BOOK100R

Notes:
"U(4.9) rads #6" on spine

Blank pages: inside cover sheet, 1, 22, 91-300, inside back cover sheets

-1 half sheet between cover sheets
-pages 3, 5, 6, 7, 19, 81(2), 82, 84(2), 86, 87, 89 have small drawing(s) attached to each page
-pages 19/20 have plastic clip at top
-page 54 has photo attached
-pages 77/78 have paper clip at top

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

14-2-1

VERNON
ROYAL

NO. 64-6138 (168)

ACCOUNT BOOK

RULING: RECORD

300 PAGES • 10 IN. x 8¼ IN.

S.E.&M. VERNON CO., Elizabeth, N.J. 07208
A Division of THE MEAD CORPORATION

Log #6 5/21/73

0.3 rods, 2.05 sep.

H_2O - - - -3

Concrete - Diagram 5

(Block dimensions, wgts, Plexiglas)

Reflected lattices 7

spaced from faces

Unclad concrete + diagram 19

wet concrete 20, 21

Vary refl. thickness

(no diagrams in log)

Cluster lattices, 4 r.

Vary thickness → 20"

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	$3X10^{-12}$	Meter ✓	4"	✓	$3 X 10^{-12}$
		Fast ✓	2"	✓	"
K-2	$3X10^{-12}$	Meter ✓	4"	✓	"
		Fast ✓	2"	✓	"
PM-1	700 ✓	Alarm ✓	.5"	✓	500 ✓
PM-2	1200 ✓	Low ✓	10"	✓	900 ✓
		Alarm ✓	2"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ___

RADIATION ALARM: A ✓ B ✓ C ✓ SOURCE NUMBER B-88

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKM

Source in checked by AKM [illegible] F-M-F3

Emergency equipment in control [illegible] by AKM

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

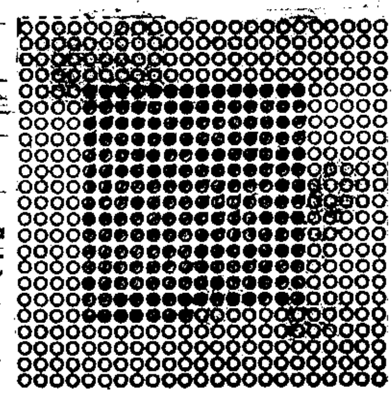
Red light on by AKM Time 1205

Start-up CK'd by I.D.C. AKM Date 5-26-73

2.050 cm separation C-C.
30 cm length.
.30" rods.

Top of rods = 25.60 cm

H_2O only.



Have an 14 X 14 + 7 arra[illegible] rods.

Water ht = 42.00 cm
1 + Per.
τ = 97.78 sec = 10.1¢ — #1 = 24.2°C, 2 = 24.2°C

1305 Water ht = 33.50 cm   37.70   25.[illegible]°C
System just critical
Drain.

Removed 1 rod: Total of 202 rods.

Water ht = 42.00 cm — Temp °C
2 - Per — #1 = 24.2°C
τ = -325.95 sec = -4.5¢ — 2 = 24.2°C
1325 Drain.

Added 1 rod: Repeat of first run. Total of 203 rods.

Water ht = 42.00 cm — Temp °C
3 + Per — #1 = 24.2°C
τ = 95.61 sec = 10.2¢ — 2 = 24.2°C
1350 Water ht = 33.50 cm
System just critical
Drain.

14 X 14 array
1 on 1 face
203 rods
P-3 log #4

2.050 cm apart
30 cm length.
.30" rods.

Top of rods = 25.60 cm
H_2O only.

Have an 14 X 14 + 7 array. Total of 203 rods.

Water ht = 42.00 cm
1 + Per.
$\bar{c}$ = 97.78 mr = 10.1 ¢
1305 Water ht = 33.50 cm
System just critical
Drain.

Temp °C
#1 = 24.2° C
2 = 24.2° C

37.70 25.7°C

Removed 1 rod. Total of 202 rods.

Water ht = 42.00 cm
2 - Per
$\bar{c}$ = -325.95 mr = -4.5 ¢
1325 Drain.

Temp °C
#1 = 24.2° C
2 = 24.2° C

Added 1 rod. Repeat of first run. Total of 203 rods.

Water ht = 42.00 cm
3 + Per
$\bar{c}$ = 95.61 mr = 10.2 ¢
1350 Water ht = 33.50 cm
System just critical.
Drain.

Temp °C
#1 = 24.2° C
2 = 24.2° C

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-12}	Meter ✓	4"	✓	3×10^{-12}
		Fast ✓	2"	✓	"
K-2	3×10^{-12}	Meter ✓	4"	✓	"
		Fast ✓	2"	✓	"
PM-1	700 V	Alarm ✓	5"	✓	500 V ~~700 V~~
PM-2	1200 V	Low ✓	10"	✓	900 V ~~1200 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 I.D.C BKH Personnel check by I.D.C BKH

