4 rods in 1 cluster removed.
Water ht = 42.00 cm 0.1 = 1.85 cm
3 + Per
C = 154.28 rem. 6.9 f
Water ht = 34.15 cm.
System just critical
Drain

19 X 23 array with 4th 8, 12, + 16th row removed in 1 direction and 4th & 7th 12, 16, 20 row in 1 direction. Total rods 257
P-194 log #5

Temp °C
= 23.0°C
= 23.0°C

Now have an 20 x 23 array, with the 3rd, 6th, 9th, 12th, 15th, 18th, row removed in 1 direction and the 3rd, 6th, 9th, 12th, 15th, 18th & 21st row in 1 direction. Total of 224 rods.

1332 Water ht = 42.00 cm Probe (in) Temp °C
System sub-critical 37.05" #1 = 23.0°C
Drain. 2 = 23.0°C

added 8 rod (2 clusters). Now have 23 X 23 array as discribe above. removed from 1 row. Total of 23.

23 X 23 array with 6 cluster removed from 1 face. Total rods 234. See page 195 log #5

1350 Water ht = 41.90 cm
System sub critical
Drain.

added 2 rods. Total of 234 rod. (See diagram).
Water ht = 42.30 cm 0.1 = 7.1 cm Probe (in) Temp °C
4 + Per 37.90" #1 = 22.8°C
C = 310.74 rem = 3.8 f 2 = 23.0°C
1417 Water ht = 35.20 cm Probe (in)
System just critical 35.07"
Drain.

Removed 1 rod. Total of 233 rods.

1425 Water lvl = 42.20 cm Probe (in) 37.80" Temps °C #1 = 22.0°C #2 = 23.0°C
System sub critical
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-12}	Meter ✓	4"	✓	10×10^{-12}
		Fast ✓	1"	✓	"
K-2	3×10^{-12}	Meter ✓	4"	✓	"
		Fast ✓	2"	✓	"
PM-1	700 V	Alarm ✓	.5"	✓	500 V
PM-2	1200 V	Low ✓	10"	✓	900 V
		Alarm ✓	10"	✓	"

LOG N CALIBRATE ___ OPERATE ✓ DUMP WELL PROBE LIGHT ___

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

1.3 cm separation c-c.
30 cm length.
38 rods.

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKK

Source in checked by RKK Source No. M-43

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

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

Red light on by RKK Time 0950

Start-up OK'd by T.D.C, RKK Date 1-15-73

Have on 22 X 22 array. with the 11th & 12th row of rods removed in 2 directions. Plus 9 rods on each corner. Total of 360 rods.

Water lvl = 41.40 cm Probe (in) 37.52" Temps °C #1 = 22.5°C #2 = 22.5°C
System sub critical
Drain.

added 8 rods. 2 to each corner. Total of 368 rods.

1030 Water lvl = 41.60 cm Probe (in) 37.64" Temps °C #1 = 22.5°C #2 = 22.5°C
System sub critical
Drain.

over.

added 8 rods. 2 to each corner: Total of 376 rods.

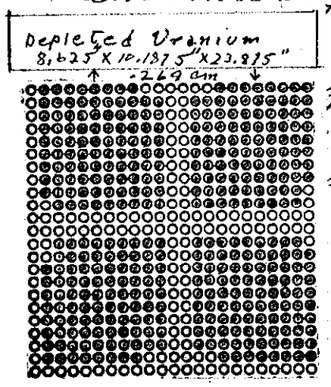
1055 Water ht = 41.90 cm Probe (in) Temp °c
System sub critical 37.11" #1 = 22.5°c
Drain. 2 = 22.5°c

added 8 rods. 2 to each corner: Total of 384 rods.

Water ht = 42.10 cm Probe (in) Temp °c
1-Per 37.80" #1 = 22.5°c
N.6. 2 = 22.5°c
1300 Drain.

added 2 rods: 1 to opposite corners: Total of 386 rods:

Δh = 6.3 cm

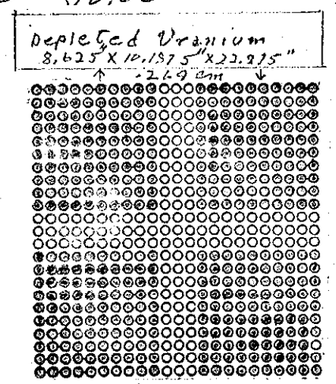


Water ht = 42.20 cm
2-Per
k = 462.85 mr = 2.6 f
1328 Water ht = 35.90 cm
System just critical
Drain.

Removed 1 rod from corner: Total of 385 rods:
Water ht = 42.40 cm Probe (in) Temp °c
3-Per 37.87" #1 = 22.5°c
k = -271.62 mr = -5.6 f
1350 Drain.

Now have an 23 X 23 array, with the 11th, 12th & 13th row removed in 2 directions. Total of 400 rods.

1415 Water ht = 42.80 cm Probe (in) Temp °c
System sub critical 38.00" #1 = 22.5°c
Drain. 2 = 22.7°c



added 8 rods. 2 to each corner: Total of 376 rods.

1055 Water ht = 41.90 cm Probe (in) Temp °C
System sub critical 37.71" #1 = 22.5°C
Drain. 2 = 22.5°C

added 8 rods. 2 to each corner: Total of 384 rods.

Water ht = 42.10 cm Probe (in) Temp °C
-Per #1 = 22.5°C
N.G. 2 = 22.5°C
1300 Drain.

22 x 22 array with 11 + 12 rows removed in 2 directions Total rods 386 P. 198 log

added 2 rods: 1 to oppos... of 386 rods.

Δh = 6.3 cm
Water ht = 42.20 cm Probe (in) Temp °C
+Per 37.87" #1 = 22.5°C
τ = 462.85 sec = 2.6¢ 2 = 22.5°C

1328 Water ht = 35.90 cm Probe (in)
System just critical 35.32"
Drain.

Removed 1 rod from corner: Total of 385 rods.
Water ht = 42.40 cm Probe (in) Temp °C
-Per 37.87" #1 = 22.5°C
τ = -271.62 sec = -5.6¢ 2 = 22.7°C
1350 Drain.

Now have an 23 x 23 array with 11, 12 + 13th row removed in 2 directions. Total of 400 rods.

23 x 23 array with 11, 12 + 13th row removed in 2 directions Total rods 400

1415 Water ht = 42.80 cm Temp °C
System sub critical #1 = 22.5°C
Drain. 2 = 22.7°C

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-12}	Meter	4"	✓	10×10^{-12}
	"	Fast	1"	✓	"
K-2	"	Meter	4"	✓	"
	"	Fast	3"	✓	"
PM-1	7000	Alarm	.5"	✓	5000
PM-2	12000	Low	10"	✓	9000
	"	Alarm	1.0"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ___

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

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKAL

Source in checked by AKAL Source No. 19-43

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

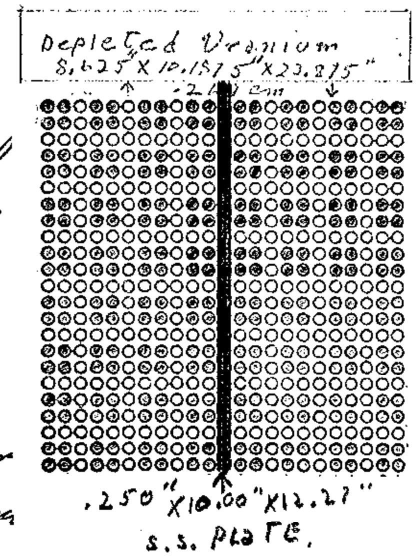
Instruments in trip circuit: K-1-2 PM1-2

Red light on by AKAL Time 1235

Start-up OK'd by E.D.C. AKAL Date 1-16-73

1.3 cm seperations c-c.
30 cm length.
130" rods.

Have an 23 X 23 array, with the 3rd, 6th, 9th, 12th, 15th, 18th, 21st row removed in 2 directions. Total of 256 rods. Have centered in center row 1 pc of S.S. plate (.250" X 10.00" X 12.27"). See diagram.



1300 Water ht = 42.70 cm [...] Temp °C
System sub critical [...] 1 = 22.7 °C
Drain. [...] 2 = 22.7 °C

Now have an 23 X 23 ar[...] 8th, 12th, 16th, + 20th row rem[...], plus 1 cluster of rods remove from 1 ~~row~~ row. Total of 315 rods.

Water ht = 30.10 cm Probe (in) Temp °C
+Pr 33.04" #1 = 23.0 °C
E = 54.32 sec = 15.5 [...] 2 = 23.0 °C

1440 Water ht = 29.60 cm Probe (in)
System just critical 32.84"
Drain.

Removed 1 cluster of rods: Total number of rods = 306.

over:

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3x10^-12	Meter	4"	✓	10x10^-12
	"	Fast	1"	✓	"
K-2	"	Meter	4"	✓	"
	"	Fast	3"	✓	"
PM-1	7000	Alarm	.5"	✓	5000
PM-2	12000	Low	10"	✓	9000
	"	Alarm	1.0"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ___

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

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKAL

Source in checked by RKAL Source No. 14-43

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

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

Red light on by RKAL Time 1235

Start-up OK'd by E.D.C. RKAL Date 1-16-73

1.3 cm sepe
30 cm lg 23X23 array with
130" rods. row 3, 6, 9, 12, 15, 18,
+ 21 removed in 2

Have an 23X23 array, w/ directions. 55 plate
15th, 18th, 21st row + in center
Total of 256 rods. Ha total rods 256
row 1 pce of S.S. plat P-201
See digram.

1300 Water ht = 42.70 cm Probe (in) Temp °C
System sub critical 38.05" #1 = 22.7°C
Drain. 2 = 22.7°C

Now have an 23X23 array, with the 4th, 8th, 12th,
16th, + 20th row removed in 2 directions, plus
1 cluster of rods removed from 1 ~~rod~~ row.
Total of 315 rods.

Water ht = 30.10 cm Probe (in) Temp °C
+Br 33.04" #1 = 23.0°C
t = 54.32 sec = 15.5¢ 2 = 23.0°C

1440 Water ht = 29.60 cm Probe (in)
System just critical 32.84"
Drain.

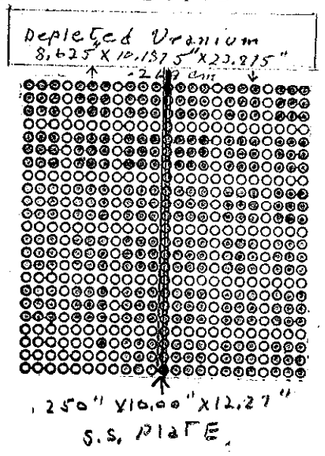
Removed 1 cluster of rods: Total number of
rods = 306.

over:

Water ht = 42.60 cm Probe (in) Temp °C
2-Per 37.99" #1 = 23.0°C
E = -193.40 rem = -8.5¢ 2 = 23.0°C
1500 Drain.

Added 1 rod. Total number of rods = 307.
See diagram.

Water ht = 42.10 cm Δ4 = 7.3cm Probe (in) Temp °C.
3 +Per 37.79 #1 = 23.0°C
E = 254.24 rem = 4.5¢ 2 = 23.0°C
1523 Water ht = 34.80 cm Probe (in)
System just critical 34.90"
Drain.



INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP.	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-12}	Meter ✓	4"	✓	10×10^{-12}
	"	Fast ✓	1"	✓	4
K-2	"	Meter ✓	4"	✓	"
		Fast ✓	3"	✓	"
PM-1	7000 ↓	Alarm ✓	.5"	✓	3500 ↓
PM-2	12000 ↓	Low ✓	10"	✓	9000 ↓
		Alarm ✓	1"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ___
RADIATION ALARM: A ✓ B ✓ C ✓ SOURCE NUMBER B-401

START-UP CHECK LIST

Equipment checked by F.D.C AKM Personnel check by F.D.C
Instruments and safeties checked and reset by AKM
Source in checked by AKM Source No. M-93
Emergency equipment in control room checked by F.D.C
Instruments in trip circuit: K-1-2 PM 1-2
Red light on by AKM Time 0950
Start-up OK'd by F.D.C AKM Date 1-17-73

2 Water ht = 42.60 cm — Per | Probe (in) 37.99" | Temp °C #1 = 23.0°C, 2 = 23.0°C

ρ = -193.40 nn = -8.5¢

1500 Drain.

Added 1 rods. Total num ^ n. - 307.
See diagram.

23 × 23 array with 4, 8, 12, 16 + 20th row removed in 2 direction + 2 clusters of rods removed. Total rods 307 Page 202

3 Water ht = 42.10 cm + Per | Temp °C #1 = 23.0°C, 2 = 23.0°C

ρ = 254.24 nn = 4.5¢

1523 Water ht = 34.80 cm
System just critical.
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP		SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10⁻¹²	Meter	✓	4"	✓	10×10⁻¹²
	"	Fast	✓	1"	✓	"
K-2	"	Meter	✓	4"	✓	"
		Fast	✓	3"	✓	"
PM-1	700 V	Alarm	✓	5"	✓	500 V
PM-2	1200 V	Low	✓	10"	✓	900 V
		Alarm	✓	1"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ___

RADIATION ALARM: A ✓ B ✓ C ✓ SOURCE NUMBER P-901

START-UP CHECK LIST

Equipment checked by AKAf / E.D.C. Personnel check by E.D.C.

Instruments and safeties checked and reset by AKAf

Source in checked by AKAf Source No. M-43

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

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

Red light on by AKAf Time 0950

Start-up OK'd by E.D.C. AKAf Date 1-17-73

Repeat of last run, p-202.

	Water ht = 42.10 cm	Probe (in)	Temp °C
	1 +Per	37.79"	#1 = 23.0°C
	C = 391.1 (?) = 3.1 ¢		2 = 23.0°C
1030	Water ht = 35.50 cm	Probe (in)	
	System just critical	35.18"	
	Drain.		

Repeat of above:

	Water ht = 42.10 cm	Probe (in)	Temp °C
	2 +Per	37.79	#1 = 23.0°C
	C = 341.16 sec = 3.5 ¢		2 = 23.0°C
1120	Water ht = 35.30 cm	Probe (in)	
	System just critical	35.11"	
	Drain.		

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP		SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-12}	Meter	✓	4"	✓	10×10^{-12}
		Fast	✓	1"	✓	"
K-2	3×10^{-12}	Meter	✓	4"	✓	"
		Fast	✓	2"	✓	"
PM-1	700 v	Alarm	✓	.5"	✓	500 v
PM-2	1200 v	Low	✓	10"	✓	900 v
		Alarm	✓	1"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ___

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

START-UP CHECK LIST

Equipment checked by E.D.C. AKAJ Personnel check by RKR

Instruments and safeties checked and reset by RKKD.

Source in checked by RKAJ Source No. M-43

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

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

Red light on by RKAJ Time 0850

Start-up OK'd by E.D.C. AKAJ Date 1-19-73

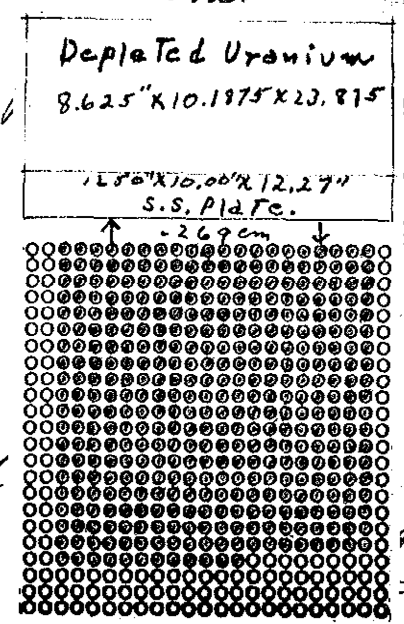
1.3 cm separation c.c.
30 cm length.
.30" rods.
Depleted Uranium + .250" S.S. plate

Have an 20X20-6 array; Total of 394 rods:
S.S. plate on face of depleted uranium reflector.
See diagram.

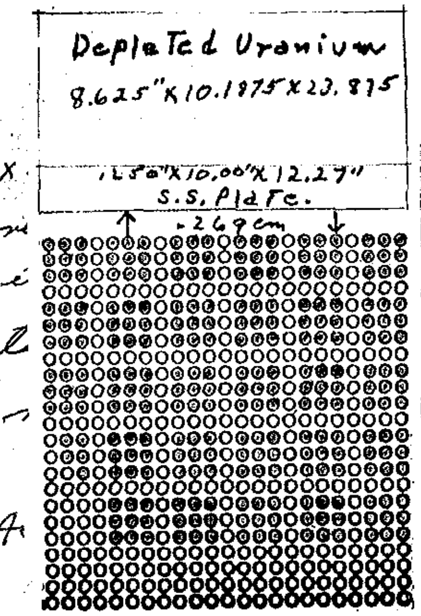
Water ht = 33.90 cm Probe (in) Temp °C
1 +Per. 34.58" #1 = 23.5°C
T = 54.32 sec = 15.5¢ 2 = 23.5°C
0933 Water ht = 32.10 cm Probe (in)
System just critical 33.83"
Drain.

Removed 2 rods: Total of rods = 392.

2.3 = 7.5 cm
Water ht = 42.30 cm
2 +Per
T = 195.51 sec = 5.7¢
0952 Water ht = 34.80 cm
System just critical
Drain.
Removed 1 rod. Total of
Water ht = 43.10 cm
3 -Per.
T = -441.12 sec = -3.2¢
1005 Drain.



°C
23.5°C
23.5°C
°C
= 23.5°C
2 = 23.5°C



Have an 19X ... 4th, 8th, 12th
& 16th row ... ion, and the 4th
8th, 12th, 16th ... ved in 1 direction.
Have 1 clust... ved and 4 rods
in 1 Cluster ... 257 now.

Water ht = 4...) Temp °C
4 +Per #1 = 23.5°C
T = 102.13 sec = 9.7¢ 2 = 23.7°C
1450 Water ht = 33.45 cm Probe (in)
System just critical 34.37"
Drain.

Removed 1 rod: Total of rods = 256

Water ht = 41.90 cm Probe (in) Temp °C
5 -Per 37.68" #1 = 23.7°C
T = -684.49 sec = -2.0¢ 2 = 23.7°C
1506 Drain.

1.3 cm separation c.c.
30 cm length
.30" rods
Depleted Uranium + .250" S.S. plate

Have an 20 X 20 - 6 array: Total of 394 rods: S.S. plate on face of depleted uranium reflector. See diagram.

1 Water ht = 33.90 cm — Probe (in) — Temp °C
+Per.
τ = 5432 sec = 15.5 ¢
0933 Water ht = 32.10 cm
System just critical
Drain.