Instruments and safeties checked and reset by BKH

Source in checked by BKH Source No. 14-93

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

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

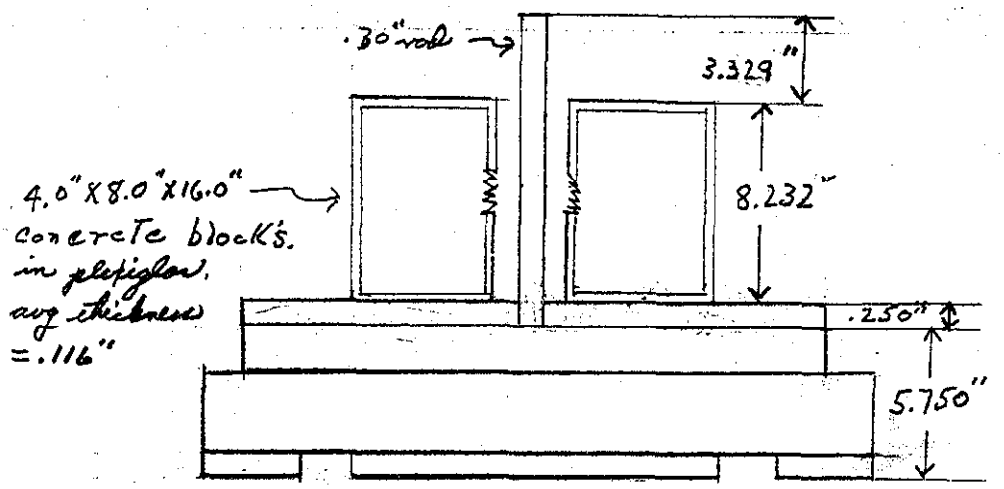
Red light on by BKH Time 0950

Start-up OK'd by I.D.C. BKH Date 5-22-73

Non 4" x 8" x 16" Concrete blocks incased in an avg thickness of plexiglas of .116"

Blocks wt before and after incasing:

	before	after	
#4	17,950 Kg	19,100 Kg	= 1,150 Kg
5	18,050 Kg	19,225 Kg	= 1,175 Kg
7	17,800 Kg	18,900 Kg	= 1,100 Kg
19	18,000 Kg	19,150 Kg	= 1,150 Kg



Position of rods to concrete blocks

6

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

Concrete blocks + H_2O. (See digram)
Blocks spaced, 250" + .116" cover thickness from array.
Have an 14 X 14 array. Total of 196 rods.

$\Delta k = 1.1$ cm

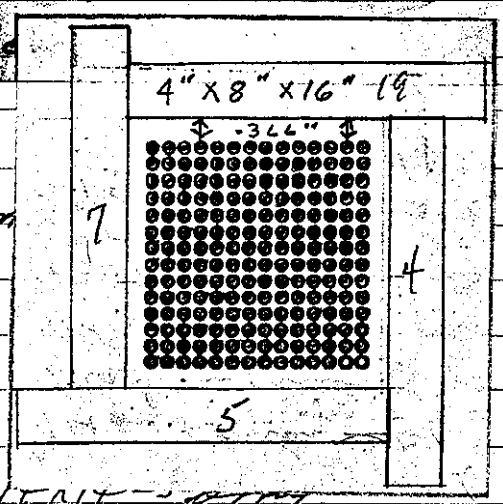
Water ht = 32.80 cm
+ Per
$C = 76.05$ mm = 12.2 ¢ = 11.09 ¢/cm
10:20 Water ht = 31.70 cm
System just critical
Drain.

Temp °C
#1 = 29.5° C
2 = 29.5° C

Removed 2 rods. Have an 12 X 14 - 2 array.
Total of 194 rods.

$\Delta k = 8.0$

Water ht = 42.00 cm
2 + Per.
$C = 141.24$ mm = 7.5 ¢ = .94 ¢/cm
10:42 Water ht = 34.00 cm
System just critical
Drain.



Removed 1 rod. Have an 11 X 11 - array
Total of 193 rods.

Water ht = 42.00 cm
3 - Per
$C = -347.68$ mm = -4.2 ¢
10:55 Drain

Temp °C
#1 = 24.5° C
2 = 24.5° C

Now have an 14 X 14 - 3 array. Total of 193 rods.
Concrete blocks now in contact with array.
Depression = cover thickness = .116"

Water ht = 42.00 cm
4 - Per
N.G.
1308 Drain.

Temp °C
#1 = 29.5° C
2 = 29.5° C

added 1 rod. Have an 14 X 14 - 2 array. Total of 194 rods.

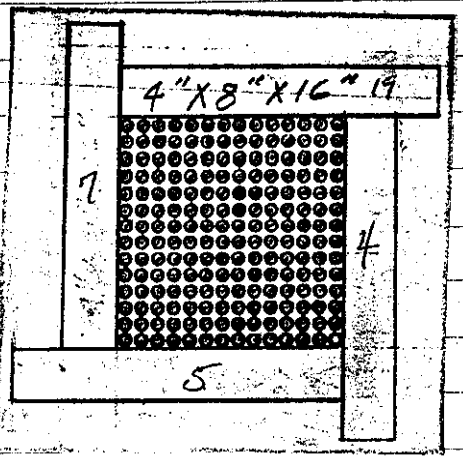
Water ht = 42.00 cm
5 - Per
E = -223.82 cm = - 7.1 f
1326 Drain

added 1 rod. Have an 14 X 14 - 1 array. Total of 195 rods.

~~Δ h = 6.2 cm~~

Water ht = 42.00 cm
6 + Per
E = 467.19 f = 2.6 f = .42 #/cm
1404 Water ht = 35.80 cm
System just critical
Drain.

Temp °C
#1 = 29.5° C
2 = 29.5° C



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

Concrete blocks + H_2O. (See diagram)

Blocks spaced .250" + .116" cover thickness from array.
Have an 14 X 14 array. Total of 196 rods.

$\Delta l = 1.1$ cm

Water ht = 32.80 cm — Temp °C
+ Per — #1 = 24.5 °C
T = 76.05 sec = 12.2 ¢ = 11.09 ¢/cm — 2 = 24.5 °C

10:20 Water ht = 31.70 cm
System just critical
Drain.