3 20 X 20 array - 8 rods — 23.5 °C
1 Total of rods 392. Reflected by depleted uranium, and SS plate. — 3.5 °C
Page 206

Removed 2 rods: Total of -

Water ht = 42.30 cm Δλ = 7.5 cm — Probe — Temp °C
2 +Per — 37.80" — #1 = 23.5 °C
τ = 195.51 sec = 5.7 ¢ — 2 = 23.5 °C
0952 Water ht = 34.80 cm — Probe (in)
System just critical — 34.85"
Drain.

Removed 1 rod. Total of rods = 391.
3 Water ht = 43.10 cm — Probe (in) — Temp °C
-Per. — 38.24 — #1 = 23.5 °C
τ = -441.12 sec = -3.2 ¢ — 2 = 23.5 °C
1005 Drain.

19 X 23 array
4, 8, 12 + 16th row removed
total rods 257
P-207

Have an 19 X 23 array with the 4th, 8th, 12th & 16th row removed in 1 direction, and the 4th, 8th, 12th, 16th & 20th row removed in 1 direction. Have 1 cluster in 1 row removed and 4 rods in 1 cluster removed: Total of 257 rods.

Δλ = 8.85
Water ht = 42.30 cm — Probe (in) — Temp °C
4 +Per — 37.89" — #1 = 23.5 °C
τ = 102.13 sec = 9.7 ¢ — 2 = 23.7 °C
1450 Water ht = 33.45 cm — Probe (in)
System just critical — 34.37"
Drain.

Removed 1 rod: Total of rods = 256

Water ht = 41.90 cm — Probe (in) — Temp °C
5 -Per — 37.68" — #1 = 23.7 °C
τ = -684.49 sec = -2.0 ¢ — 2 = 23.7 °C
1506 Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP		SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-12}	Meter	✓	4"	✓	10×10^{-12}
		Fast	✓	1"	✓	"
K-2	3×10^{-12}	Meter	✓	9"	✓	"
		Fast	✓	2"	✓	"
PM-1	700 V	Alarm	✓	.5"	–	500 V
PM-2	1200 V	Low	✓	10"	–	900 V
		Alarm	✓	1"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ___

RADIATION ALARM: A ✓ B ✓ C ✓ SOURCE NUMBER B-85

START-UP CHECK LIST

Equipment checked by E.O.C. RKAL Personnel check by RKAL

Instruments and safeties checked and reset by RKAL

Source in checked by RKAL Source No. M-43

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

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

Red light on by RKAL Time 0850

Start-up OK'd by E.O.C. RKAL Date 1-24-73

1.3 cm separation c-c.
30 cm length.
.30" rods.

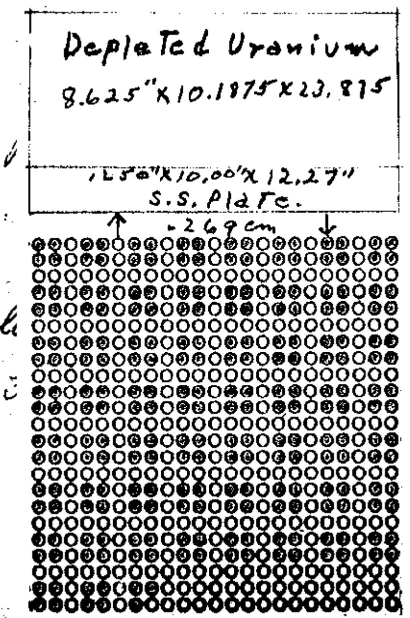
Depleted Uranium & .250" S.S. plate.

Have an 23 x 23 array, with the 3rd, 6th, 9th, 12th, 15th, 18th, & 21st row removed in 2 directions. with 5 clusters & 2 rods from 1 cluster removed from 1 row. Total of 234 rods.

Water ht = 41.90 cm | Probe (in) | Temp °C
1 - Per | 37.71 | #1 = 24.0 °C
τ = -680.15 sec = -2.0¢ | | 2 = 24.1 °C

0924 Drain.

Added 1 rod. Total number of rods = 235
See diagram.



ρ = 7.45
Water ht = 42.00 cm
2 + Per
τ = 191.22 sec = 5.8¢

0940 Water ht = 34.55 cm Prob[e]
System just critical
Drain.

1.3 cm separation c-c.
30 cm length.
.30" rods.

Depleted Uranium & .250" S.S. plate.

Have an 23 x 23 array, with the 3rd, 6th, 9th, 12th, 15th, 18th, & 21st row removed in 2 directions. with 5 clusters & 2 rods from 1 cluster removed from 1 row. Total of 234 rods.

Water ht = 41.90 cm
1 - Per
τ = -680.15 sec = -2.0¢
0924 Drain.

| 23x23 array with 3,6,9,12,15,18, 21 rows removed in 2 directions, and 5 clusters + 3 rods ~~removed~~ from 1 cluster removed from 1 row. total rods 235 | .°c
2.0°c
.1°c |

Added 1 rod: Total rods
See diagram.

Water ht = 42.00 cm (Δλ = 7.45) Probe (in) 37.76 Temp °c
2 + Per #1 = 24.2°c
τ = 191.22 sec = 5.8¢ 2 = 24.2°c
0940 Water ht = 34.55 cm Probe (in) 34.75"
System just critical
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP		SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3x10⁻¹²	Meter	✓	4"	✓	10x10⁻¹²
		Fast	✓	"	✓	"
K-2	3x10⁻¹²	Meter	✓	4"	✓	"
		Fast	✓	2"	✓	"
PM-1	700v	Alarm	✓	.5"	✓	500v
PM-2	1200v	Low	✓	10"	✓	900v
		Alarm	✓	1.0"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ___

RADIATION ALARM: A ✓ B ✓ C ✓ SOURCE NUMBER B-8

START-UP CHECK LIST

Equipment checked by RKAL E.P.C Personnel check by E.P.C

Instruments and safeties checked and reset by RKAL

Source in checked by RKAL Source No. M-43

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

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

Red light on by RKAL Time 1420

Start-up OK'd by E.P.C. RKAL Date 8-2-73

2.050 cm separation c.c.
30 cm length
.30" rods (unclad)

H_2O + Depleted Uranium reflector centered on 1 face of array. Reflector 1.02 cm from face of array.

H_2O = 25.60 cm : = top of rods.

Have an 14x14+2 array: total of 198 rods.

Water ht = 31.50 cm	Probe (in)	Temp °C
+Per	33.62"	#1 = 23.5°C
C = 76.05 sec = 12.2¢		2 = 23.5°C
Water ht = 30.80 cm	Probe (in)	
System just critical	33.30"	

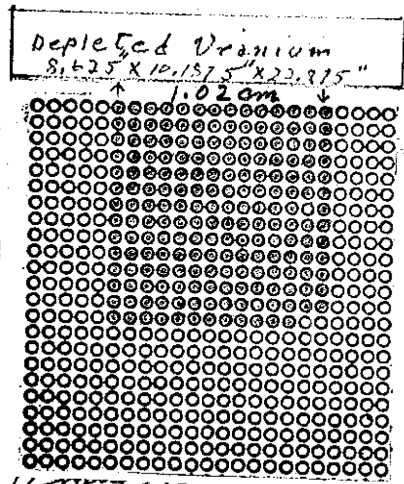
1450 Drain.

Removed 5 rods: Now have an 14x14-3 total of 193 rods.

Water ht = 41.90 cm	Probe (in)	Temp °C
-Per	37.69"	#1 = 23.2°C
C = -391.14 sec = -3.7¢		2 = 23.2°C

1510 Drain.

RKAL



Added 1 rod: Now … -2 array.
Total of 194 rods.

6.4=8

Water ht = 42.00 cm … Temp °C
3 +Per … #1 = 23.5 °C
T = 154.28 sec = 6.9¢ … 2 = 23.7 °C

1530 Water ht = 33.90 cm Probe (in)
System just critical ~~35~~ 34.52"
Drain

RADIATION ALARM: A ✓ B ✓ C ✓ SOURCE NUMBER B-8C

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1 Meter	3×10^{-12}	✓	4"	✓	3x10^- [illegible]
K-1 Fast		✓	1"	✓	"
K-2 Meter	3×10^{-12}	✓	4"	✓	"
K-2 Fast		✓	1"	✓	"
PM-1 Alarm	700 r	✓	5"	✓	500 r
PM-2 Low	1100 r	✓	10"	✓	900 r
PM-2 Alarm		✓	1"	✓	"

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKK

Source in checked by RKK Source No. 19-43

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

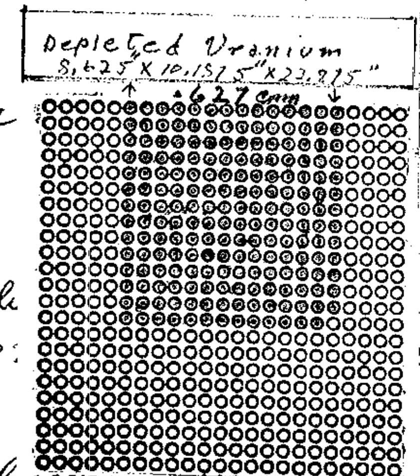
Instruments in trip circuit: K-1-2 PM 1-2

Red light on by RKK Time 1250

Start-up OK'd by E.D.C. R.KK Date 2-6-73

Moved Depleted uranium reflector to half-cell width. Now .627 cm from face of array. Repeat of last run 14x14-2 array. Total of 194 rods.

Water ht = 42.00 cm Probe (in) Temp °C
1 -Per 37.75" #1 = 23.5°
T = -475.89 sec = -3.0¢ 2 = 23.5 °C
1330 Drain.



Added 1 rod: Have an 14 … l of 195 rods.

ΔL = 1.25 cm

Water ht = 42.10 cm Probe … °C
2 +Per 3… 23.5 °C
T = 280.32 sec = 4.1¢ 23.5 °C
1355 Water ht = 34.85 cm Probe (in)
System just critical 34.92"
Drain.

2.050 cm c-c.
30 cm length.
130" rods.
14-X14-2 array.
Total of 194 rods.
Log #5
P-212

Added 1 rod: Now have an 14 X 14 - 2 array.
Total of 194 rods.

Water ht = 42.00 cm	Probe (in)	Temp °C
3 + Per	37.72" (δ.4 = 8.1 cm)	#1 = 23.5°C
τ = 154.28 sec = 6.9¢		2 = 23.7°C

1530 Water ht = 33.90 cm Probe (in)
System just critical ~~35~~ 34.52"
Drain

RADIATION ALARM: A ✓ B ✓ C ✓ SOURCE NUMBER D-8

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ✓

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP		SOURCE DISTANCE	RESET	STARTUP RANGE
PM-2	1000¢	Alarm	✓	1"	✓	"
		Low	✓	10"	✓	500¢
PM-1	700¢	Alarm	✓	5"	✓	500¢
K-2	3x10^-12	Fast	✓	1"	✓	"
		Meter	✓	4"	✓	"
K-1	3x10^-12	Fast	✓	1"	✓	"
		Meter	✓	4"	✓	3x10^-12

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKK.

Source in checked by RKK Source No. 14-43

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

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

Red light on by RKK Time 1250

Start-up OK'd by E.D.C. R.K.K. Date 2-6-73

Moved Depleted uranium rods to [illegible] left - cell width. Now .6 of array. Repeat of last [illegible] array. Total of 194 rods.

2.050 cm c-c.
30" rods.
30 cm length.
14-X14-1 array.
Total of 195 rods.
Log #5
P-213

Water ht = 42.00 cm	Pro[illegible]	
1 - Per	37[illegible]	[illegible].5°
τ = -475.89 sec = -3.0¢		[illegible].5°C

1330 Drain.

Added 1 rod: Have an 14 X 14 - 1 array. Total of 195 rods.

Water ht = 42.10 cm	Probe (in)	Temp °C
2 + Per	37.77" (δx = 7.25 cm)	#1 = 23.5°C
τ = 280.32 secs = 4.1¢		2 = 23.5°C

1355 Water ht = 34.85 cm Probe (in)
System just critical 34.92"
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP		SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3x10⁻¹²	Meter	✓	4"	✓	10x10⁻¹²
		Fast	✓	1"	✓	"
K-2	3x10⁻¹²	Meter	✓	4"	✓	"
		Fast	✓	1"	✓	"
PM-1	700 V	Alarm	✓	5"	✓	500 V
PM-2	1300 V	Low	—	10"	✓	900 V
		Alarm	✓	1"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ___

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

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKAC

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

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

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

Red light on by RKAC Time 0830

Start-up OK'd by I.D.C., RKAC Date 2-8-73

2.050 cm separation c-c.
30 cm length.
.30" rods.

Have an 17x17 array, with the 9th row removed in 2 directions: plus 8 rods removed at intersection: total of 248 rods.

0917	Water ht = 42.00 cm	Probe (in)	Temp °C
	System sub critical	37.77"	#1 = 23.5°C
	Drain.		2 = 23.5°C

added 2 rods: Total number of rods = 250

Water ht = 42.00 cm	Probe (in)	Temp °C
−Per	37.77	#1 = 23.7°C
T = −149.94 sec = −12.2¢		2 = 23.7°C

0947 Drain.

added 1 rod. Total number [illegible]

Water ht = 42.00 cm Probe [illegible] Δh = 6.8 cm

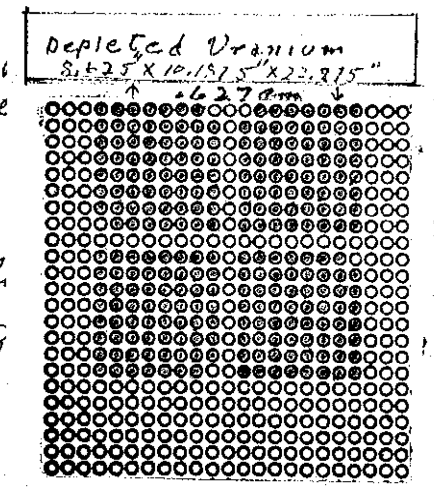
+Per 3

T = 315.08 sec = 3.7¢

1020 Water ht = 35.20 cm Probe [illegible]

System just critical 3

Drain.



awr.

2.050 cm separation c-c.
30 cm length.
.30" rods.

Have an 17 X 17 array, with the 9th row removed in 2 directions: plus 8 rods removed at intersection: total of 248 rods.

		Probe (in)	Temp °C
0917	Water ht = 42.00 cm		
	System sub critical	37.77"	#1 = 23.5°C
	Drain.		2 = 23.5°C

added 2 rods: total number of .30" rods - 250
Water ht = 42.00 cm
-Per
$\tau = -149.94$ sec $= -12.2$ ¢
0947 Drain.

Pu 2.050 cm. separation c-c
3 17 X 17 array with 9th row removed in 2 directions and 5 rods removed at intersection

added 1 rod. Total number Total rods 251
Water ht = 42.00 cm (Δh = 6.8 cm)

		Probe (in)	Temp °C
	+Per	37.77"	#1 = 24.0°C
	$\tau = 315.08$ sec $= 3.7$ ¢		2 = 24.0°C
1020	Water ht = 35.20 cm	Probe (in)	
	System just critical	35.10"	
	Drain.		

cont.

Now have an 22x22 array: with the 11th & 12th rows of rods removed in 2 directions. Plus 16 rods removed at intersections. Total of 384 rods.

Water ht = 33.60 cm	Probe (in)	Temp °C
3 +Per	34.50"	#1 = 23.7°C
C-143.42 sec = 7.4¢		2 = 23.7°C
1325 Water ht = 32.75 cm.	Probe (in)	
System just critical	34.10"	

Drain.

Removed 4 rods. Total number of rods = 380.

Water ht = 42.00 cm	Probe (in)	Temp °C
4 -Per	37.78"	#1 = 24.0°C
N.C.		2 = 24.0°C

1345 Drain:

added 1 rod: Total number of rods = 381.

Water ht = 42.10 cm	Probe (in)	Temp °C
5 -Per	37.80"	#1 = 24.0°C
C = -239.03 sec = -6.5¢		2 = 24.0°C

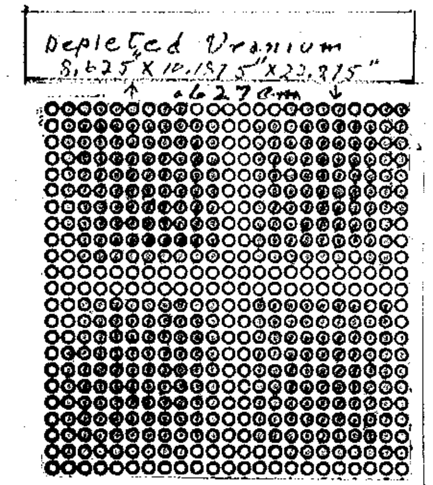
1400 Drain

added 1 rod. Total number of rods = 382

Δh = 6.60 cm

Water ht = 42.10 cm	Probe (in)	Temp °C
6 +Per	37.80"	#1 = 24.0°C
C = 706.22 sec = 1.8¢		2 = 24.0°C
Water ht = 35.50 cm	Probe (in)	
System just critical	35.20"	

Drain.



added 1 rod. Total number of rods = 382

a.h = 6.60 cm

Water ht = 42.10 cm

6 + Pen

C = 706.22 sec = 1.84

Water ht = 35.50 cm

System just critical

Drain.

.30" rods 30 cm long
2.050 cm. separation c-c
22X22 array
with 11th + 12th row
removed in 2 directions
and 18 rods removed
at intersection
Total rods 382

°c
14.0 °c
4.0 °c

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-12}	Meter ✓	4"	✓	10×10^{-12}
		Fast ✓	1"	✓	"
K-2	3×10^{-12}	Meter ✓	4"	✓	"
		Fast ✓	1"	✓	"
PM-1	7000 ✓	Alarm ✓	.5"	✓	5000 ✓
PM-2	12000 ✓	Low ✓	10"	✓	9000 ✓
		Alarm ✓	1"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ___

RADIATION ALARM: A ✓ B ✓ C ✓ SOURCE NUMBER B-8 ✓

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKL

Source in checked by RKL Source No. M-43

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

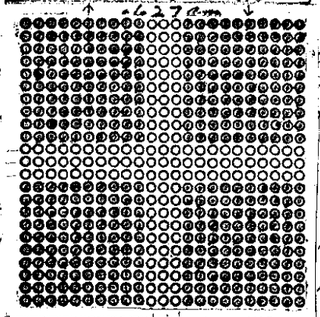
Instruments in trip circuit: K-1-2 PM1-2

Red light on by RKL Time 0810

Start-up OK'd by F.D.C. RKL Date 2-9-73

2.050 cm separation c-c.
30 cm longed.
30" rods.