14 X 14 array - 2
block in 1 row.
Block separation
.366"
total rods
194
Page 6 log # 6

Removed 2 rods: Have a
Total of 194 rods.

$\Delta l = 8.0$

Water ht = 42.00 cm — Temp °C
2+ Per. — #1 = 24.5 °C
T = 141.24 sec = 7.5 ¢ = .94 ¢/cm — 2 = 24.5 °C

10:42 Water ht = 34.00 cm
System just critical
Drain.

Removed 1 rod. Have an 14 X 14 - 3 array.
Total of 193 rods.

Water ht = 42.00 cm — Temp °C
3 - Per. — #1 = 24.5 °C
T = -347.68 sec = -4.2 ¢ — 2 = 24.5 °C

10:55 Drain

Now have an 14 X 14 - 3 array. Label of 193 rods.
Concrete blocks spaces in contact with array.
Separation = cover thickness = .116"

Water ht = 42.00 cm
4 - Per
N.C.
1308 Drain.

Temp °c
#1 = 24.5° c
2 = 24.5° c

added 1 rod. Have an 14 X 14 - 2 array. Label of 197 rods.

Water ht = 42.00 cm
5 - Per
C = -223.82 cm = - 7.1 ¢
1326 Drain

added 1 rod. Have an 14 X 14 - 1 ~~ 4 = 6.2 cm~~
Water ht = 42.00 cm
6 + Per
C = 407.19 ¢ = 2.6 ¢ = .42 ¢/cm
1404 Water ht = 35.80 cm
System just critical
Drain.

14 X 14 array - (rods.
Concrete blocks
.366" separation
total rods 195
Page 7 log #6

°c
°c

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-12}	Meter ✓	4"	✓	3×10^{-12}
		Fast ✓	2"	—	"
K-2	3×10^{-12}	Meter ✓	4"	✓	"
		Fast ✓	2"	—	"
PM-1	7000	Alarm ✓	5"	✓	5000
PM-2	12000	Low ✓	10"	—	9000
		Alarm ✓	1"	C	"

LOG N CALIBRATE ___ OPERATE ✓ DUMP WELL PROBE LIGHT ___

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

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKH

Source in checked by RKH Source #'s 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 0853

Start-up OK'd by I.D.C. RKH Date 5-23-73

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

Have an 14X14-2 array. Total 198 rods.
Concrete blocks now .100" from array.
+ thickness of cover: .116"

0923 Water ht = 42.00 cm
System just critical
Drain.

Temp °c
#1 = 24.5°c
2 = 24.5°c

Now have an 14X14-3 array. Total of 193 rods.
Concrete blocks now .500" from array.
+ thickness of cover: .116"

1007 Water ht = 42.00 cm
System just critical
Drain.

Temp °c
#1 = 24.5°c
2 = 24.5°c

Now have an 14X14-3 array. Total of 193 rods
Concrete blocks now .350" from array.
+ thickness of cover: .116"

Water ht = 42.00 cm
- Per
τ = -115.69 sec = -1.2¢
1312 Drain.

Temp °c
#1 = 24.7°c
2 = 24.7°c

dew:

added 1 rod. Total of 194 rods.

Water ht = 42.00 cm
^{2}+Per
T = 93.94 sec = 10.4¢

Temp °C
#1 = 24.8°C
2 = 24.8°C

1330 Water ht = 33.20 cm.
System just critical
Drain.

New lowest on 14 X 14 - 2 array. Total of 194 rods.
Concrete blocks were .600" from array.
+ thickness of cover .116"

Water ht = 42.00 cm
^{3}+Per
T = 80.40 sec = 11.7¢

Temp °C
#1 = 24.8°C
2 = 24.8°C

1438 Water ht = 33.20 cm
System just critical
Drain.

Removed 1 rod. Total of 193 rods.

1458 Water ht = 42.00 cm
~~+Per~~ System just critical
Drain.

Temp °C
#1 = 24.8°C
2 = 24.8°C

Have an 14×18 − 3 array. Total of 193 rods.
Concrete blocks now 1.00" from array.
+ thickness of cover .116"

Water ht = 42.00 cm — Temp °c
4 – Per — #1 = 24.8°c
τ = −156.46 sec = −11.4 ¢ — 2 = 24.8°c
1538 Drain.

added 1 rod; Total of 194 rods.

Water ht = 42.00 cm — Temp °c
~~5 Per~~ — #1 = 24.9°c
System just critical — 2 = 24.9°c
1558 Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-12}	Meter ✓	4"	✓	3×10^{-12}
		Feet ✓	4"	✓	"
K-2	3×10^{-12}	Meter ✓	4"	✓	"
		Feet ✓	2"	✓	"
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. Personnel check by I.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 I.D.C

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

Red light on by RKH Time 0845

Start-up OK'd by I.D.C. RKH Date 5-29-73

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

Have an 14 X 14 - 2 array. Total of 198 rods.
Concrete blocks now 1.50" from array.
+ thickness of cover. .116"

Water ht = 42.00 cm — Temp °C
1-Per — #1 = 24.8°C
N.G — 2 = 24.8°C
0915 Drain.

added 1 rod. Total of 195 rods.