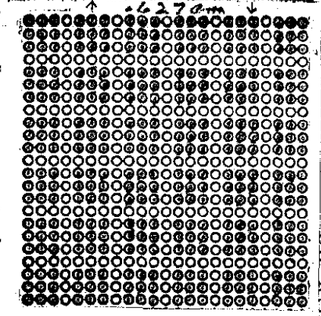
Depleted Uranium
5.625 X 10.157.5" X 22.875"



Have an 23 X 23 array, with
row removed in 2 directions

0840 Water lvl = 42.10 cm Probe(
System sub critical 37.84"
Drain.

Depleted Uranium
5.625 X 10.157.5" X 22.875"

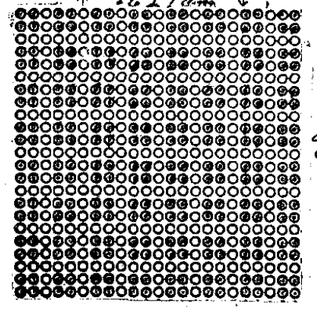


Have an 23 X 23 array, with 2
16 th & 20 th row removed
Total of 324 rods.

0930 Water lvl = 42.10 cm Probe(in
System sub critical 37.84'
Drain.

Have an 23 X 23 array, with the 3rd, 6th, 9th, 12th,
15th, 18th, & 21st row removed in a similiar
Total of 256 rods.

Depleted Uranium
5.625 X 10.157.5" X 22.875"



1013 Water lvl = 42.10 cm Probe(
System sub critical 37.84
Drain.

Over.

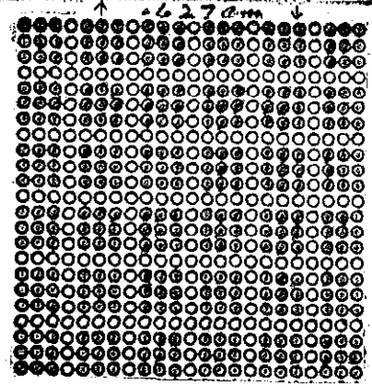
,30" rods, 30 cm long
2.050 cm. separation
23 X 23 array with
11, 12, 13 rows
removed in 2 directions
Total rods 400
Page 219 log

2.050 cm separation
30 cm length.
,30" rods.

Have an 23 X 23 array, with the 11th, 12th, & 13th row removed in 2 directions; Total of 400 rods.

0840 Water lvl = 42.10 cm Probe (in) Temp °C
System sub critical 37.84" t1 = 23.5°C
Drain. 2 = 23.5°C

Depleted Uranium
S.625" X 10.1575" X 22.875"

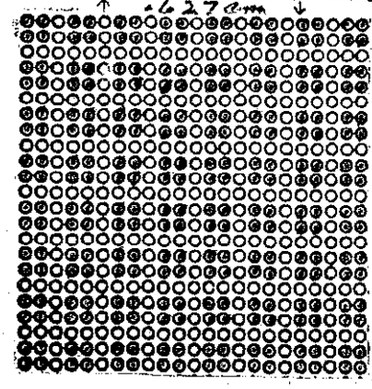


Have an 23 X 23 array, with 2
16th & 20th row removed
Total of 324 rods.

0930 Water lvl = 42.10 cm Probe (in
System sub critical 37.84"
Drain.

Have an 23 X 23 array, with the 3rd, 6th, 9th, 12th, 15th, 18th, & 21st row removed in 2 directions
Total of 256 rods.

Depleted Uranium
S.625" X 10.1575" X 22.875"



1013 Water lvl = 42.10 cm Probe (
System sub critical 37.84
Drain.

Rev.

,30" rods, 30 cm long
2.050 cm. separation
23 X 23 array with
11, 12, 13 row
removed in 2 directions
Total rods 400
Page 219 log.

2.050 cm separation
30 cm length.
,30" rods.

Have an 23 X 23 array, with the 11th, 12th, & 13th
row removed in 2 directions. Total of 400 rods.
,30" rods, 30cm length
2.050 cm. separation
23 X 23 array with
4, 8, 12, 16 & 20th row
removed in 2 directions
Total rods 324
Page 219 log.

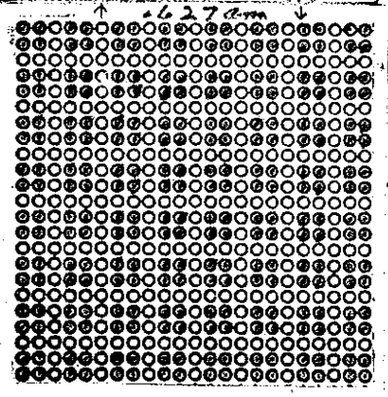
0840 Water ht = 42.10 cm Probe (in) Temp °C
System sub critical 37.84" #1 = 23.7 °C
Drain. #2 = 24.0 °C

Have an 23 X 23 array, with 4, 8, 12, 16 & 20th row removed in 2 directions.
Total of 324 rods.

0930 Water ht = 42.10 cm Probe (in) Temp °C
System sub critical 37.84" #1 = 23.7 °C
Drain. #2 = 24.0 °C

Have an 23 X 23 array, with the 3rd, 6th, 9th, 12th,
15th, 18th, & 21st row removed in 2 directions
Total of 256 rods.

Depleted Uranium
8.625 X 10.1875" X 23.875"
↑ 6.27 cm ↓



1013 Water ht = 42.10 cm Probe (in) °C
System sub critical 37.84 °C
Drain.

Rev.

,30" rods, 30 cm long
2.050 cm. separation
23 X 23 array with
11, 12, 13 rows
removed in 2 directions
Total rods 400
Page 219 log

2.050 cm separation
30 cm length.
,30" rods.

Have an 23 X 23 array, with the 11th, 12th, & 13th
row removed in 2 directions. Total of 400 rods.
,30" rods, 30cm length
2.050 cm. separation

0840 Water ht = 42.10 cm Probe (in) Temp °c
System sub critical 37.84" 23 X 23 array with
Drain. 4, 8, 12, 16 & 20th row
removed in 2 directions
Total rods 324
Page 219 log

Have an 23 X 23 array, with 4th, 8th, 12th,
16th & 20th row removed in 2 directions.
Total of 324 rods.

0930 Water ht = 42.10 cm Probe (in) Temp °c
System sub critical 37.84"
Drain.
,30" rods 30 cm length
2.050 cm. separation
23 X 23 array with
3, 6, 9, 12, 15, 18 21th
row removed in
2 directions
Total rods 256
Page 219 log

Have an 23 X 23 array, with the
15th, 18th, & 21st row rema
Total of 256 rods.

1013 Water ht = 42.10 cm Probe (in) Temp °c
System sub critical 37.84" #1 = 23.7°c
Drain. 2 = 24.0°c

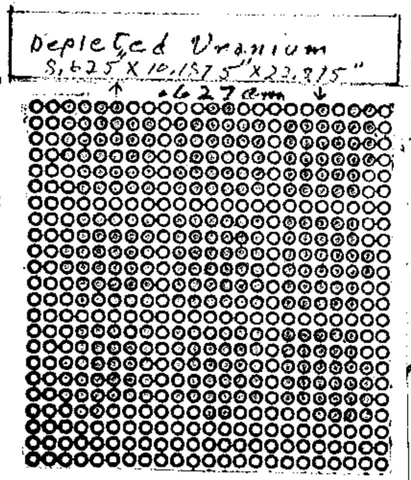
Over.

Now have an 20 X 20 ... &

14 th now removed in ... e

4 rods removed at ...

Total of 292 rods.



1300 Water ht = 42.20 cm ... °C

System sub critical 23.7°C

Drain. ~-24.0°C

added 2 rods: 1 each to opposite faces.

Total number of rods = 294.

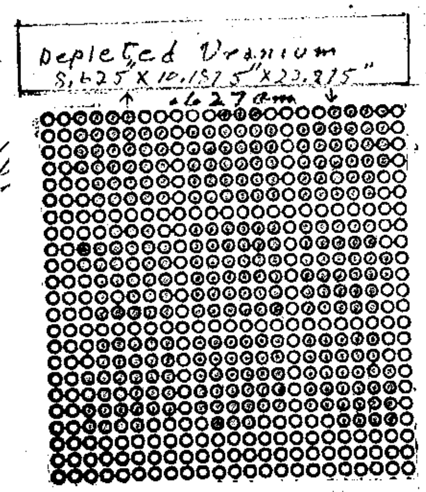
Water ht = 42.10 cm   Probe (in)   Temp °C

-Rer   37.84"   #1 = 23.7°C

I = -199.92 sec = -8.2¢   2 = 24.0°C

1334 Drain

added 1 rod: Total number



1353 Water ht = 42.10cm ... °C

System just critical .7°C

Drain. 0°C

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP		SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3x10^-12	Meter	✓	4"	✓	10x10^-12
		Fast	✓	1"	✓	"
K-2	3x10^-12	Meter	✓	4"	✓	"
		Fast	✓	1"	✓	"
PM-1	700V	Alarm	✓	.5"	✓	500cps
PM-2	1200V	Low	✓	10"	✓	900cps
		Alarm	✓	1"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ___

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

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKA

Source in checked by RKA   Source No. M-43

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

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

Red light on by RKA   Time 0815

Start-up OK'd by I.D.C. RKA   Date 2-14-73

2.050 cm c-c.
30 cm length.
.30" rods.
20X20 array, mid
7 & 14 th row removed
in 2 directions, + 4
rods at each intersection
Log #5
p-220

Now have an 20 X 20 array, with the 7th &
14th row removed in 2 directions. place
4 rods removed at each intersection.
Total of 292 rods.

1300	Water ht = 42.20 cm	Probe (in)	Temp °C
	System sub critical	37.84"	#1: 23.7°C
	Drain.		2: 24.0°C

added 2 rods: 1 each to c[illegible]
Total number of rods = [illegible]

Water ht = 42.10 cm
-Per
I = -199.92 sec = -8.2¢

1334 Drain

Total of 295 rods.
p-70
Log Book #5
removed in 2 direction
1st & 14 th row
20X20 array, mid
.30" rods.
30 cm length.
2.050 cm - c-c.

added 1 rod: Total number of rods = 295

1353	Water ht = 42.10 cm	Probe (in)	Temp °C
	System just critical	37.84"	# 1 = 23.7°C
	Drain.		2 = 24.0°C

2.050 cm separation c-c.
30 cm length.
30" rods.

Have an 20 X 18 array, with the 7th and 14th rows removed in 2 locations. Total number of rods = 284 rods.

$\Delta L = 1.5$ cm

Water ht = 32.50 cm Probe (in) Temp °c
+Per 34.04" #1 = 22.8°c
E = 34.77¢ = 20.7¢ 2 = 23.0°c
0855 Water ht = 31.00 cm Probe (in)
System just critical ?
Drain

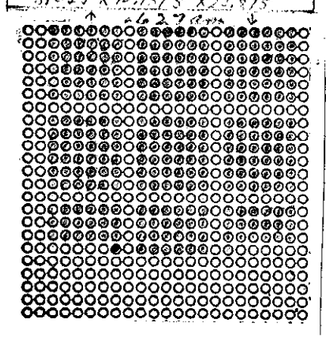
Removed 4 rods. Total number of rods = 280.

$\Delta L = 2.6$ cm

Water ht = 35.00 cm Probe (in) Temp °c
2 +Per 35.04" #1 = 22.8°c
E = 67.36 mm = 13.3 ¢ 2 = 23.0°c
0921 Water ht = 32.40 cm Probe (in)
System just critical 33.95"
Drain.

Removed 2 rods: Total number of rods = 278.

Depleted Uranium
5.625 X 10.125" X 22.975"



$\Delta L = 1.6$ cm

Water ht = 42.20 cm Probe (in) Temp °c
3 +Per #1 = 22.8°c
E = 215.13 mm = 5.2 ¢ 2 = 23.0°c
0957 Water ht = 34.60 cm
System just critical
Drain.

Removed 1 rod: Total number of rods = 277.

Water ht = 42.20 cm Probe (in) Temp °c
4 +Per 37.82" #1 = 22.8°c
E = -415.09 mm = -3.4 ¢ 2 = 23.0°c
1012 Drain.

Now have an 22 X 21 array: we left the 11th & 12th row removed in 2 deviations: Total of 370 rods.

$\Delta L = 1.2$ cm

Water ht = 33.40 cm Probe (in) Temp °c
5 +Per 34.39" #1 = 23.8°c
E = 97.78 mm = 10.1 ¢ 2 = 23.0°c
1313 Water ht = 32.20 cm Probe (in)
System just critical 33.86"
Drain.

ave.

• 30" rods 30 cm long.
2.050 cm. separation.
20 X 18 array with
7th & 14th row
removed in 2 direction
Total rods 278
Page # 222 +
223 for leak

Δh = 7.6 cm

Water ht = 42.20 cm   Probe (in)   Temp °C
3 + Per   37.84"   #1 = 22.8 °C
T = 215.13 sec = 5.2 ¢   2 = 23.0 °C

0957 Water ht = 34.60 cm   Probe (in)
System just critical   34.84"
Drain.

Removed 1 rod: Total number of rods = 277.

Water ht = 42.20 cm   Probe (in)   Temp °C
4 - Per   37.82"   #1 = 22.8 °C
T = −415.09 sec = −3.4 ¢   2 = 23.0 °C

1012 Drain.

Now have an 22 X 21 array; with the 11th & 12th row removed in 2 directions: Total of 370 rods.

Δh = 1.2 cm

Water ht = 33.40 cm   Probe (in)   Temp °C
5 + Per   34.39"   #1 = 23.0 °C
t = 97.78 sec = 10.1 ¢   2 = 23.0 °C

1313 Water ht = 32.20 cm   Probe (in)
System just critical   33.86"
Drain.

awr.

Removed 2 rods. Total number of rods = 368.

ΔL = 8.75 cm

Water Ht = 42.20 cm Probe (in) Temp °C

+Per 37.84" #1 = 23.0°C

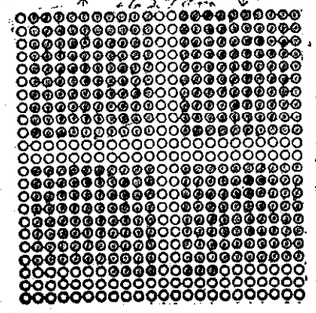
τ = 108.65 sec = 9.0¢ 2 = 23.0°C

1330 Water Ht = 33.75 cm Probe (in)

System just critical 39.50"

Drain.

Depleted Uranium
5.625" X 10.125" X 22.875"



Removed 1 rod: Total number

ΔL = 6.7 cm

Water Ht = 42.20 cm Pro

7 +Per 3 .0°C

τ = 338.99 sec = 3.5¢ .0°C

1353 Water Ht = 35.50 cm Probe (in)

System just critical 35.19"

Drain.

Removed 1 rod: Total number of rods = 366.

Water Ht = 42.20 cm Probe (in) Temp °C

8 Per 37.84" #1 = 23.0°C

τ = -677.98 sec = -2.0¢ 2 = 23.0°C

1401 Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	$3X10^{-12}$	Meter ✓	9"	✓	$10X10^{-12}$
		Fast ✓	1"	✓	"
K-2	$3X10^{-12}$	Meter ✓	9"	✓	"
		Fast ✓	1"	✓	"
PM-1	700 V	Alarm ✓	.5"	✓	900 V
PM-2	1200 V	Low ✓	10"	✓	900 V
		Alarm ✓	1"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ✓

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

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RHH

Source in checked by RHH 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 RHH Time 0835

Start-up O.K'd by F.D.C. RHH Date 2-15-73

Removed 2 rods: Total number of rods = 368.

$\Delta h = 8.75$ cm

Water ht = 42.20 cm Probe .30" Rods 30 cm. length? 2.050 cm. separation c.c.

6 +Per 37 22 x 21 array with 3.0°C

τ = 108.65 sec = 9.3¢ 11th + 12th rows 3.0°C

1330 Water ht = 33.75 cm Pro removed in 2 direction

System just critical Total rods = 367

Drain. Page 224 log

Removed 1 rod: Total number of rods = 367

$\Delta h = 6.7$ cm

Water ht = 42.20 cm Probe (in) Temp °C

7 +Per 37.89" #1 = 23.0°C

τ = 338.99 sec = 3.5¢ 2 = 23.0°C

1353 Water ht = 35.50 cm Probe (in)

System just critical 35.19"

Drain.

Removed 1 rod: Total number of rods = 366.

Water ht = 42.20 cm Probe (in) Temp °C

8 -Per 37.84" #1 = 23.0°C

τ = -677.98 sec = -2.0¢ 2 = 23.0°C

1407 Drain.

Repeat of critical p-224. 367 rods.

Water ht = 42.20 cm	Probe (in)	Temp °C
1 +Per	37.84	#1 = 23.2 °C
τ = 275.97 sec = 4.2¢		2 = 23.2 °C

0920 Water ht = 35.30 cm — Probe (in) 35.08"

System just critical

Drain.

Have an 17 X 17 array, with the 9th row removed in 2 direction: Have 10 rods removed from 1 face. Total of 246 rods.

Δh = 9.4 cm

Water ht = 42.20 cm	Probe (in)	Temp °C
2 +Per	37.84	#1 = 23.2 °C
τ = 65.19 sec = 13.6¢		2 = 23.2 °C

1035 Water ht = 32.80 cm — Probe (in) 34.10"

System just critical

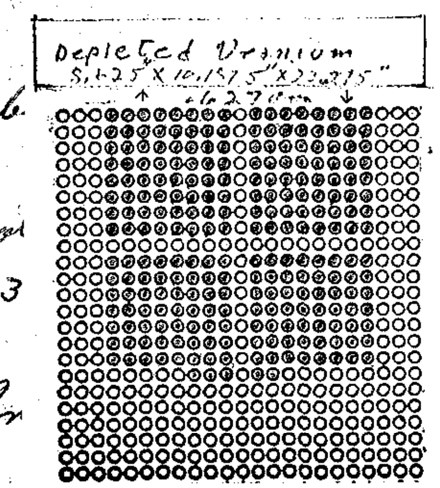
Drain.

Removed 2 rods: Total number of rod = 244.

Water ht = 42.20 cm	Probe (in)	Temp °C
3 -Per	37.84"	#1 = 23.2 °C
τ = -256.41 sec = -6.0¢		2 = 23.2 °C

1055 Drain

added 1 rod: Total numb



Δh = 7.1¢

Water ht = 42.20 cm	Prob	
4 +Per	3	3.2 °C
τ = 267.28 sec = 4.3¢		3.2 °C

1113 Water ht = 35.10 cm — Pr

System just critical

Drain

• 30" rods 30 in. long
2.050 cm separation c-c
Water ht = 42.20 cm   Pins 17X17 array with the 9th row removed in 2 directions. Done 11 rods removed from 1 face.
3 - Pen   total rods 245
τ = -256.41 sec = -6.0 ¢
1055 Drain

added 1 rod : total number of rods = 245

Δρ = 7.1 ¢

Water ht = 42.20 cm	Probe (in)	Temp °C
4 + Pen	37.84"	#1 = 23.2 °C
τ = 267.28 sec = 4.3 ¢		2 = 23.2 °C

1113 Water ht = 35.10 cm   Probe (in)
System just critical   35.01"
Drain

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP		SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-12}	Meter	✓	4"	✓	10×10^{-12}
		Fast	✓	1"	✓	"
K-2	"	Meter	✓	4"	✓	"
		Fast	✓	1"	✓	"
PM-1	700 v	Alarm	✓	.5"	✓	500 v
PM-2	1200 v	Low	✓	10"	✓	900 v
		Alarm	✓	1"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ___

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

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKK

Source in checked by RKK Source No. M-43

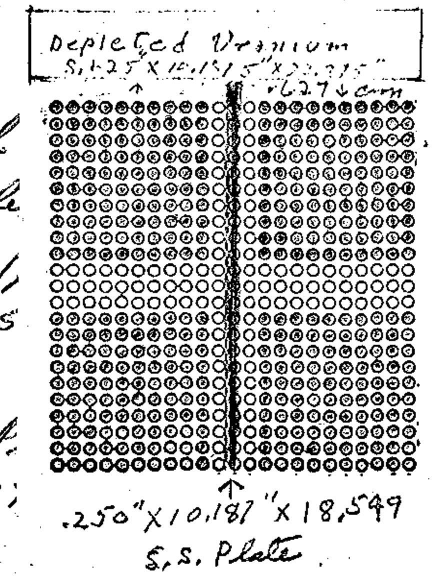
Emergency equipment in control room checked by I.D.C

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

Red light on by RKK Time 12:15

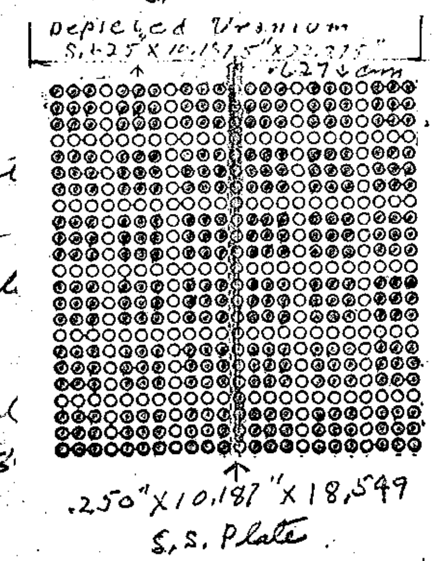
Start-up OK'd by I.D.C. RKK Date 2-16-73

2.050 cm separation C-C.
30 cm length
.30" rods.



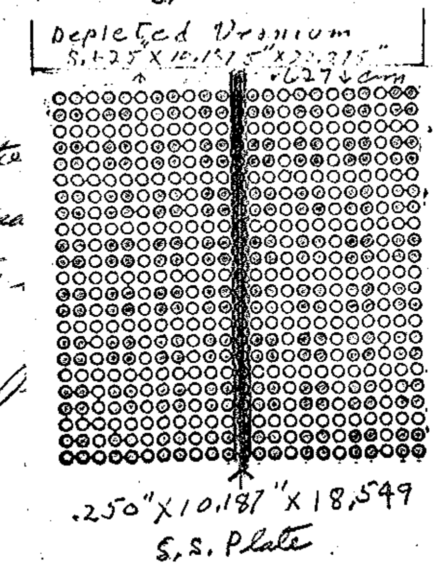
Have an 23X23 array, with
row removed in 2 direction
Have centered in array. ¼
Stainless Steel plate .25

1250 Water Ht = 42.20 cm
System sub critical 3
Drain.



Have an 23X23 array, with
16th & 20th row removed
Total of 324 rods. S.S. plat

1327 Water Ht = 42.20 cm Probe
System sub critical 37.8
Drain.



Have an 23X23 array, with the
15th, 18th, & 21st row rema
Total of 256 rods. S.S. plate

1900 Water Ht = 42.20 cm
System sub critical
Drain.

.30" rods 30 Cm. length
2.050 Cm. separation c-c
23 X 23 array with 11, 12, 13th row removed in 2 directions. Hole centered in array | Pc of 304 L S.S. plate .250"X10.1875X" 18.549"
Total rods = 400
Page 229 log

2.050 cm separation
30 cm length
.30" rods

Have an 23 x 23 array, with the 11th, 12th, 13th row removed in 2 directions. Total of 400 rods. Hole centered in array. 1pc of ~~type~~ 304L Stainless Steel plate .250" X 10.1875" X 18.549".

1250 Water lvl = 42.20 cm Probe (in) Temp °c
System sub critical 37.84" I1 = 23.2°c
Drain. 2°c

Depleted Uranium
S.S. 25 X 10.1875" X 18.549"
.627 cm

Have an 23 x 23 array, with 1
16th & 20th row removed
Total of 324 rods. S.S. plat

1 30" rods 30 Cm long
2.050 Cm separation c-c
23 X 23 array with 3, 6, 9, 12, 15, 18, 21st rows removed in 2 direction
Total rods 256
Page 229 log.

1327 Water lvl = 42.20 cm Probe
System sub critical 37.8
Drain. 2°c
2°c

Have an 23 x 23 array, with the 3rd, 6th, 9th, 12th, 15th, 18th, & 21st row removed in 2 direction. Total of 256 rods. S.S. plate centered in array.

1900 Water lvl = 42.20 cm Probe (in) Temp °c
System sub critical 37.84" I1 = 23.5°
Drain 2 = 23.5°c

2.050 cm separation C-C.
30 cm length.
.30" rods.

Depleted Uranium
5.625 X 10.1315" X 23.315"
.627 cm

.30" rods 30 cm. long
2.050 cm. separation C-C
23 X 23 array with 4, 8, 12, 16, 20th rows removed in 2 directions
S.S plate centred in array
total rods 324
Page 229

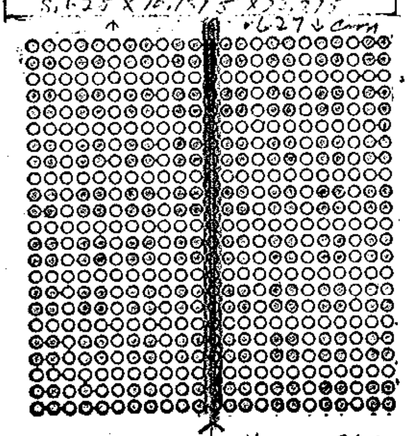
Have an 23 X 23 array, with ...
row removed in 2 direc...
Have centred in array ...
Stainless steel plate .25 ...

1250 Water ht = 42.20 cm P...
System sub critical 3...
Drain.

Have an 23 X 23 array, with the 4th, 8th, 12th, 16th & 20th row removed in 2 directions
Total of 324 rods. S.S. plate centred in array.

1327 Water ht = 42.20 cm Probe (in) Temp °C
System sub critical 37.84" #1 = 23.2°C
Drain. 2 = 23.5°C

Depleted Uranium
5.625 X 10.1315" X 23.315"
.627 cm



Have an 23X23 array, with the ...
15th, 18th, & 21st row remo...
Total of 256 rods. S.S. plate ...

1900 Water ht = 42.20 cm
System sub critical
Drain.

.250" X 10.187" X 18.549
S.S. Plate

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP		SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3x10⁻¹²	Motor	✓	4"	–	10x10⁻¹²
		Fast	✓	1"	–	"
K-2	3x10⁻¹²	Motor	✓	4"	–	"
		Fast	✓	1"	–	"
PM-1	700 v	Alarm	–	.5"	–	500 v
PM-2	1200 v	Low	✓	10"	–	700 v
		Alarm	✓	1"	–	"

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ___

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

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKM

Source in checked by RKM Source No. M-43

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

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

Red light on by RKM Time 10:00

Start-up OK'd by F.O.C. RKM Date 2-20-7?

2.050 cm operation c-c.
30 cm length.
130" rod.

Have an 23 x 23 array, with the 11th, 12th, 13th row removed in 1 direction: Have S.S. plates centered in the other direction.
Total of 440 rods:

	Water ht = 32.10 cm	Probe (in)	Temp °C
	¹+Per	33.81"	#1 = 22.5°C
	t = 71.11 sec = 12.7¢		2 = 22.5°C
1055	Water ht = 31.45 cm	Probe (in)	
	System just critical	33.51	
	Drain.		

Removed 8 rods from 1 face: Total of 432 rods.

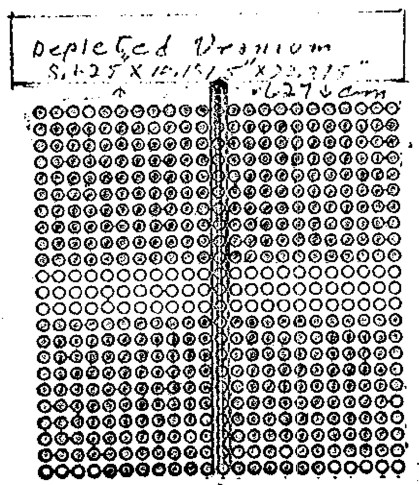
	Water ht = 42.30 cm	Probe (in)	Temp °C
	²+Per	37.83"	#1 = 22.5°C
	t = 121.69 sec = 8.5¢		2 = 22.5°C
1110	Water ht = 33.95 cm	Probe (in)	
	System just critical	34.56"	
	Drain.		

aw?

Removed 2 rods. Total of 430 rods:

Water ht = 42.10 cm Probe (in) Temp °C
3 -Per 37.85" #1 = 22.5 °C
T = -1564.56 sec = -.85 ¢ 2 = 22.5 °C
1312 Drain

Added 1 rod: Total number of rods = 431
Δh = 6.4 cm
Water ht = 42.20 cm Probe (in) Temp °C
+Per 37.85" #1 = 22.5 °C
T = 306.39 sec = 3.8 ¢ 2 = 22.5 °C
1337 Water ht = 35.80 cm Probe (in)
System just critical 35.26"
Drain.



Have an 19X21 array: With the S.S. plate centered in array: Total of 380 rods.

1445 Water ht = 20.50 cm Temp °C
System just critical #1 = 22.9 °C
Drain. 2 = 22.9 °C

Removed 38 rods: Now have an 19X19 array, with S.S. plate centered in array: Total of 342 rods.

1505 Water ht = 23.10 cm
System just critical
Drain.

Now have an 17X18 array, with S.S. plate centered in array: Total of 288 rods.

1525 Water ht = 27.50 cm.
System just critical
Drain.

awr.

Removed 2 rods. Total of 430 rods.

Water ht = 42.10 cm Probe (in) Temp °C
3 -Per 37.85" H1 = 22.5°C
L = -1564.56 cm = .85 ¢ 2 = 22.5°C
1312 Drain

added 1 rod. Total = 431

Water ht = 42.20 cm Temp °C
4 +Per H1 = 22.5°C
L = 306.39 cm = 3.8 ¢ 2 = 22.5°C
1337 Water ht = 35.80 cm
System just criticized
Drain.

Removed 12 rods: Total of 276 rods.

Water ht = 29.10 cm
System just critical
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3x10⁻¹²	Meter ✓	4"	✓	10x10⁻¹²
		Fast ✓	1"	✓	"
K-2	3x10⁻¹²	Meter ✓	4"	✓	"
		Fast ✓	1"	✓	"
PM-1	700 ʋ	Alarm ✓	.5"	✓	500 ʋ
PM-2	1260 ʋ	Low ✓	10"	✓	900 ʋ
		Alarm ✓	1"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ___

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

START-UP CHECK LIST

Equipment checked by F.D.C. R.M.H. Personnel check by R.M.H.

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

Source in checked by R.M.H. 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 R.M.H. Time 0830

Start-up OK'd by F.D.C. R.M.H. Date 2-21-73

Removed 12 rods: Total of ~~276~~ 264 rods:

$\Delta h = 8.55$ cm

Water ht = 42.20 cm — Probe (in) — Temp °C

+Per — 37.84" — #1 = 23.0°C

τ = 117.34 sec = 8.7¢ — 2 = 23.0°C

0915 Water ht = 33.65 cm — Probe (in)

System just critical — 34.44"

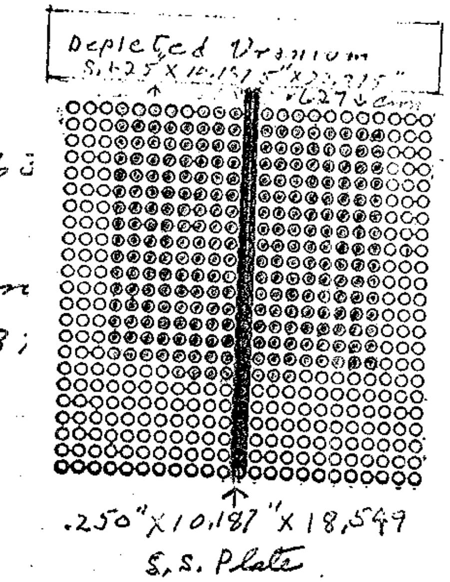
Drain.

Removed 1 rod: Total of 263

0930 Water ht = 42.20 cm. — Pr[obe]

System just critical — 3

Drain.



START-UP CHECK LIST

Equipment checked by ~~R.K.L.~~ F.D.C. Personnel check by R.K.L.

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

Source in checked by R.K.L. 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 R.K.L. Time 0830

Start-up OK'd by F.D.C. R.K.L. Date 2-21-73

Removed 12 rods: total of ?
ΔL = 8.55 cm

Water ht = 42.20 cm Prod 3
+Rx

τ = 117.34 sec = 8.7¢

0915 Water ht = 33.65 cm Prob 3
System just critical
Drain.

• 30" rods 30 cm length
2.050 cm separation c-c
17 X 17 array with
9 rods removed from
1 face, + SS plate
centered in array.
total rods 263
Page 235 log

Removed 1 rod: total of 263 rods:

0930 Water ht = 42.20 cm. Probe (in) 37.84" Temp °C
System just critical #1 = 23.0°C
Drain. 2 = 23.0°C

2.050 cm separation c-c.
30 cm length.
.30" rod.

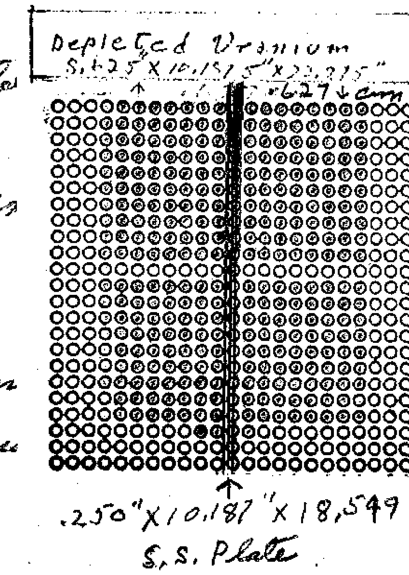
Now have an 17 X 19 array: with the 10th row removed in 1 direction and the 9th row removed in 1 direction. With s.s. plate centered in 9th row: (see diagram) Total of 288 rods.

1245 Water ht = 42.20 cm — Probe (in) 37.84
System sub critical
Drain.

Added 20 rods: Total number of rods = 298.

2 Water ht = 42.20 cm — Probe (in) 37.84" — Temp °C
+Per — #1 = 23.2 °C
T = 104.30 sec = 9.6¢ — 2 = 23.2 °C
1405 Water ht = 33.55 cm — Probe (in) 34.41"
System just critical
Drain.

Removed 1 rod: Tota[l]



Delete 1 row of rods from drawing. GCW

Δh = 6.8 cm
3 Water ht = 42.20 cm — Temp °C
+Per — #1 = 23.2 °C
T = 430.25 sec = 2.8¢ — 2 = 23.2 °C
1428 Water ht = 35.40 cm
System just critical
Drain.

Removed 1 rod: Total number of rods = 296.

4 Water ht = 42.20 cm — Probe (in) 37.84" — Temp °C
-Per — #1 =
T = -459.16 sec = -3.1¢ — 2 =
1445 Drain.

• 30" rods 30 cm length
2.050 cm. sep. c-c.
21 x 17 array
with 10th row removed
in 1 direction + 9th
row removed in other
direction with SS plate
centered in 9th row.
Total rods = 297
Page - 237 Log.

Removed 1 rod: total number of rods = 297 — Delete 1 row of rods from drawing. GCW

Δh = 6.8 cm

Water ht = 42.20 cm | Probe (in) 37.84" | Temp °C
+Per | | #1 = 23.2 °C
τ = 430.25 sec = 2.8¢ | | 2 = 23.2 °C

1428 Water ht = 35.40 cm | Probe (in) 35.17"
System just critical
Drain.

Removed 1 rod: total number of rods = 296.

Water ht = 42.20 cm | Probe (in) 37.84" | Temp °C
−Per | | #1 =
τ = −459.16 sec. = −3.1¢ | | 2 =

1445 Drain.

...el
...el
...plate
...tal
=298.
...mp °C
23.2 °C
23.2 °C

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	$3X10^{-12}$	Meter ✓	9"	✓	$10X10^{-12}$
		Fast ✓	1"	✓	"
K-2	$3X10^{-12}$	Meter ✓	9"	✓	"
		Fast ✓	1"	✓	"
PM-1	700V	Alarm ✓	.5"	✓	3000V
PM-2	12000V	Low ✓	10"	✓	9000V
		Alarm ✓	2"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ___

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

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKK

Source in checked by RKK Source No. M-93

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

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

Red light on by RKK Time 0905

Start-up OK'd by I.D.C. RKK Date 2-22-73

2 1030 Terminated run.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	$3X10^{-12}$	Meter ✓	9"	✓	$10X10^{-12}$
		Fast ✓	1"	✓	"
K-2	$3X10^{-12}$	Meter ✓	9"	✓	"
		Fast ✓	1"	✓	"
PM-1	700V	Alarm ✓	.5"	✓	3000V
PM-2	12000V	Low ✓	10"	✓	9000V
		Alarm ✓	2"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ___

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

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKK

Source in checked by RKK Source No. M-93

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

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

Red light on by RKK Time 0810

Start-up OK'd by I.D.C. RKK Date 2-23-73

Now have an 16 X 19 array. With the S.S. plate centered in array. (See diagram). Total of 276 rods.