Water ht = 42.00 cm — Temp °C
2-Per — #1 = 24.8°C
N.G — 2 = 24.8°C
0938 Drain.

added 1 rod. Total of 196 rods. (full 14X14 array)

Water ht = 42.00 cm — Temp °C
3-Per — #1 = 24.8°C
C = -412.87 ma = -3.5¢ — 2 = 24.8°C
0957 Drain.

added 2 rods. Total of 198 rods: 14X14+2 array.
Water ht = 42.00 cm — Temp °C
Lg stem just critical — #1 = 25.0°C
1055 Drain. — 2 = 25.0°C

Now have on 14X14+5 array. Total 201 rods.
Concrete blocks now 2.0" from array.
+ thickness of cover. .116"

Δl = 9.6 cm

Water ht = 42.00 cm — Temp °C
4 + Per — #1 = 25.0°C
τ = 52.15 sec = 15.9¢ — 2 = 25.0°C
1300 Water ht = 32.40 cm
System just critical
Drain.

Removed 1 rod. Total number of rods = 200

Δl = 5.9 cm

Water ht = 42.00 cm — Temp °C
5 + Per — #1 = 25.0°C
τ = 669.28 sec = 1.8¢ — 2 = 25.0°C
1320 Water ht = 36.10 cm
System just critical
Drain.

Removed 1 rod. Total number of rods = 199

Water ht = 42.00 cm — Temp °C
6 − Per — #1 = 25.0°C
τ = −152.11 sec = −11.9¢ — 2 = 25.0°C
1341 Drain

Rods have an 14 X 14 + 7 array. Total of 202 rods
Concrete blocks near 2.50" from array.
+ thickness of cover. .116"

$\Delta k = 9.85$ cm

Water ht = 42.00 cm
7 + Per
C = 39.11 rem = 19.2 ¢
Water ht = 32.15 cm
System just critical
Drain.

Temp °C
#1 = 25.0 °C
2 = 25.0 °C

Removed 1 rod. Total number ~~of~~ of rods = 201

$\Delta k = 6.8$ cm

Water ht = 42.00 cm
8 + Per
C = 393.33 rem = 3.4 ¢
1433 Water ht = 35.20 cm
System just critical
Drain.

Temp °C
#1 = 25.0 °C
2 = 25.0 °C

Removed 1 rod. Total number of rods = 200

Water ht =
9 - Per
C = -180.88 rem = -8.9 ¢
1445 Drain.

Temp °C
#1 = 25.0 °C
2 = 25.0 °C

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-12}	Meter ✓	4"	✓	3×10^{-12}
		Fast ✓	2"	✓	"
K-2	3×10^{-12}	Meter ✓	4"	✓	"
		Fast ✓	2"	✓	"
PM-1	700 ✓	Alarm ✓	5"	✓	500 ✓
PM-2	1200 ✓	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 RKK I.D.C Personnel check by I.D.C

Instruments and safeties checked and reset by RKK

Source in checked by RKK Source No. M-93

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

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

Red light on by RKK Time 0850

Start-up OK'd by I.D.C. RKK Date 5-25-73

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

Have an 14 X 14 + 5 array: Total of 201 rods.
Concrete blocks move 3.00" from array.
+ thickness of cover. .116"

Water ht = 42.00 cm
1 - Per
T = -239.03 sec = -6.5 ¢
0920 Drain.

Temp °C
#1 = 25.0 °C
2 = 25.0 °C

added 1 rod: Total number of rods = 202

Water ht = 42.00 cm
2 + Per
T = 130.38 sec = 8.0 ¢
0940 Water ht = 33.55 cm
System just critical
Drain.

Temp °C
#1 = 25.0 °C
2 = 25.0 °C

INSTRUMENT CHECK

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

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ___

RADIATION ALARM: A ✓ B ✓ C ✓ SOURCE NUMBER B-90

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-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 RKH Time 1225

Start-up OK'd by F.O.C. RKH Date 6-1-73

2.050 cm
30 cm len
.30" rods.

Unclad concrete b
wt:

#1 = 17.800 Kg
2 = 17.650 Kg
3 = 18.100 Kg
4 = 17.925 Kg

Have an 14 x 14 - 6 array: total of 190 rods: Unclad concrete blocks spaced .250" from array. (1 on each face.)

1320	Water ht = 42.00 cm	Temp °C
	System just critical	#1 = 24.8°C
	Drain.	2 = 24.8°C

After leaving blocks covered with water for 1 hr.

	Water ht = 42.00 cm	Temp °C
	1 - Per	#1 = 25.1°C
	τ = -2607.6 sec = -.51¢	2 = 25.1°C
1432	Drain.	

Blocks covered for 1 more hr.

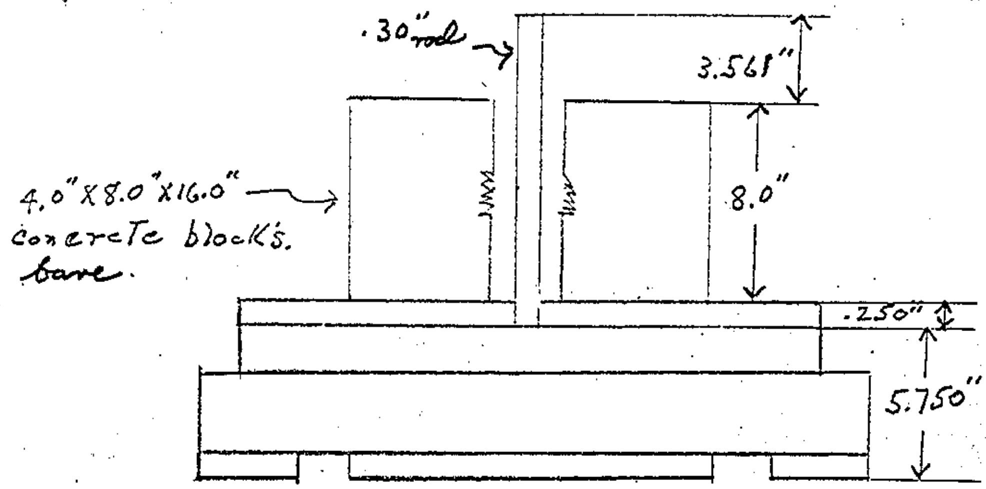
2.050 cm separation
30 cm length.
.30" rods.

Unclad concrete blocks. 4" X 8" X 16"
(annotations above: w ht length)

wt:

#1 = 17.800 Kg
2 = 17.650 Kg
3 = 18.100 Kg
4 = 17.925 Kg

Have an 14 X 14 - 6
Unclad concrete
array. (1 on each fa



Position of rods to concrete block's

20 Water ht = 42.00 cm
System just critical
Drain.

Temp:
#1 = 24.8 °C
2 = 24.8 °C

after leaving blocks covered with water
for 1 hr.

Water ht = 42.00 cm
1 - Per
τ = -2607.6 sec = -.51¢

Temp °C
#1 = 25.1 °C
2 = 25.1 °C

32 Drain.

Blocks covered for 1 more hr.

Water ht = 42.00 cm
2 - Per
t = 2151.27 sec = -.61¢
1540 Drain

Temp °c
#1 = 25.0°c
2 = 25.0°c

Wt of concrete blocks after above run:
Unclad concrete blocks:
#1 = 18.475 Kg diff = .675 Kg
2 = 18.450 Kg " = .800 Kg
3 = 18.900 Kg " = .800 Kg
4 = 18.675 Kg " = .750 Kg

Wt of unclad concrete blocks used in array's from p-24 to p . Block where spaced at cell boundary .250".
4" x 8" x 16"
concrete blocks:
Weight of blocks before placed in water. (See diagram of position in array's

1 = 17.500 Kg	9 = 17.900 Kg	17 = 18.100 Kg
2 = 17.825 Kg	10 = 18.875 Kg	18 = 18.175 Kg
3 = 17.675 Kg	11 = 17.750 Kg	19 = 17.800 Kg
4 = 17.625 Kg	12 = 18.100 Kg	20 = 17.925 Kg
5 = 17.950 Kg	13 = 17.650 Kg	21 = 18.550 Kg
6 = 17.450 Kg	14 = 17.600 Kg	22 = 18.575 Kg
7 = 18.075 Kg	15 = 17.950 Kg	23 = 18.025 Kg
8 = 18.050 Kg	16 = 17.700 Kg	24 = 18.050 Kg

25 = 18,075 Kg
26 = 18.200 Kg
27 = 18,100 Kg
28 = 18.250 Kg
29 = 17.900 Kg
30 = 18.150 Kg
31 = 18.100 Kg
32 = 18,075 Kg
33 = 18,450 Kg
34 = 17.975 Kg
35 = 18.450 Kg
36 = 18.350 Kg
37 = 18.425 Kg
38 = 18.400 Kg
39 = 18.350 Kg
40 = 17.950 Kg
41 = 18.000 Kg
42 = 18.025 Kg
43 = 18.250 Kg
44 = 18.175 Kg
45 = 17.875 Kg
46 = 18.250 Kg
47 = 18.475 Kg
48 = 17.950 Kg.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-12}	Meter	4'	✓	3×10^{-12}
		Fast	2'	✓	"
K-2	3×10^{-12}	Meter	2'	✓	"
		Fast	"	✓	"
PM-1	700V	Alarm			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 E.V. R.K.H. Personnel check by R.K.H.

Instruments and safeties checked and reset by E.V.

Source in checked by R.K.H. Source No. M-93

Emergency equipment in control room checked by R.K.H.

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

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

Start-up OK'd by E.V. R.K.H. Date 6-29-73

2.050 cm injection c-c.
30 cm length.
.130" rods.
4.0" " Wet Concrete reflector. See diagram
Have an 18 x 18 array. Total of 196 rods.
Concrete blocks spaced at all boundary. .250"

1015 Water ht = 43.00 cm
System sub critical
Drain.

Temp °C
#1 = 25.1 °C
2 = 25.1 °C

added 4 rods. Have an 18 x 18 + 4 array.
Total 200 rods.

1040 Water ht = 42.50 cm
System sub critical
Drain.

added 2 rods. Have an 18 x 18 + 6 array.
Total of 202 rods.

$\delta_1 = 4.8$ cm

Water ht = 42.00 cm
+ Per
$\ell = 977.85$ sec = 1.3 ¢ = .27 ¢/cm

Temp °C
#1 = 25.5 °C
2 = 25.5 °C

37.20 cm
1121 Water ht = ~~36.70~~ cm
System just critical
Drain.

7/2/73

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-N} amp	Meter ✓	9"	✓	3×10^{-12}
		Fast ✓	2"	✓	"
K-2	3×10^{-N} amp	Meter ✓	9"	✓	"
		Fast ✓	2"	✓	"
~~PM-1~~	700V	Alarm ✓	.5"	✓	500V
~~PM-2~~	1200+V	Low ✓	10'	✓	900V
		Alarm ✓	2'	✓	"

~~LOG~~ IN CALIBRATE ___ OPERATE ___ DUMP WELL PROBE LIGHT ___

~~RADIATION~~ ALARM: A ✓ B ✓ C ✓ SOURCE NUMBER B-60

START-UP CHECK LIST

~~Equipment~~ checked by E.S. RKD Personnel check by RKD

~~Instructions~~ and procedures checked and read by E.S.