Water ht = 28.70 cm — Temp °C
System just critical — #1 = 23.2 °C
Drain. — 2 = 23.2 °C

Removed 20 rods: Now have an 16 X 17 array: Total of 256 rods.

0930 Water ht = 42.20 cm — Probe (in) — Temp °C
System sub critical — 37.84" — #1 = 23.2 °C
Drain. — 2 = 23.2 °C

added 6 rods: Total number of rods = 262

1033 Water ht = 42.20 cm — Probe (in) — Temp °C
System sub critical — 37.84" — #1 = 23.2 °C
Drain. — 2 = 23.2 °C

added 2 rods: Total number of rods = 264

Water ht = 42.20 cm — Probe (in) — Temp °C
1-Per — 37.84" — #1 = 23.2 °C
τ = -282.49 sec = -5.3¢ — 2 = 23.2 °C
1051 Drain

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP		SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3 X 10^{-12}	Meter	✓	4"	✓	10 X 10^{-12}
		Fast	✓	1"	✓	"
K-2	3 X 10^{-12}	Meter	✓	4"	✓	"
		Fast	✓	1"	✓	"
PM-1	700 V	Alarm	✓	.5"	✓	500 V
PM-2	1200 V	Low	✓	10"	✓	900 V
		Alarm	✓	2"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ____

RADIATION ALARM: A ✓ B ✓ C ✓ SOURCE NUMBER B-70

START-UP CHECK LIST.

Equipment checked by E.D.C / RKK Personnel check by E.D.C

Instruments and safeties checked and reset by RKK

Source in checked by RKK Source No. M-43

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

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

Red light on by RKK Time 0815

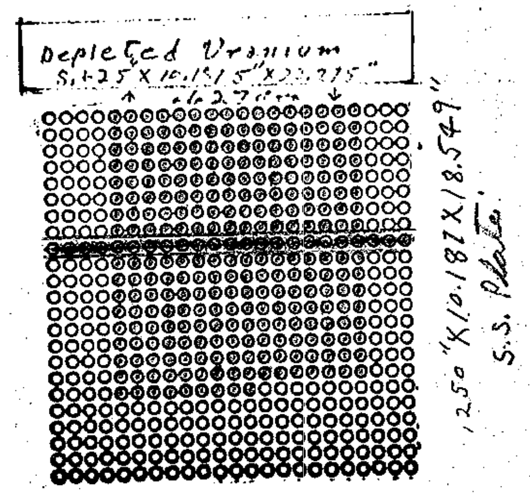
Start-up OK'd by E.D.C, RKK Date 2-26-73

2.050 cm separation c-c
30 cm length. .30" rods.

added 1 rod: total number of rods = 265.

Water ht = 42.20 cm (Δh = 8.7 cm) Probe (in) Temp °C
+Per 37.84" #1 = 24.0°C
T = 97.78 sec = 10.1¢ 2 = 24.0°C

0855 Water ht = 33.50 cm Probe (in)
System just critical 34.41"
Drain.



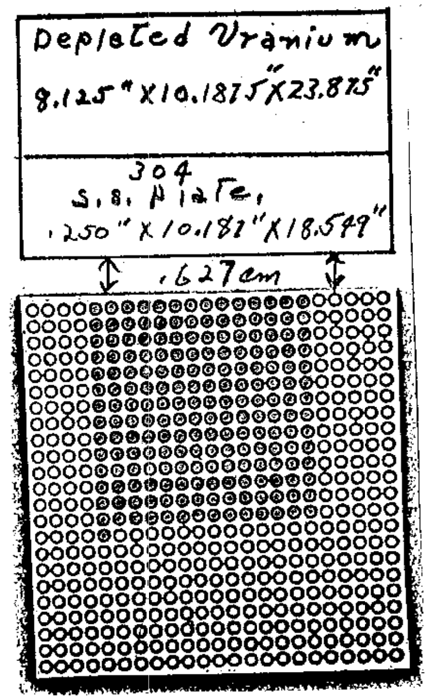
Now have an 14 x 14 array: total of 196 rods:
Have S.S. plate on face of depleted uranium reflector.
See diagram.

Water ht = 42.20 cm Probe (in) Temp °C
-Per 37.84" #1 = 24.0°C
T = -308.51 sec = -4.8¢ 2 = 24.0°C

1458 Drain:

added 1 rod: total of 197 rods:

1514 Water ht = 42.20 cm Probe (in) Temp °C
System just critical 37.84" #1 = 24.0°C
Drain. 2 = 24.0°C



START-UP CHECK LIST

Equipment checked by RKLL (E.D.C) Personnel check by E.D.C

Instruments and safeties checked and reset by RKLL

Source in checked by RKLL Source No. M-43

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

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

Red light on by RKLL Time 0815

Start-up OK'd by E.D.C, RKLL Date 2-26-73

2.050 cm separation c-c
30 cm length. .30" rods.

Added 1 rod: Total number of rods = 265.

δh = 8.7cm

Water ht = 42.20cm
+Per
τ = 97.78 sec = 10.1¢
0855 Water ht = 33.50cm
System just critical
Drain.

.30" rods 30cm long
2.050 cm. separation c-c
18 X 16 array with 4 rods removed in 1 row
Have S.S. plate in 9th row
total rods 265
Page 242 log.

T. °C
24.0°C
24.0°C

Now have an 14 X 14 array: Total of 196 rods:
Have S.S. plate on face of depleted uranium reflector.
See diagram.

Water ht = 42.20cm
+Per
τ = -308.51 sec = -4.8¢
1458 Drain:

.30" rods 30 cm length
2.050 separation c-c
14 X 14 array + 1 rod in 1 row.
Have S.S. plate on face of depleted uranium reflector.

Temp °C
#1: 24.0°C
2 = 24.0°C

added 1 rod: Total

total rods 197
Page 243 log.

1514 Water ht = 42.20 cm
System just critical
Drain.

Temp °C
#1 = 24.0°C
2 = 24.0°C

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP		SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3x10^-12	Meter	✓	4"	✓	10x10^-12
		Fast	✓	1"	✓	"
K-2	3x10^-12	Meter	✓	4"	✓	"
		Fast	✓	1"	✓	"
PM-1	700 V	Alarm	✓	.5"	✓	500 V
PM-2	1200 V	Low	✓	10"	✓	900 V
		Alarm	✓	2"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ___

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

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKAV

Source in checked by RKAV Source No. M-43

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

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

Red light on by RKAV Time 0820

Start-up OK'd by F.D.C, RKAV Date 2-27-73

2.050 cm separation c-c.
30 cm length.
130" rods.

Repeat of last run:

0855 Water ht = 42.10 cm Probe (in) Temp °C
System just critical 37.84" #1 = 24.0°C
Drain. 2 = 24.0°C

Have an 18 X 20 array: with 6 rods removed from 1 face. Total of 282 rods; the 7th & 14th row removed in 2 directions.

Water ht = 34.70 cm Probe (in) Temp °C
+Pr 34.89" #1 = 24.2°C
C = 80.40 cm = 11.7 f 2 = 24.2°C

1300 Water ht = 32.40 cm Probe (in)
System just critical ~~37~~ 33.97"
Drain.

ws.

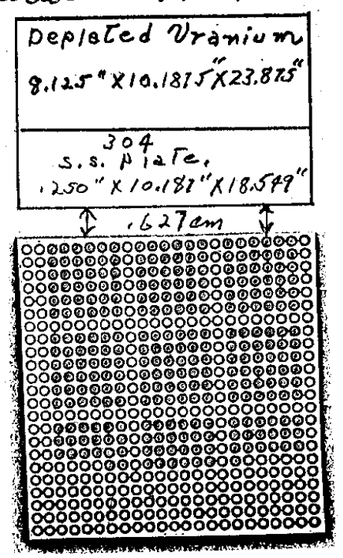
Removed 2 rods: total number of rods = 280.

Water ht = 42.20 cm Probe (in) Temp °C
2 Per 37.84" #1 = 24.2°C
C = 156.46 mc = 6.9 f 2 = 24.2°C

1320 Water ht = 34.05 cm Probe (in)
System just critical 34.62"
Drain.

Removed 1 rod: total number of rods = 279.

1335 Water ht = 42.20 cm Probe (in) Temp °C
System just critical 37.84" #1 = 24.2°C
Drain. 2 = 24.2°C



Now have an 21 X 22 array. With the 12th / 12th row removed in 2 directions. Total of ~~368~~ 352 rods.

1437 Water ht = 42.20 cm Probe (in) Temp °C
System sub critical 37.84" #1 = 24.2°C
Drain. 2 = 24.2°C

added 2 rods: total number of rods = ~~370~~ 352.

1448 Water ht = 42.20 cm Probe (in) Temp °C
System sub critical 37.84" #1 = 24.2°C
Drain. 2 = 24.2°C

added 16 rods: total of 368 rods. (checked) MF

Water ht = 42.20 cm Probe (in) Temp °C
3 Per 37.84" #1 = 24.2°C
C = -564.98 mc = -2.5 f 2 = 24.2°C

1517 Drain

over:

Removed 2 rods: total number of rods = 280.

Water ht = 42.20 cm Probe (in) Temp °c
2 + Per 37.84" #1 = 24.2°c
t = 156.46 sec = 6.9 f 2 = 24.2°c

1320 Water ht = 34.05 cm Probe (in)
System just @ 30" rods 30 cm. long
Drain. 2.050 cm. separation

18 x 20 array
7th & 14th row
removed in 2 direction

Removed 1 rod: and 9 rods removed from 1 face. & = 279.

1335 Water ht = 42.2 c total rods 279 Temp °c
System just over Page 246 log. #1 = 24.2°c
Drain. 2 = 24.2°c

added 1 rod. Total now 9.

Depleted Uranium
8.125" X 10.181" X 23.875"

304 S.S. Plate.
.250" X 10.181" X 18.599"

.627cm

$\Delta k = 6.1$ cm

Water ht = 42.20 cm

+ Per

E = 499.79 mv = 2.1 ϕ

Water ht = 36.10 cm

System just critical

Drain.

mp °C
= 29.2°C
= 29.2°C

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	$3X10^{-12}$	Meter ✓	9"	✓	$10X10^{-12}$
		Fast ✓	1"	✓	"
K-2	$3X10^{-12}$	Meter ✓	9"	✓	"
		Fast ✓	1	✓	"
PM-1	700 V	Alarm ✓	5"	✓	500 V
PM-2	1200 V	Low ✓	10"	✓	900 V
		Alarm ✓	2"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ___

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

2.050 cm separation a - a.
30 cm length.
130° rod.

START-UP CHECK LIST

Equipment checked by ±10°C Personnel check by E.D.C

Instruments and safeties checked and reset by AKK

Source in checked by AKK Source No. M-93

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

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

Red light on by AKK Time 0830

Start-up OK'd by E.D.C. AKK Date 2-28-73

Repeat of last run:

	Water ht = 42.20 cm	Probe (in)	Temp °C
	+ Per	37.84"	#1 = 23.7°C
	E = 521.52 mv = 2.3 ϕ		2 = 24.0°C
0913	Water ht = 36.00 cm	Probe (in)	
	System just critical	35.90"	
	Drain.		

Rods.

30" rods 30 cm long
2.050 cm separation c-c
21 X 22 array
with the 11th & 12th
rows removed in
2 directions.
Total rods - 369
Page 249 log.

added 1 rod. Total number of rods = 369.

$\Delta h = 6.1$ cm

Water ht = 42.20 cm	Probe (in)	Temp °C
9 + Per	37.84"	#1 = 29.2°C
E = 499.79 sec = 2.4¢		2 = 29.2°C
Water ht = 36.10 cm	Probe (in)	
System just critical	35.40	

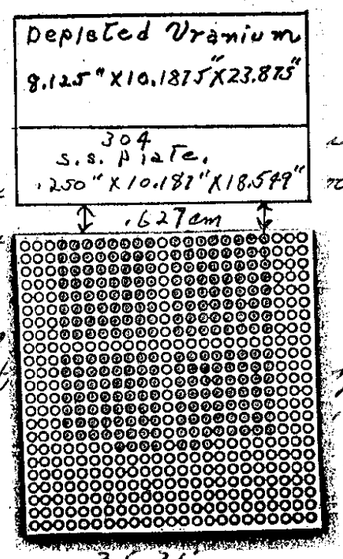
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP		SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3X10^-12	Meter	✓	4"	✓	10X10^-12
		Fast	✓	1"	✓	"
K-2	3X10^-12	Meter	✓	4"	✓	"
		Fast	✓	1	✓	"
PM-1	700 V	Alarm	✓	5"	✓	500 V
PM-2	1200 V	Low	✓	10"	✓	900 V
		Alarm	✓	2"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ___

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



Have an 17 X 17 array of
removed in 2 diff
removed from 1 row
Total of 247 rods.

$\Delta k = 6.5$ cm

Water lvl = 42.20 cm
2 + Per
$\rho = 693.19$ mm = 1.8 ¢
1040 Water lvl = 35.70 cm
System just critical
Drain

mp °C
= 24.0°C
= 24.0°C

Removed 1 rod. Total number of rods = 246.

11.00 Water lvl = 42.20 cm
3 - Per
$\rho = -299.89$ mm = -6.2 ¢
Drain

Probe (in)
37.84"

Temp °C
$t_1 = 24.0$°C
$t_2 = 24.0$°C

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-12}	Meter ✓	9"	✓	10×10^{-12}
		Fast ✓	1"	✓	"
K-2	3×10^{-12}	Meter ✓	9"	✓	"
		Fast ✓	1"	✓	"
PM-1	700 V	Alarm ✓	.5"	✓	500 V
PM-2	1200 V	Low ✓	10"	✓	900 V
		Alarm ✓	2"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ✓

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

START-UP CHECK LIST

Equipment checked by A.K.H. Personnel check by F.D.C.

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

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

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

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

Red light on by A.K.H. Time 1235

Start-up OK'd by F.D.C. A.K.H. Date 3-1-73

1 30" rods 30 cm long
2.050 cm. sep. - c-c
17X17 array with
the 9th row removed
in 2 directions
+ 9 rods removed
from 1 row.
Total rods 247
Page 250 log.

Have an 17X17 array, with the 9th row removed in 2 directions, with 9 rods removed from 1 row. (See diagram).
Total of 247 rods.

Δh = 6.5cm

Water ht = 42.20 cm Probe (in) Temp °C
2 + Per 37.84" #1 = 24.0°C
τ = 693.19 sec = 1.8¢ 2 = 24.0°C

1040 Water ht = 35.70 cm Probe (in)
System just critical 35.31"
Drain.

Removed 1 rod: Total number of rods = 246.

11:00 Water ht = 42.20 cm Probe (in) Temp °C
3 - Per 37.84" #1 = 24.0°C
τ = -299.89 sec = -6.2¢ 2 = 24.0°C
Drain

2.250 cm separation c-c,
30 cm length.
.30" rod.

Have an 17 X 17 array, with the 9th row removed from 2 directions: Total of 256 rods. Now have 1 pc .250" X 10.187" X 18.549" 50% B_4C boral plate on face of Depleted Uranium reflector. See diagram.

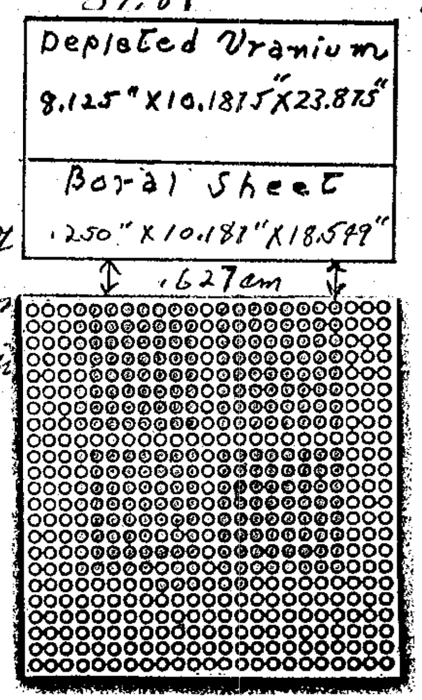
1305	Water ht = 42.20 cm	Probe (in)	Temp °C
	System sub critical	37.84"	#1 = 23.7°C
	Drain.		2 = 24.0°C

Added 4 rod to 1 face: Total of 260 rods.

	Water ht = 42.20 cm	Probe (in)	Temp °C
	Per	37.84"	#1 = 23.8°C
	N.G.		2 = 24.0°C
1328	Drain.		

Added 1 rod: Total of
Water ht = 42.20 cm
System just critical
Drain.

Temp °C
#1 = 23.8°C
2 = 24.0°C



Now have an 22 X 22 array, with the 11th & 12th row removed in 2 directions. With 16 rods removed from 1 face. See diagram. Total of 384 rods.

Water ht = 42.20 cm	Probe (in)	Temp °C
System sub critical	37.84"	#1 = 24.0°C
Drain.		2 = 24.0°C

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP		SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-12}	Motor	✓	4"	✓	10×10^{-12}
		Fast	✓	1"	✓	"
K-2	3×10^{-12}	Motor	✓	4"	✓	"
		Fast	✓	1"	✓	"
PM-1	700 V	Alarm	✓	.5"	✓	500 V
PM-2	1200 V	Low	✓	10"	✓	900 V
		Alarm	✓	2"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ___

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

2.250 cm separation c-c.
30 cm length.
.305" rod.

Have an 17 X 17 array, with the 9th row removed from 2 directions: total of 256 rods. Now have 1 pc .250" X 10.187" X 18.549" 50% B_4C bond plate on face of depleted Uranium reflector. See diagram.

1305 Water ht = 42.20 cm | 17X17 array with 9th row removed in 2 directions, Have 1 Pc .250" X 10.187" X 18.549" 50% B_4C bond plate on face of depleted Uranium reflector | Temp °C
System sub critical | | = 23.7°C
Drain. | | = 24.0°C

Added 4 rod to 1 pc ... rods.

Water ht = 42.20 cm | total rods 261 | Temp °C
1 - Per | | #1 = 23.8°C
N.G. | | 2 = 24.0°C
1328 Drain.

Added 1 rod: total of 261 rods.