~~Source~~ checked by RKD Source No. M-43

~~Emergency~~ equipment in control room checked by RKD

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

~~Red~~ light on by RKD Time 0950

~~Start-up~~ OK'd by J.T. RKD Date 7-2-73

26

2.05 cm separation c-c.
30 cm length.
.30" rod.

Repeat of last run: ρ - 29
Δh = 6.7 cm
Water ht = 42.10 cm
+ Pr
L = 345.51 cm = 3.4 ft = .51 ft/cm
0926 Water ht = 35.40 cm
System just artificial
Drain.

Temp °C
#1 = 25.3 °C
2 = 25.3 °C

12

133

14

Now have an 9X23-5 array. Total 202 rods.

1255 Water ht = 42.00 cm
System sub critical
Drain.

Temp °c
#1 = 25.2°c
2 = 25.2°c

added 28 rods. Now have an 10X23 array.
Total of 230 rods.

1330 Water ht = 42.00 cm
System sub critical
Drain

Temp °c
#1 = 25.1°c
2 = 25.2°c

added 5 rods. Now have an 11X23-18 array.
Total of 235 rods.

Δh = 7.5 cm

Water ht = 42.00 cm
2 + P.S.

Temp °c
#1 = 25.2°c
2 = 25.2°c

C = 182.53 cm = 6.0 f = .80 f/cm

1418 Water ht = 34.50 cm
System just critical
Drain!

over.

Removed 1 rod: Have an 11X23-19 array.
Total of 239 rods.

Water ht = 42.00 cm — Temp °C

3 -Per — #1 = 25.2 °C

I = -258.59 mv = -5.94 — 2 = 25.3 °C

1437 Drain:

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-12}	Meter ✓	1"	✓	3×10^{-12}
		Fast ✓	1"	✓	"
K-2	3×10^{-12}	Meter ✓	1"	✓	"
		Fast ✓	1"	✓	"
PM-1	7000	Alarm ✓	Cont	✓	5000 ✓
PM-2	12000	Low ✓	8"	✓	9000 ✓
		Alarm ✓	Cont	✓	

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ✓

RADIATION ALARM: A ✓ B ✓ C ✓ SOURCE NUMBER D-8

START-UP CHECK LIST

Equipment checked by J.T. BKH Personnel check by J.T. BKH

Instruments and safeties checked and reset by BKH

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

Emergency equipment in control room checked by BKH

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

Red light on by BKH Time 0940

Start-up OK'd by J.T. BKH Date 7-5-77

2,050 cm separation c-c
30 cm length.
130° rods.

Repeat of last run: Now have 8.0" of concrete on each face. (See diagram).
Total of 234 rods.

Water ht = 42.10 cm — Temp °C
1 +Per — #1 = 25.4 °C
τ = 195.57 sec = 6.94 — 2 = 25.4 °C
1020 Water ht = 34.60 cm
System just critical
Drain

Repeat of above:

Water ht = 42.15 cm — Temp °C
2 +Per — #1 = 25.5 °C
τ = 212.95 sec = 5.34 — 2 = 25.5 °C
1254 Water ht = 34.70 cm
System just critical
Drain

Removed 1 rod: Total of 233 rods.

1310 Water ht = 42.00 cm — Temp °C
3 −Per — #1 = 25.6 °C
τ = −321.60 sec = −4.6 — 2 = 25.5 °C

Repeat of last run. Now have 12.0" of concrete on each face. (See diagram).
Total of 233 rads.

Water ht = 42.00 cm
t-Pw = -
C = -338.99 sec = -4.34

Temp °c
#1 = 25.6 °c
2 = 25.7 °c

1419 Drain

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-12}	Meter ✓	1"	✓	3×10^{-12}
		Fast ✓	1"	✓	4
K-2	3×10^{-12}	Meter ✓	1"	✓	4
		Fast ✓	1"	✓	4
PM-1	700 v	Alarm ✓	Cont	✓	500 v
PM-2	1200 v	Low ✓	8"	✓	900 v
		Alarm ✓	Cont	✓	1

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ✓

RADIATION ALARM: A ✓ B ✓ C ✓ SOURCE NUMBER 19-F3

START-UP CHECK LIST

Equipment checked by F, H, C Personnel check by BKH

Instruments and safeties checked and reset by BKH

Source in checked by BKH Source No. 19-F3

Emergency equipment in control room checked by BKH

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

Red light on by BKH Time 10:20

Start-up OK'd by RC BKH Date 7-5-73

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

Repeat of last run. p-31

Water ht = 42.30 cm
1-Per
C = -695.36 mr = -2.0 ¢
11:00 Drain.

Temp °c
#6 = 25.5°C
2 = 25.5°C

Added 1 rod. Above on 11x23-19 array. Total of 239 rods. 12" concrete reflector. (See diagram.)

Water ht = 42.30 cm
2 +Per
C = 236.86 mr = 4.8 ¢
12:48 Water ht = 35.30 cm
System just critical
Drain.

Temp °c
#1 = 25.5°C
2 = 25.5°C

Now have 16" of concrete reflector. 11×23-19 array. Total of 234 rods. (See diagram.)

Water ht = 42.90 cm | Temp °C
3 + Per | 3, Nabey nat with example. | #1 = 25.5 °C
τ = 388.97 mu = 3.1¢ | 2 = 25.5 °C
1343 Water ht = 36.10 cm
System just critical
Drain.

Repeat of last run: p - 34.

Water ht = 42.90 cm
1 + Per
E = 156.45 mr = 6.9 ¢
0846 Water ht = 34.40 cm
System just critical
Drain.

Temp °C
#1 = 25.5°C
2 = 25.5°C

Repeat of above.

Water ht = 42.90 cm
2 + Per
E = 156.45 mr = 6.9 ¢
0902 Water ht = 34.40 cm
System just critical
Drain.

Temp °C
#1 = 25.5°C
2 = 25.5°C

Removed 1 rod: Total of 233 rods.

Water ht = 43.00 cm
3 - Per
E = -484.58 mr = -2.9 ¢

Temp °C
#1 = 25.5°C
2 = 25.5°C

Now have 12.0" concrete reflector. and a total of 234 node.

Water ht = 42.20 cm
4 + Per
C = 247.72 cm = 4.6 f
Water ht = 34.80 cm
System just critical
Drain.

Temp °C
#1 = 25.6°C
2 = 25.6°C

Now have 8.0" concrete reflector. and a total of 234 node.

Water ht = 42.10 cm
5 + Per
C = 256.91 cm = 4.5 f
Water ht = 35.60 cm
System just critical
Drain.

Temp °C
#1 = 25.6°C
2 = 25.6°C

Repeat of above:

Water ht = 42.40 cm
6 + Per
C = 271.62 cm = 4.3 f
Water ht = 35.60 cm
System just critical
Drain

Temp °C
#1 = 25.6°C
2 = 25.6°C

ave.

Now have 4.0" concrete reflector. and a total of 235 rods.

7 Water ht = 42.20 cm — Temp °C
+Per — #1 = 25.6°C
τ = 167.32 sec = 6.5 ¢ — 2 = 25.6°C

11:12 Water ht = 34.60 cm
System just critical
Drain

Removed 1 rod. Total number of rods = 234
4.0" concrete reflector.

8 Water ht = 42.20 cm — Temp °C
−Per — #1 = 25.6°C
τ = −291.18 sec = −5.2 ¢ — 2 = 25.6°C

11:26 Drain

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-12}	Meter	4"	✓	3×10^{-12}
		Fast	3"	✓	"
K-2	"	Meter	3½"	✓	"
		Fast	2"	✓	"
PM-1	700 v	Alarm	½	✓	500 v
PM-2	12000 v	Low	12	✓	9000 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 ERR AKL Personnel check by RKL

Instruments and safeties checked and reset by AKL

Source in checked by AKL Source No. M-93

Emergency equipment in control room checked by RKL

Instruments in trip circuit: K-1-2 AM1-2

Red light on by AKL Time 0810

Start-up OK'd by T.E AKL Date 7-10-23

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

4.0" concrete reflector on 4 sides.
Have an 23 X 23 array, with the 11, 12, 13 row removed in 2 directions. Total of 400 rods.

0840 Water ht = 42.00 cm
System sub critical
Drain.

Temp °c
#1 = 25.5°c
2 = 25.5°c

Same array as above: Now have 16.0" concrete reflector.

1023 Water ht = 42.30 cm
System sub critical
Drain.

Temp °c
#1 = 25.5°c
2 = 25.5°c

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	10×10^{-12}	Meter ✓	.5"	✓	3×10^{-12}
		Fast ✓	Out	✓	"
K-2	10×10^{-12}	Meter ✓	.5"	✓	"
		Fast ✓	Out	✓	"
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 T.T. R.K.H. Personnel check by T.T.

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

Source in checked by T.T. Source No. M-93

Emergency equipment in control room checked by R.K.H.

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

Red light on by R.K.H. Time 1910

Start-up OK'd by T.T. R.K.H. Date 7-11-72

2.050 cm separation c-c.
30 cm length.
.20" rods.

Now have an 23 x 23 array, with the 4 rd, 8 th, 12 th, 16 th, & 20 th rows removed in 2 directions. Total of 324 rods. Have 16.0" concrete reflector on 4 faces.

1450 Water Ht = 42.30 cm
System sub critical
Drain.

Temp °C
#1 = 25.3 °C
2 = 25.3 °C

Now have an 23 x 23 array, with the 3 rd, 6 th 9 th, 12 th, 15 th, 18 th & 21 st rows removed in 2 directions. Total of 256 rods. 16.0" Concrete reflector on 4 faces.

1535 Water Ht = 42.30 cm
System sub critical
Drain.

Temp °C
#1 = 25.3 °C
2 = 25.3 °C

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-12}	Meter ✓	4"	✓	3×10^{-12}
		Fast ✓	1"	✓	"
K-2	3×10^{-12}	Meter ✓	4"	✓	"
		Fast ✓	1"	✓	"
PM-1	700V	Alarm ✓	1/2"	✓	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-70

START-UP CHECK LIST

Equipment checked by JRT-RKR-IDC Personnel check by IDC

Instruments and safeties checked and reset by JRT

Source in checked by JRT Source No. M-43

Emergency equipment in control room checked by JRT

Instruments in trip circuit: K1-2 PM1-2

Red light on by IDC F.D.C Time 10:20

Start-up OK'd by JRT & RKR & NR Date 12 JULY 73

2.05 cm separation c-c.
30 cm length.
.30" rods.

Have an 20X17 array, with the 7th & 14th row removed in 2 directions. Total number of rods = 270 rods. 16.0" concrete reflector.