Water ht = 42.20 cm	Probe (cir.)	Temp °C
System just critical	37.84.	#1 = 23.8°C
Drain.		2 = 24.0°C

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKL

Source in checked by RKL Source No. M-43

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

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

Red light on by RKL Time 0810

Start-up OK'd by I.D.C. RKL Date 3-2-73

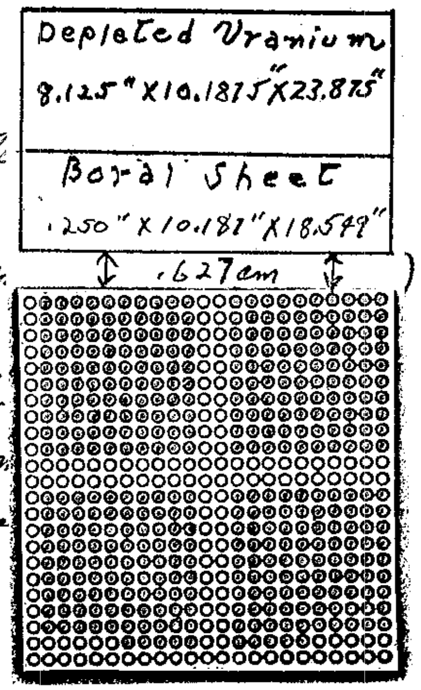
2.05 cm separation c-c.
30 cm length.
.30" rods.

Added 4 rods: Total of 388 rods.

Water ht = 42.20 cm Probe (in) Temp °C
1 -Per 37.84" #1 = 23.7°C
N.G 2 = 24.0°C
0905 Drain

Added 2 rods: Total
ΔL = 5.5cm

Water ht = 42.20 c Temp °C
2 +Per #1 = 23.2°C
τ = 1043.04 sec = 1.2¢ 2 = 23.2°C
0940 Water ht = 36.10 cm
System just critical
Drain.



Removed 1 rod: Total of 389 rods:

Water ht = 42.20 cm Probe (in) Temp °C
3 -Per 37.84" #1 = 23.7°C
τ = -260.76 sec = -5.9¢ 2 = 23.7°C
10:00 Drain

Now have an 19 X 20 array. ~~Total~~ With the 7th + 14th row removed in 2 directions. Total of 300 rods. See diagram.

Water ht = 42.20 cm Probe (in) Temp °C
4 +Per 37.84" #1 = 24.0°C
τ = 56.50 sec = 15.1¢ 2 = 24.0°C
1344 Water ht = 32.75 cm Probe (in)
System just critical 34.08"
Drain.

ave.

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKH

Source in checked by RKH Source No. M-4-3

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

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

Red light on by RKH Time 0810

Start-up OK'd by I.D.C. .130" rods 30 cm long ; 3
2.05 cm. 2.050 cm. separation
30 cm l 22 X 22 array with
.130" rods

added 4 rods: Le 11th + 12th rows ? removed in 2 direction with 10 rods removed

Water ht = 42.2 cm from 1 face
Total rods 390
Page 254 log

1 - Per

N.G

0905 Drain

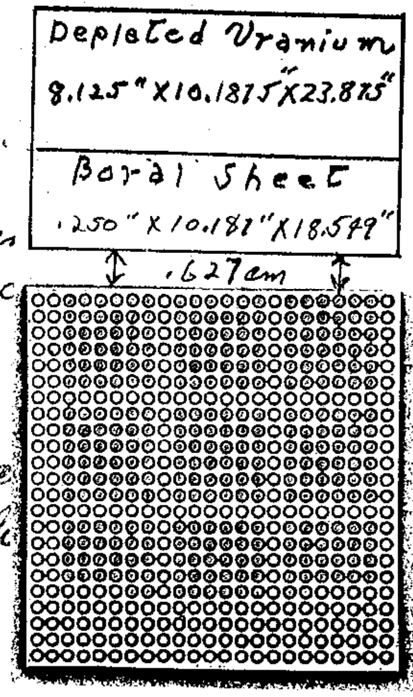
Temp °C
#1 = 23.7°C
2 = 24.0°C

added 2 rods: total of 390 rods.

$\Delta \ell = 5.5$ cm

Water ht = 42.20 cm Probe (in) 37.84" Temp °C
2 + Per
τ = 1043.04 sec = 1.2¢ #1 = 23.2°C
2 = 23.2°C

0940 Water ht = 36.70 cm Probe (in) 35.73"
System just critical
Drain.



Removed 7 rods: [illegible]

$\Delta h = 1.5$ cm

Water ht = 42.2[illegible]

5 - Rs

C = 262.93 ¢ = 4.4¢

Temp °C

#1 = 24.0°C

2 = 24.0°C

1406 Water ht = 34.10 c[illegible]

System just criti[illegible]

Drain.

Removed 1 rod: Total of 297 rods.

Water ht = 42.20 cm   Probe (in) 37.84"   Temp °C

6 - Ps

#1 = 23.7°C

C = -608.44 ¢ = -2.0¢

2 = 23.7°C

1429 Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP		SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3X10^-12	Meter	✓	4"	✓	10X10^-12
		Fast	✓	1"	✓	"
K-2	3X10^-12	Meter	✓	4"	✓	"
		Fast	✓	1"	✓	"
PM-1	700 U	Alarm	✓	.5"	✓	500 U
PM-2	1200 U	Low	✓	10"	✓	900 U
		Alarm	✓	2"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ___

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

START-UP CHECK LIST

Equipment checked by RKW (F.P.C.)   Personnel check by F.P.C.

Instruments and safeties checked and reset by RKW

Source in checked by RKW   Source No. M-43

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

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

Red light on by RKW   Time 0915

Start-up OK'd by F.P.C. RKW   Date 3-6-73

Removed 7 rods. Total of 298 rods.

$\Delta h = 7.5$ cm

Water Alt = 42.20 cm Probe (in) Temp °C
5 + Pos 37.89" #1 = 24.0°C
Σ = 262.93 mm = 4.9 ℓ 2 = 24.0°C

1906 Water Alt = 34.70 cm Probe (in)
System just critical 34.88"
Drain.

Removed 1 rod. Total of 297 rods.

Water Alt = 42.20 cm Probe (in) Temp °C
6 - Pos 37.89" #1 = 23.7°C
Σ = -608.44 mm = -8.0 ℓ 2 = 23.7°C

1929 Drain.

2.050 cm spacing c-c.
30 cm length.
.30" rods.

Have an 14-X15-1 array. Total of 203 rods.

0930 Water Lt = 43.20 cm Probe (in) Temp °c
System sub critical 37.84" #1 = 24.0°c
Drain. 2 = 24.0°c

added 7 rods. Now have an 14X15 array.
Total of 210 rods.

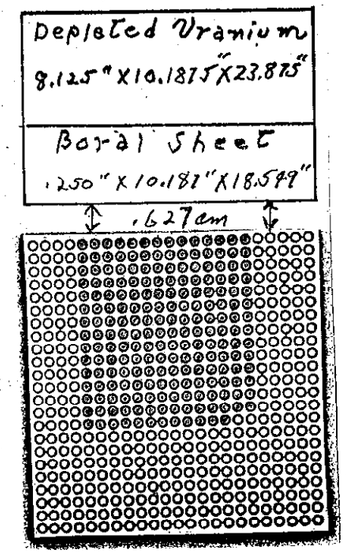
Water Lt = 33.00 cm Probe (in) Temp °c
+Per 33.93" #1 = 24.0°c
Δ = 80.92 mm = 11.0¢ 2 = 24.0°c
Water Lt = 31.75 cm Probe (in)
System just critical 33.70"
0955 Drain.

Removed 3 rods from face. Total of 207 rods.

Water Lt = 42.40 cm Probe (in) Temp °c
2-Per 37.~~84~~85" #1 = 24.0°c
Δ = -402.00 mm = -3.6¢ 2 = 24.0°c
1012 Drain

added 1 rod. Total of 208 rods.

Δ1 = 8.25 cm
Water Lt = 42.30 cm Probe (in) Temp °c
3 +Per 37.85 #1 = 24.0°c
Δ = 150.11 mm = 7.0¢ 2 = 24.0°c
1041 Water Lt = 33.95 Probe (in)
System just critical 34.55"
Drain.



added 1 rod. Total of
$\Delta h = 8.25$ cm
Water ht = 42.30 cm
3 + Per
$T = 152.11$ sec $= 7.04$
1041 Water ht = 33.95
System just critical
Drain.

.30" rods 30 cm long
2.050 cm. sep. c-c
14 X 15 array
with 2 rods removed in 15th row
Total rods 208
Page 259 log.

Temp °C
= 24.0 °C
= 24.0 °C

INSTRUMENT CHECK

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

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ___

RADIATION ALARM: A ___ B ___ C ___ SOURCE NUMBER [illegible]

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKK

Source in checked by AKK Source No. M-93

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

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

Red light on by AKK Time 1320

Start-up OK'd by I.D.C. AKK Date 3-7-73

2.050 cm separation c-c.
30 cm length.
.130" rad.

Have an 23 x 23 array, with the .250" bond sheet centered in array. Have 14 rods removed from 1 row, (on face). Total of 492 rods.

1405 Water lvl = 21.50 cm — Temp °C
System just critical — #1 = 24.0°C
Drain — 2 = 24.2°C

Removed 30 rods. Now have an 22 x 22 array, with the bond plate centered in 12th row. Total of 462 rods.

1425 Water lvl = 23.30 cm — Temp °C
System just critical — #1 = 24.2°C
Drain. — 2 = 24.2°C

Removed 42 rods. Now have an 21 x 21 array, with the bond plate centered in 12th row. Total of 420 rods.

1446 Water lvl = 24.80 cm — Temp °C
System just critical — #1 = 24.2°C
Drain. — 2 = 24.2°C

Removed 40 rods. Now have an 20 X 20 array, with the bord sheet centered in 12 th row. Total of 380 rods.

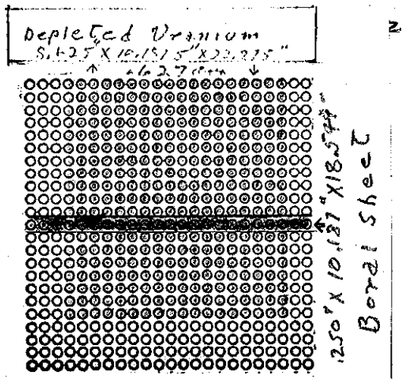
1507 Water Ht = 26.30 cm — Temp °c
System just critical — #1 = 24.2°c
Drain. — 2 = 24.2°c

Removed 38 rods. Now have an 19X19 array, with the bord sheet centered in 12 th row. Total of 342 rods.

1530 Water Ht = 28.70 cm — Temp °c
System just critical — #1 = 24.3°c
Drain. — 2 = 24.3°c

Removed 18 rods. Now have an 18 X 19 array, with the bord sheet centered in the 12 th row. Total of 324 rods.

1550 Water Ht = 42.20 cm — Probe (in) — Temp °c
System just critical — 37.84" — #1 = 24.3°c
Drain — 2 = 24.3°c



INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-12}	Meter ✓	9"	✓	10×10^{-12}
		Fast ✓	1"	✓	"
K-2	3×10^{-12}	Meter ✓	9"	✓	"
		Fast ✓	1"	✓	"
PM-1	700 ✓	Alarm ✓	.5"	✓	500 ✓
PM-2	12000 ✓	Low ✓	10"	✓	9000 ✓
		Alarm ✓	2"	✓	"

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

Removed 18 rods. Now have an 18 X 19 array, with the borel ... the
12 th row. Tota...

30" rods 30 cm long
2.050 cm. sep. c-c
18 X 19 array with
boral sheet centered
in 12th row.
Total rods 324
Page 263

1550 Water ht = 42.20 ... Temp °C
System just crit ... 1 = 24.3°C
Drain. ... 2 = 24.3°C

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP		SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-12}	Meter	✓	4"	✓	10×10^{-12}
		Fast	✓	1"	✓	"
K-2	3×10^{-12}	Meter	✓	4"	✓	"
		Fast	✓	1"	✓	"
PM-1	700 v	Alarm	✓	.5"	✓	500 v
PM-2	1,200 v	Low	✓	10"	✓	900 v
		Alarm	✓	2"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ____

RADIATION ALARM: A ✓ B ✓ C ✓ SOURCE NUMBER B-8 ...

2.050 cm separation c-c.
30 cm length.
30 rods.

START-UP CHECK LIST

Equipment checked by I.V.C BKH Personnel check by E.D.C.

Instruments and safeties checked and reset by BKH

Source in checked by BKH Source No. M-43

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

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

Red light on by BKH Time 0820

Start-up OK'd by E.D.C. BKH Date 3-8-73

Repeat of last run:

0859 Water lvl = 42.20 cm Probe (in) Temp °c
System just critical 37.84" #1 = 24.0°c
Drain. 2 = 24.2°c

Have an 18 X 19 array, with the boral sheet centered in the 13th row. Total of 329 rods.

1002 Water lvl = 27.15 cm Temp °c
System just critical #1 = 24.2°c
Drain. 2 = 24.2°c

Removed 18 rods: Now have an 18 X 18 array, with the boral sheet centered in the 13th row. Total of 306 rods.

1020 Water lvl = 27.70 cm Temp °c
System just critical #1 = 24.2°c
Drain. 2 = 24.2°c

Removed 34 rods: Now have an 17 X 17 array, with the boral sheet centered in the 13th row. Total of 272 rods.

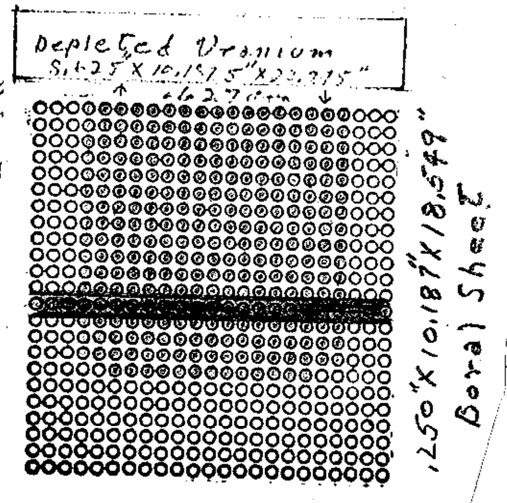
Water lvl = 42.20 cm Probe (in) Temp °c
+ Rer 37.84" #1 = 24.2°c
L = 228.16 cm = 5.0 f 2 = 24.2°c

1053 Water lvl = 35.80 cm Probe (in)
System just critical 35.38"
Drain.

ees:

Removed 4 rods f... ...8 rods.

$\Delta L = 4.3$...



Water ht = 42.20 cm		...°C
[2] + Per.		...24.2°C
τ = 869.20 sec = 1.4¢		...24.2°C

1315 Water ht = 37.85
System just critical
Drain.

Removed 1 rod: Total of 267 rods.

Water ht = 42.20 cm	Probe (in)	Temp °C
[3] − Per	37.84"	#1 = 24.2°C
τ = −1260.34 sec = −1.1¢		2 = 24.2°C

1535 Drain.

Now have an 15 X 16 array, with the boral sheet centered in the 14th row. Total of 224 rods.

Water ht = 42.20 cm	Probe (in)	Temp °C
[4] + Per	37.84"	#1 = 24.2°C
τ = 706.22 sec. = 1.7¢		2 = 24.2°C
1515 Water ht = 36.10 cm	Probe (in)	
System just critical	35.46"	

Drain.

Removed 2 rods from 1 face: Total of 222 rods.

Water ht = 42.20 cm	Probe (in)	Temp °C
[5] − Per	37.84"	#1 =
τ = −977.85 sec. = −1.4¢		2 =

1530 Drain.

over.

.30" rods 30 Cm. length
2.050 Cm. separation c-c
17 X 17 array with
lead sheet in the
13th row - and
4 rods removed on
1 face
Total rods 268

Page 266 bo[illegible]

Removed 4 rods from 1 face. Total of 268 rods.

$\Delta L = 4.35$ cm

Water ht = 42.20 cm Probe (in) Temp °c

2 + Per. 37.84 #1 = 24.2°c

τ = 869.20 sec = 1.4¢ 2 = 24.2°c

1315 Water ht = 37.85 Probe (in)

System just critical 36.16"

Drain.

Removed 1 rod: Total of 267 rods.

Water ht = 42.20 cm Probe (in) Temp °c

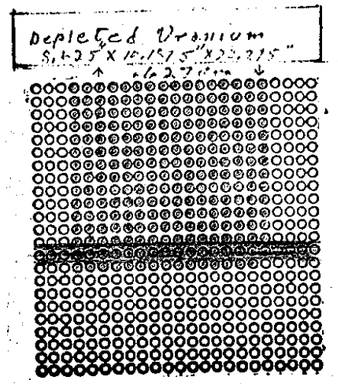
3 - Per 37.84" #1 = 24.2°c

τ = -1260.34 sec = -1.1¢ 2 = 24.2°c

1535 Drain.

Added 1 rod. Total number of rods = 223.

1542 Water lvl = 42.20 cm Probe (in) Temp °C
System just critical 37.84" #1 = 24.3°C
Drain. 2 = 24.3°C



INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-12}	Meter ✓	4"	✓	10×10^{-12}
		Fast ✓	1"	✓	"
K-2	3×10^{-12}	Meter ✓	4"	✓	"
		Fast ✓	1"	✓	"
PM-1	700 ✓	Alarm ✓	.5"	✓	500 ✓
PM-2	1200 ✓	Low ✓	10"	✓	900 ✓
		Alarm ✓	1"	✓	"

LOG N CALIBRATE ___ OPERATE ✓ DUMP WELL PROBE LIGHT ___

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

START-UP CHECK LIST

Equipment checked by R.K.A. Personnel check by I.D.C

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

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

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

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

Red light on by R.K.A. Time 0820

Start-up OK'd by I.D.C. R.K.A. Date 3-9-73

Repeat of last run:

0847 Water lvl = 42.20 cm Probe (in) Temp °C
System just critical 37.84" #1 = 24.2°C
Drain. 2 = 24.2°C

Now have an 13 X 16 array, with the boral sheet centered in the 15th row. (See diagram)
Total of 208 rods.

Water lvl = 30.10 cm Probe (in) Temp °C
+ Per 33.12" #1 = 24.5°C
I = 110.82 mm = 9.1 f 2 = 24.5°C
Water lvl = 29.85 cm Probe (in)
System just critical 32.98"
Drain.

dcm

Added 1 rod — 130" rods 30 cm long = 223.
2.050 cm. separation c-c

1542 Water ht = System for Drain. — 15 X 16 array with bond sheet centered in 14th row - and 1 rod removed from 15th row - total rods 223

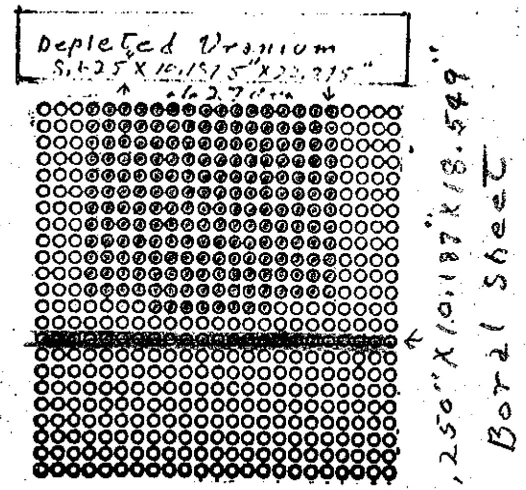
Temp °C
#1 = 24.3 °C
2 = 24.3 °C

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP		SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-12}	Meter	✓	4"	✓	10×10^{-12}
		Fast	✓	1'	✓	"
K-2	3×10^{-12}	Meter	✓	4"	✓	"
		Fast	✓	1"	✓	"
PM-1	700 V	Alarm	✓	.5"	✓	500 V
PM-2	1200 V	Low	✓	10'	✓	900 V
		Alarm	✓	1"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ____

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



Removed 8 rods. ... 200 rods.

Water ht = 42.2c ... Temp °c
2 + Per ... = 24.5°c
T = 1673.21 sec = .8¢ ... = 24.5°c
1027 Water ht = 38.8
System just critical
Drain.

Removed 1 rod: Total of 199 rods.

Water ht = 42.20 cm Probe (in) Temp °c
3 - Per 37.84" #1 = 24.7°c
T = -176.01 sec = -9.7¢ 2 = 24.7°c
1300 Drain:

Now have an 18 X 19 array, with the boral sheet centered in 11-th row. Total of 324 rods.

Water ht = 42.20 cm Probe (in) Temp °c
System sub-critical 37.84" #1 = 24.7°c
Drain 2 = 24.7°c

Added 18 rods: Now have an 19 X 19 array, with the boral sheet centered in 11 th row. Total of 342 rods.

1443 Water ht = 42.20 cm Probe (in) Temp °c
System sub-critical 37.84" #1 = 24.7°c
Drain. 2 = 24.7°c

Added 19 rods: Now have an 19 X 20 array with the boral sheet centered in the 11 th row. Total of 361 rods.

Water ht = 31.60 cm Probe (in) Temp °c
4 + Per 33.71" #1 = 24.7°c
T = 126.03 sec = 8.2¢ 2 = 24.7°c
1522 Water ht = 31.25 cm Probe (in)
System just critical 33.51"
Drain.

Removed 10 rods: Total of 351 rods.

Water ht = 42.30 cm Probe (in) Temp °c
5 - Per 37.84" #1 = 24.7°c
T = -438.95 sec = -3.2¢ 2 = 24.7°c
1546 Drain.

270

30" rods 30 cm. long.
2.050 cm. separation c-c
13 X 16 array with
boral sheet centered in
15th row. Have 8 rods
removed from 1 face

Removed 8 rods from 1 face. Total of 200 rods.

Δh = 3.4 cm.

Water lvl = 42.20 cm Probe (in) Temp °c
2 + Per 37.84" #1 = 24.5°c
C = 1673.21 cm = .8ϕ 2 = 24.5°c 144
1027 Water lvl = 38.80 cm Probe (in)
System just critical 36.53
Drain.

Removed 1 rod. Total of 199 rods.

Water lvl = 42.20 cm Probe (in) Temp °c
3 - Per 37.84" #1 = 24.7°c
C = -176.01 cm = -.9ϕ 2 = 24.7°c
1300 Drain:

152

Now have an 18 X 19 array, with the boral
sheet centered in 11th row. Total of 324 rods.

Water lvl = 42.20 cm Probe (in) Temp °c
System sub critical 37.84" #1 = 24.7°c
Drain 2 = 24.7°c

154

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP		SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3X10⁻¹²	Meter	✓	4"	✓	10 X10⁻¹²
		Fast	✓	1"	✓	"
K-2	3X10⁻¹²	Meter	✓	4"	✓	"
		Fast	✓	1"	✓	"
PM-1	700 mr	Alarm	✓	.5'	✓	500 mr
PM-2	1200 mr	Low	✓	10"	✓	900 mr
		Alarm	✓	1"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ___

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

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKAl

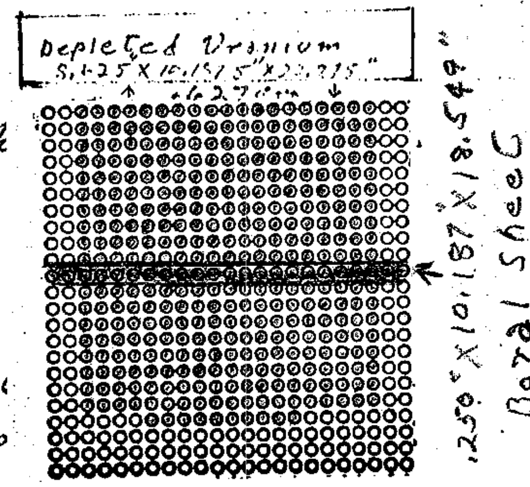
Source in checked by RKAl Source No. M-43

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

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

Red light on by RKAl Time 0815

Start-up OK'd by E.D.C., RKAl Date 3-12-73



added 1 rod: T[illegible]

$\Delta\lambda = 6$

Water ht = 42.10 [illegible] 24.2°C

+Per 24.2°C

τ = 325.95 sec = 3.[illegible] 24.2°C

0857 Water ht = 36.00

System just critical 36.41

Drain.

Have an 19X20 array, with 9 rods removed from 1 face. Have the boral sheet centered in the 10th row. Total of 352 rods.

1023 Water ht = 42.20 cm	Probe (in)	Temp °C
System sub critical	37.84"	#1 = 24.2°C
Drain.		2 = 24.2°C

added 3 rods: Total of 355 rods.

Water ht = 42.20 cm	Probe (in)	Temp °C
2 -Per	37.84"	#1 = 24.2°C
τ = -113.0 sec = -20.2¢		2 = 24.2°C

1045 Drain.

over

30" rods 30cm. long
2.050 cm separation c-c
19 X 20 array with
boral sheet centered
in 11th row.
Total rods 352
Page 273 log

added 1 rod. Total of 352 rods.

$\delta k = 6.1$ cm

Water ht = 42.10 cm Probe (in) Temp °c
+Per 37.84" #1 = 24.2°c
τ = 325.95 sec = 3.6 ℓ 2 = 24.2°c
0857 Water ht = 36.00 cm Probe (in)
~~System~~ just critical 35.41"
Drain.

Have an 19 X 20 array, with 9 rods removed from 1 face. Have the boral sheet centered in the 10 th row. Total of 352 rods.

1023 Water ht = 42.20 cm Probe (in) Temp °c
~~System~~ sub critical 37.84" #1 = 24.2°c
Drain. 2 = 24.2°c

added 3 rods: Total of 355 rods.

Water ht = 42.20 cm Probe (in) Temp °c
2 -Per 37.84" #1 = 24.2°c
τ = 113.0 sec = 20.2 ℓ 2 = 24.2°c
1045 Drain.

over

added 1 rod: Total of 356 rods.

Water ht = 42.20 cm Probe (in) Temp °C
3-Per 37.84 #1 = 24.2°C
E = -143.42 mm = 13.0¢ 2 = 24.2°C

1106 Drain.

added 1 rod: Total of 357 rods.

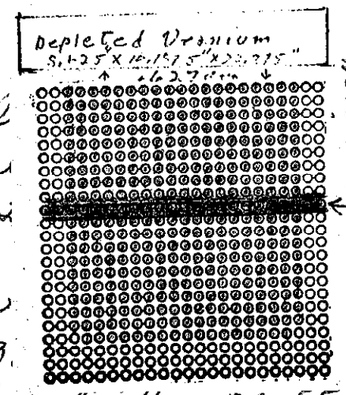
Water ht = 42.20 cm Probe (in) Temp °C
4-Per 37.84" #1 = 24.2°C
E = -202.09 mm = -8.1 2 = 24.2°C

1300 Drain:

added 1 rod: Total of 358 rods.

Water ht = 42.20 cm Probe (in) Temp °C
5-Per 37.84" #1 = 24.5°C
E = -300.72 mm = -4.0¢ 2 = 24.5°C

1320 Drain



added 1 rod

Water ht = 4
6+Per
E = 2259.92 mm
1350 Water ht = 3.
System just critical 36.55
Drain.

Have an 19 x 20 array, with 2 rods removed from 1 face. Have boral sheet centered in the 9 el row. Total of 359 rods.

Water ht = 29.70 cm Probe (in) Temp °C
7+Per 32.98" #1 = 24.5°C
E = 54.32 mm = 15.5¢ 2 = 24.5°C

1458 Water ht = 29.45 cm Probe (in)
System just critical 32.80
Drain.

Removed 10 rods. Total of 349 rods.

Water ht = 42.20 cm Probe (in) Temp °C
8-Per 37.84" #1 = 24.2°C
E = -160.80 mm = -11.0¢ 2 = 24.2°C

1517 Drain.

19 x 20 array with Boral sheet centered in 10th row.

Total rods 359

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added 1 rod. Total 359 rods.

$\Delta h = 3.3$ cm

Water ht = 42.20 cm Probe (in) Temp °C

6 + Per 37.84" #1 = 24.5°C

C = 2259.92 nn = .6 ¢ 2 = 24.5°C

1350 Water ht = 38.90 cm Probe (in)

System just critical 36.55

Drain.

Have an 19 x 20 array, with 2 rods removed from 1 face. Have Boral sheet centered in the 9th row. Total of 359 rods.

Water ht = 29.70 cm Probe (in) Temp °C

7 + Per 32.98" #1 = 24.5°C

C = 54.32 nn = 15.5 ¢ 2 = 24.5°C

1458 Water ht = 29.45 cm Probe (in)

System just critical 32.80

Drain.

Removed 10 rods. Total of 349 rods.

Water ht = 42.20 cm Probe (in) Temp °C

8 - Per 37.84" #1 = 24.2°C

C = -160.80 nn = -11.0 ¢ 2 = 24.2°C

1517 Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIPS		SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-12}	Meter	✓	4"	✓	10×10^{-12}
		Fast	✓	4"	✓	"
K-2	3×10^{-12}	Meter	✓	4"	✓	"
		Fast	✓	1"	✓	"
PM-1	7000	Alarm	✓	15"	✓	500
PM-2	1200	Low	✓	10"	✓	900
		Alarm	✓	1"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ___

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

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKH

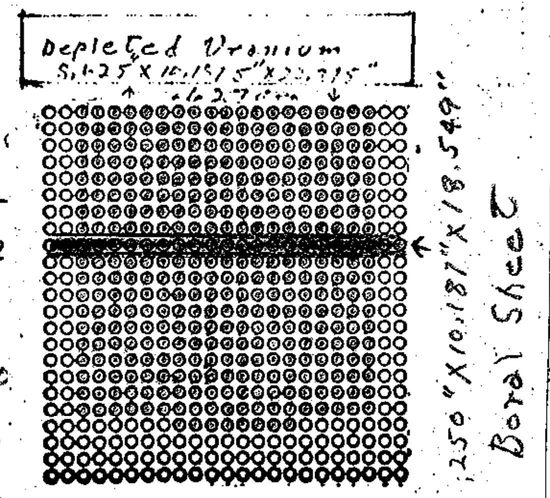
Source in checked by AKH Source No. M-43

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

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

Red light on by AKH Time 0815

Start-up OK'd by I.A.C. AKH Date 3-13-73



added 1 rod.

Water ht = 42.2 … Temp °C

+Per … #1 = 24.2°C

τ = 630.17 sec = 2.0 … 2 = 24.2°C

0917 Water ht = 36.

System just cr…

Drain.

Now have an 19 X 18 array; Have boral sheet centered in the 8th row. Total of 342 rods.

Water ht = 33.80 cm Probe (in) Temp °C

+Per 34.56" #1 = 24.3°C

τ = 110.82 sec = 9.1¢ 2 = 24.3°C

1021 Water ht = 32.60 cm Probe (in)

System just critical 34.04"

Drain.

Removed 4 rods from face; Total of 338 rods.

Water ht = 42.20 cm Probe (in) Temp °C

−Per 37.84" #1 = 24.5°C

τ = −289.01 sec = −5.2¢ 2 = 24.5°C

1052 Drain

19 X 20 array with Boral sheet centered in 9th row. and 11 rods removed from 1 face
+ total rods 350
Page 277 log.

277

added 1 rod. Total of 350 rods.

$\sigma_1 = 5.5$ cm

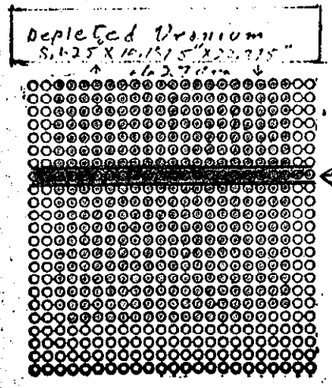
Water ht = 42.20 cm Probe (in) Temp °C
1 + Per 37.84" #1 = 24.2°C
ε = 630.17 mm = 2.0 ¢ 2 = 24.2°C
0917 Water ht = 36.70 cm Probe (in)
System just critical 35.69"
Drain.

Now have an 19 X 19 array. Have boral sheet centered in the 9th row. Total of 342 rods.

Water ht = 33.80 cm Probe (in) Temp °C
2 + Per 34.56" #1 = 24.3°C
ε = 110.82 mm = 9.1 ¢ 2 = 24.3°C
1021 Water ht = 32.60 cm Probe (in)
System just critical 34.04"
Drain.

Removed 4 rods from face: Total of 338 rods.

Water ht = 42.20 cm Probe (in) Temp °C
3 - Per 37.84" #1 = 24.5°C
ε = -289.01 mm = -5.2 ¢ 2 = 24.5°C
1052 Drain



added 1 rod

Water ht = 42

+Per

C = 1173.42 mm =

Water ht = 3

System just critical

Drain.

Temp °

= 24.5°C

= 24.5°C

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3X10⁻¹²	Meter ✓	4"	✓	10X10⁻¹²
		Fast ✓	1"	✓	"
K-2	3X10⁻¹²	Meter ✓	4"	✓	"
		Fast ✓	1"	✓	"
PM-1	700 ✓	Alarm ✓	.5"	✓	500 ✓
PM-2	1200 ✓	Low ✓	10"	✓	900 ✓
		Alarm ✓	1"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ___

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

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKK

Source in checked by RKK Source No. M-43

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

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

Red light on by RKK Time 0840

Start-up OK'd by I.D.C. RKK Date 3-14-73

Repeat of last run:

Water ht = 42.20 cm Probe (in) Temp °C

+Per. 37.84" #1 = 24.3°C

C = 386.79 mm = 3.1 ϕ #2 = 24.5°C

0930 Water ht = 35.70 cm Probe (in)

System just critical 35.33"

Drain.

Now have an 18X19 array, with the boral sheet centered in the 7-th row. Total of 323 rods.

Water ht = 42.20 cm Probe (in) Temp °C

System sub critical 37.84" #1 = 24.5°C

1039 Drain. #2 = 24.5°C

19 X 19 array with borated sheet centered in 8th row. Have 3 rods removed on 1 face

total rods 339

added 1 rod: total of 339 rods.

Δh = 3.8 cm

Water ht = 42.20 cm Probe (in) Temp °C

+ Per 37.84" #1 = 24.5 °C

2 = 24.5 °C

t = 1173.42 sec = 1.14

Water ht = 38.40 cm Probe (in)

System just critical 36.33"

Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP		SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3x10⁻¹²	Meter	✓	4"	✓	10x10⁻¹²
		Fast	✓	1"	✓	"
K-2	3x10⁻¹²	Meter	✓	4"	✓	"
		Fast	✓	1"	✓	"
PM-1	700V	Alarm	✓	.5"	✓	500V
PM-2	1200V	Low	✓	10"	✓	900V
		Alarm	✓	1"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ____

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

added 4 rods: Total of 327 rods.

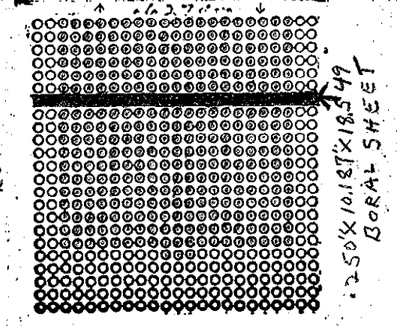
Water Lvl = 33.60 cm Probe (in) — Temp °C
+Per — 34.10" — #1 = 24.3°C
C = 63.02 rem = 13.9¢ — 2 = 24.3°C
1105 Water Lvl = 31.50 cm Probe (in)
System just critical — 33.61"
Drain

Removed 2 rods: Total of 325 rods.

Water Lvl = 42.20 cm Probe (in) — Temp °C
3-Per — 37.84" — #1 = 24.5°C
C = -286.84 rem = -5.3¢ — 2 = 24.5°C
1256 Drain.

added 1 rod: Total of 326 rods.

Δh = 8.9 cm
Water Lvl = 42.20 cm — Depleted Uranium 5.125 X 10.125" X 23.975" — 0
4+Per — 4.5°C
C = 86.92 sec: = 11.0¢ — 4.5°C
1320 Water Lvl = 33.40 cm
System just Critical
Drain.



INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	$3X10^{-12}$	Meter ✓	5"	✓	$10X10^{-12}$
		Fast ✓	5"	✓	"
K-2	$3X10^{-12}$	Meter ✓	5"	✓	"
		Fast ✓	5"	✓	"
PM-1	7000	Alarm ✓	5"	✓	500 ✓
PM-2	12000	Low ✓	10"	✓	900 ✓
		Alarm ✓	2"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ___

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

START-UP CHECK LIST

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

Instruments and safeties checked and reset by BHH

Source in checked by BHH Source No. M-43

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

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

Red light on by BHH Time 0845

Start-up OK'd by I.D.C. BHH Date 3-16-73

added 4 rods: Total of 327 rods.

Water ht = 33.60 cm Probe (in) Temps °C
4 + Per 34.10" #1 = 24.3°C
C = 63.02 sec = 13.9 k 2 = 24.3°C
1105 Water ht = 31.50 cm Probe (in)
System just critical 33.61"
Drain

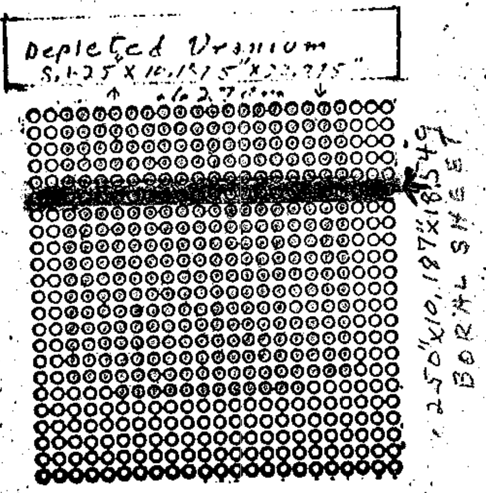
Removed 2 rods: Total of 325 rods.

Water ht = 42.20 cm Probe (in) Temps °C
3 - Per 24.5°C
C = -286.84 sec = -5. 18 X 19 array with 24.5°C
1256 Drain. lead shut centred
in 7th row.
added 1 rod: Total total rods 326
Δh = 8.4 c Page 260 log
Water ht = 42.20 c
4 + Per 37.84" #1 = 24.5°C
C = 86.92 sec: = 11.0 k 2 = 24.5°C
1320 Water ht = 33.40 cm Probe (in)
System just critical 34.34"
Drain.

Now have an 18 X 18 array, with the boral plate centered in 6th row. Total of 306 rods.

Water ht = 30.50 cm Probe (in) Temp °C
1 +Per 33.30" #1 = 24.3°C
τ = 84.75 sec = 11.2¢ 2 = 24.3°C
0935 Water ht = 30.20 cm Probe (in)
System just critical 33.13"
Drain.

Removed 6 rods. α

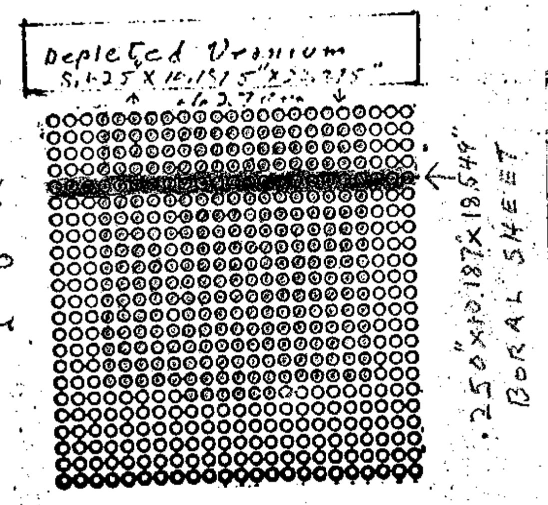


Δh = 8.7 cm
Water ht = 42.20 cm °C
2 +Per -24.5°C
τ = 97.78 sec = 10.0¢ 24.5°C
1030 Water ht = 33.50 cm
System just critic
Drain.

Removed 1 rod: Total of 299 rods.
Water ht = 42.30 cm Probe (in) Temp °C
3 −Per 37.84" #1 = 24.3°C
τ = −782.28 sec = −1.7¢ 2 = 24.3°C
1045 Drain.

Now have an 17 X 17 array, with the boral plate centered in the 5th row. Total of 272 rods.
1304 Water ht = 42.20 cm Probe (in) Temp °C
System sub critical 37.84" #1 = 24.5°C
Drain 2 = 24.5°C

added 6 rods to 1 face. Total of 278 rods.



Δh = 9.6 cm
Water ht = 42.20 °C
4 +Per -24.7°C
τ = 56.50 sec = 15.1¢ -24.7°C
Water ht = 32.60
System just cri
Drain.

Removed 1 rod: Total of 277 rods.

Water ht = 42.30 cm Probe (in) Temp °C
5 −Per 37.84" #1 = 24.7°C
τ = −2281.65 sec = −.6¢ 2 = 24.7°C
1356 Drain

Now have an 18 X 18 array, with the bond plate centered in 6th row. Total of 306 rods.

Water ht = 30.50 cm Probe (in) Temp °C
+Per 29.3°C
Σ = 84.75 mm = 11.2¢ 29.3°C
0935 Water ht = 30.20 cm
System just critical
Drain.

Removed 6 rods. d
Δ4 = 8.7 cm
Water ht = 42.20 cm Probe (in) Temp °C
2 +Per 37.84" #1 = 29.5°C
Σ = 97.78 mm = 10.0¢ 2 = 29.5°C
1030 Water ht = 33.50 cm Probe (in)
System just Critical 34.40"
Drain.

Removed 1 rod: Total of 299 rods.
Water ht = 42.30 cm Probe (in) Temp °C
3 - Per 37.84" #1 = 29.3°C
Σ = -782.28 mm. = -1.7¢ 2 = 29.3°C
1045 Drain:

Now have an 17 X 17 array, with the bond plate centered in the 5th row. Total of 272 rods.

1304 Water ht = 42.2
System sub crit
Drain

added 6 rod
Δ4 = 9.6 cm
Water ht = 42.20 cm
4 +Per
Σ = 56.50 mm = 15.1¢
Water ht = 32.60 cm Probe (in)
System just Critical 34.06"
Drain.

°C
29.5°C
29.5°C
8 rods.
°C
37.84" #1 = 29.7°C
2 = 29.7°C

Removed 1 rod: Total of 277 rods.

Water ht = 42.30 cm Probe (in) Temp °C
5 - Per 37.84" #1 = 29.7°C
Σ = -2281.65 mm = -.6¢ 2 = 29.7°C
1356 Drain

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP		SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3x10⁻¹²	Meter	✓	4"	✓	10x10⁻¹²
		Fast	✓	2"	✓	"
K-2	3x10⁻¹²	Meter	✓	4"	✓	"
		Fast	✓	2"	✓	"
PM-1	200V	Alarm	✓	.5"	✓	500V
PM-2	1200V	Low	✓	10"	✓	1200V
		Alarm	✓	2"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ___

RADIATION ALARM: A ✓ B ✓ C ✓ SOURCE NUMBER B-83

START-UP CHECK LIST

Equipment checked by I.O.C / RKW Personnel check by I.O.C

Instruments and safeties checked and reset by RKW

Source in checked by RKW Source No. 19-43

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

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

Red light on by RKW Time 0940

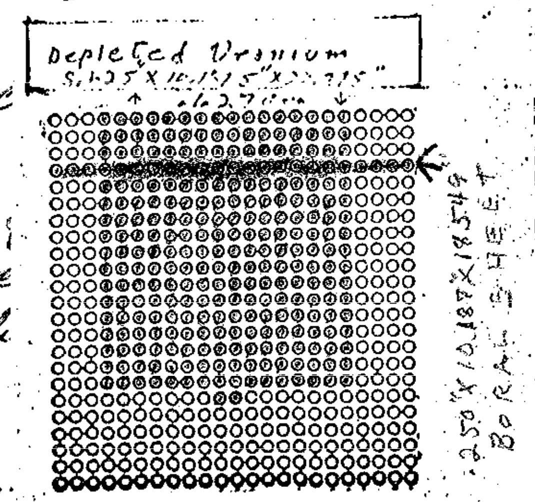
Start-up OK'd by I.O.C, RKW Date 3-19-73

Have an 16X17 array with the boral plate centered in the 4th row. Total of 256 rods.

Water ht = 42.20cm Probe (in) Temp °C
1-Per ~~38~~. 37.84 #1 = 24.2°C
N.G. 2 = 24.2°C
1010 Drain

added 2 rods to 1 face. Total of 258 rods.

δh = 8.9 cm



Water ht = 42.20c… …°C
2-Per …°C
τ = 89.09 sec = 10.8… …°C
1045 Water ht = 33.30c…
System just critic…
Drain.

Removed 1 rod: Total of 251 rods.
Water ht = 42.20cm Probe (in) Temp °C
3-Per 37.88" #1 = 24.0°C
τ = -278.14 sec = -5.44 2 = 24.0°C
1100 Drain

Have an 16X17 array, with the boral plate centered in the 4th row. Total of 256 rods.

Water ht = 42.2 — Probe (in) Temp °C
1-Per 24.2 °C
N.C. 24.2 °C
1010 Drain

16X17 array with boral sheet in 4th row
Total rods 258
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added 2 rod to ... rods.

δh = 8.9 cm
Water ht = 42.20 cm Probe (in) Temp °C
2-Per 37.84 #1 = 24.2 °C
τ = 89.09 sec = 10.8¢ 2 = 24.2 °C
1045 Water ht = 33.30 cm Probe (in)
System just critical 34.29"
Drain.

Removed 1 rod: Total of 257 rods;
Water ht = 42.20 cm Probe (in) Temp °C
3-Per 37.88" #1 = 24.0 °C
τ = -278.14 sec = -5.4¢ 2 = 24.0 °C
1100 Drain

Have an 16 X 16 array, with the bond sheet centered in 3rd row. Total of 240 rods.

1325 Water Ht = 42.20 cm Probe (in) Temp °C
System sub Critical 37.84" #1 = 24.2°C
Drain. 2 = 24.2°C

added 3 rods to 1 face. Total of 243 rods.

Water Ht = 42.20 cm Probe (in) Temp °C
4 - Per 37.84" #1 = 24.3°C
C = -793.14 cm = -1.7¢ 2 = 24.3°C

1348 Drain

added 1 rod. Total of 244 rods.

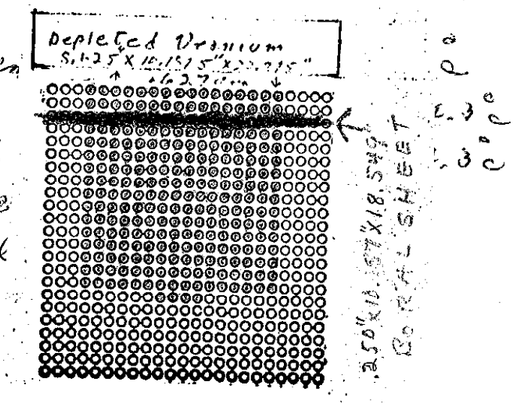
Δh = 9.7cm

Water Ht = 42.20 cm

5 Per

C = 54.32 cm = 15.5¢

1408 Water Ht = 32.50 cm
System just critical
Drain.



Have an 15 X 16 array with the bond sheet centered in the 2nd row. Total of 225 rods.

Water Ht = 42.20 cm Probe (in) Temp °C
6 - Per 37.84" #1 = 24.5°C
C = -154.28 cm = -11.7¢ 2 = 24.5°C

1530 Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-2}	Meter ✓	9"	✓	10×10^{-12}
		Fast ✓	2"	✓	"
K-2	3×10^{-12}	Meter ✓	9"	✓	"
		Fast ✓	2"	✓	"
PM-1	1000 v	Alarm ✓	5"	—	500 v
PM-2	1200 v	Low ✓	10"	✓	900 v
		Alarm ✓	2"	✓	"

LOG N CALIBRATE ___ OPERATE ✓ DUMP WELL PROBE LIGHT ___

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

Have an 16 X 16 array, with the bond sheet centered in 3rd row. Total of 240 rods.

1325 Water ht = 42.20 cm Probe (in) Temp °C
System sub critical 37.84" #1 = 24.2 °C
Drain. 2 = 24.2 °C

added 3 rod to 1 face. Total of 243 rods.

Water ht = 42.20 cm Probe (in) Temp °C
4 - Per [illegible].3 °C
τ = -793.14 sec = -1.7¢ [illegible].3 °C
1348 Drain

16 X 16 array with Bond sheet centered in 3rd row, 12 rods missing on 1 face. total rods 244 [illegible]

added 1 rod. To
Δh = 9.1 cm
Water ht = 42.20 cm
5 + Per 37.84" #1 = 24.3 °C
τ = 54.32 sec = 15.5¢ 2 = 24.3 °C
1408 Water ht = 32.50 cm Probe (in)
System just critical 33.99"
Drain.

START-UP CHECK LIST

Equipment checked by F.O.C / RKM Personnel check by RKM

Instruments and safeties checked and reset by RKM

Source in checked by RKM Source No. M-43

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

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

Red light on by RKM Time 0930

Start-up OK'd by F.O.C, RKM Date 3-20-73

added 1 rod to 1 face: total of 226 rods.

$\Delta h = 8.6$ cm

Water ht = 42.20 cm Probe (in) Temp °C

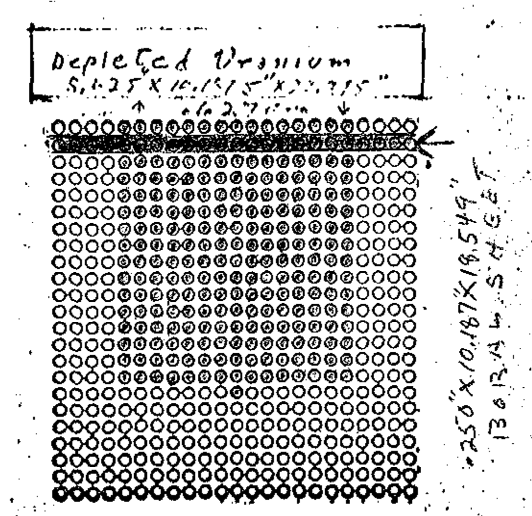
+Per 37.84" #1 = 24.2°C

τ = 123.86 sec = 8.3¢ 2 = 24.2°C

1055 Water ht = 33.60 cm Probe (in)

System just critical 34.43"

Drain



Now have an 14×15 array: with the boral sheet in 1st row; Have 4 rod removed from 1 face: total of 206 rods.

Water ht = 42.20 cm Probe (in) Temp °C

2-Per 37.84" #1 = 24.0°C

τ = −165.15 sec = −10.6¢ 2 = 24.2°C

1330 Drain:

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP		SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10⁻¹²	Meter	✓	4"	✓	10×10⁻¹²
		Fast	✓	2"	✓	"
K-2	3×10⁻¹²	Meter	✓	4"	✓	"
		Fast	✓	2"	✓	"
PM-1	700v	Alarm	✓	5"	✓	500v
PM-2	1200v	Low	✓	10"	✓	900v
		Alarm	✓	2"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ___

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

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKH

Source in checked by RKH Source No. M-83

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

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

Red light on by RKH Time 0930

Start-up OK'd by F.O.C. RKH Date 3-20-73

added 1 rod to 1 face: total of 226 rods.

$\Delta h = 8.6$ cm

Water ht = [illegible] (in) — Temp °C

+ Per — 15 X 17 array with — #1 = 24.2 °C

[illegible] centered — 2 = 24.2 °C

τ = 123.86 sec — in 3rd row, and

1055 Water ht = — 14 rods missing in

System just — 1 row

Drain

Total rods 226

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START-UP CHECK LIST

Equipment checked by F.P.C. RKW Personnel check by RKW

Instruments and safeties checked and reset by RKW

Source in checked by RKW Source No. M-43

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

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

Red light on by RKW Time 0235

Start-up OK'd by F.P.C. RKW Date 3-21-73

added 1 rod: Total of 207 rods.

Δh = 6.4 cm

Water ht = 42.20 cm Probe (in) Temp °C

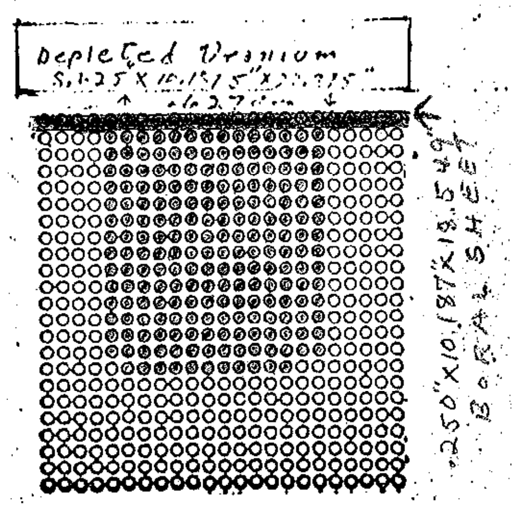
1 + Per 37.84" #1 = 24.0°C

T = 478.06 sec = 2.5¢ 2 = 24.0°C

1315 Water ht = 35.80 cm Probe (in)

System just critical 35.31"

Drain.



Repeat of experiment described on p-213.
14 X 14 - 1 array: Total of 195 rods.

Water ht = 42.20 cm Probe (in) Temp °C

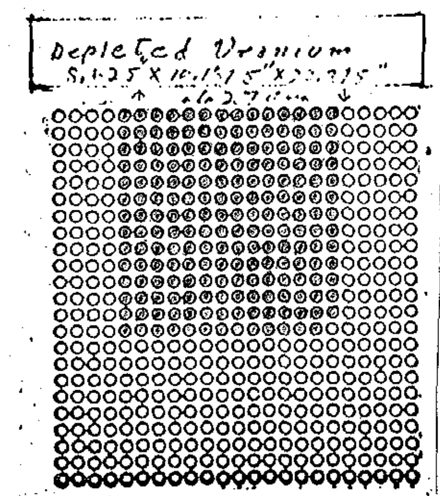
2 + Per 37.84 #1 = 24.0°C

T = 506.31 sec = 2.4¢ 2 = 24.0°C

1443 Water ht = 35.70 cm Probe (in)

System just critical 35.27"

Drain. Diff from 2-6-73 ~ 1.1¢



START-UP CHECK LIST

Equipment checked by T.P.C. RKH Personnel check by RKH

Instruments and safeties checked and reset by RKH

Source in checked by RKH Source No. M-43

Emergency equipment in control room checked by RKH T.P.C.

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

Red light on by RKH Time 0235

Start-up OK'd by T.P.C. RKH Date 3-21-73

added 1 rod: Total of 207 rods.

$\Delta h = 6.4$ cm

Water ht: 14X15 array with | Temp °C
+Per boral sheet centered | #1 = 24.0 °C
τ = 478.06 sec in 1st row. Have | 2 = 24.0 °C
1315 Water ht = 3 rods removed from
System ... 1 face
Drain. Total rods 207
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Repeat of experiment described on P-213.
14X14 - 1 array: Total of 195 rods.

Water ht = 42.20 cm Probe (in) Temp °C
+Per 37.84 #1 = 24.0 °C
τ = 506.31 sec = 14X14 array 2 = 24.0 °C
1443 Water ht = with 1 rod missing in 1 row. No (in)
System ... Boron plate 7"
Drain. Total rods 195 ... 1.19
Page 291 ... (repeat run)