11:10 Water ht = 42.20 cm — Temp °c
System sub critical — #1 = 25.1 °c
Drain. — 2 = 25.1 °c

added 4 rods. Now have an 20X18 array with 14 rods removed from 18th row. Have the 7th & 14th row removed in 2 directions. Total number of rods = 274.

1303 Water ht = 42.20 cm — Temp °c
System sub critical — #1 = 25.5 °c
Drain — 2 = 25.5 °c

added 2 rods: Now have an 20X18 array with 10 rods removed from 18th row. Have the 7th & 14th row removed in 2 directions. Total of 278 rods.

Water ht = 42.70 cm — Temp °C
1+ Per — #25.6°C
τ = 130.38 sec = 8.0¢ — 25.6°C
1340 Water ht = 34.05 cm
System just critical
Drain.

Removed 1 rod from 18th row: Total of 277 rods.

1355 Water ht = 42.30 cm — Temp °C
System just critical — #1 = 25.6°C
Drain. — 2 = 25.6°C

Removed 1 rod from 18th row: Total of 276 rods.

Water ht = 42.30 cm — Temp °C
2 - Per — #1 = 25.6°C
τ = -191.22 sec = -8.6¢ — 2 = 25.6°C
1410 Drain

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-12}	Meter ✓	9"	✓	3×10^{-12}
		Fast ✓	2"	✓	"
K-2	3×10^{-12}	Meter ✓	9"	✓	"
		Fast ✓	2"	✓	"
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-8

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKM

Source in checked by RKM Source No. M-97

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 1410

Start-up OK'd by F.D.C. RKM Date 7-13-73

Have an 22 X 21 array, with the 11th & 12th row removed in 2 directions. Total of 364 rods (see diagram). 16.0" Concrete reflector.

Water ht = 42.80 cm — Temp °C
+Per τ = 47.81 sec = 16.9¢ — #1 = 25.6 °C
Water ht = 32.60 cm. Just critical — 2 = 25.6 °C
15:00 Drain

Removed 2 rods: Total of 362 rods. (see diagram).
Water ht = 48.20 cm — Temp °C
+Per — #1 = 25.6 °C
τ = 223.82 sec = 5.1¢ — 2 = 25.6 °C
Water ht = 34.90 cm
System just critical
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-12}	Meter ✓	9"	✓	3×10^{-12}
		Fast ✓	2"	✓	"
K-2	3×10^{-12}	Meter ✓	9"	✓	"
		Fast ✓	2"	✓	"
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-8

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKH

Source in checked by AKH Source No. M-93

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

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

Red light on by AKH Time 0855

Start-up OK'd by I.D.C AKH Date 7-17-73

Repeat of last run. (p-47).

Water ht = 42.40 cm — Temp °C

+Rev — #1 = 25.0 °C

T = 221.65 sec = 5.1¢ — 2 = 25.0 °C

1008 Water ht = 35.00 cm

System just critical

Drain.

Same array as above: added 4.0" of concrete: Now have a total of 20.0" of concrete blocks. Total of 362 rods.

Water ht = 42.20 cm — Temp °C

+Rev — #1 = 25.2 °C

T = 319.43 sec = 3.7¢ — 2 = 25.2 °C

1410 Water ht = 35.50 cm

System just critical

Drain.

RWR.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-12}	Meter ✓	9"	✓	3×10^{-2}
		Fast ✓	2"	✓	"
K-2	3×10^{-12}	Meter ✓	9"	✓	"
		Fast ✓	2"	✓	"
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-8

START-UP CHECK LIST

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

Instruments and safeties checked and reset by BKH

Source in checked by BKH Source No. RE-93

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

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

Red light on by BKH Time 0855

Start-up OK'd by F.P.C. BKH Date 7-18-73

Repeat of last run (p - 49)

Water ht = 42.20 cm — Temp °c

1 + Rem — #1 = 25.0°c

τ = 375.93 sec = 3.2 ¢ — 2 = 25.0°c

1019 Water ht = 35.60 cm

0 System just critical

Drain.

Removed 1 rod: total of 361 rods.

Water ht = 43.20 cm — Temp °c

2 - Rem — #1 = 25.2°c

τ = -291.18 sec = -5.2 ¢ — 2 = 25.2°c

1040 Drain.

Repeat of run top of (p-51) Total of 362 rods

Water ht = 42.30 cm
3 + Per
T = 310.74 sec = 3.8 ¢
1339 Water ht = 35.60 cm
System just critical
Drain.

Temp °C
#1 = 25.2 °C
2 = 25.2 °C

Same array as above. Now have 16.0" thick concrete reflector. (No instruments have not been moved. same position as last run with 20.0" thick reflector. Instruments on lying berg on the last row of blocks.).

Water ht = 42.30 cm
4 + Per
T = 305.06 sec = 3.3 ¢
1438 Water ht = 35.90 cm
System just critical
Drain.

Temp °C
#1 = 25.2 °C
2 = 25.2 °C

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-12}	Meter ✓	4"	✓	3×10^{-12} ✓
		Fast ✓	2"	✓	"
K-2	3×10^{-12}	Meter ✓	4"	✓	"
		Fast ✓	2"	✓	"
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 D-80

START-UP CHECK LIST

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

Instruments and safeties checked and reset by BHL

Source in checked by BHL Source No. M-93

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

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

Red light on by BHL Time 1240

Start-up OK'd by F.D.C BHL Date 1-19-73

Repeat of last run: Now have instruments mounted in box for above array. See photo.

Water ht = 42.20 cm — Temp °C

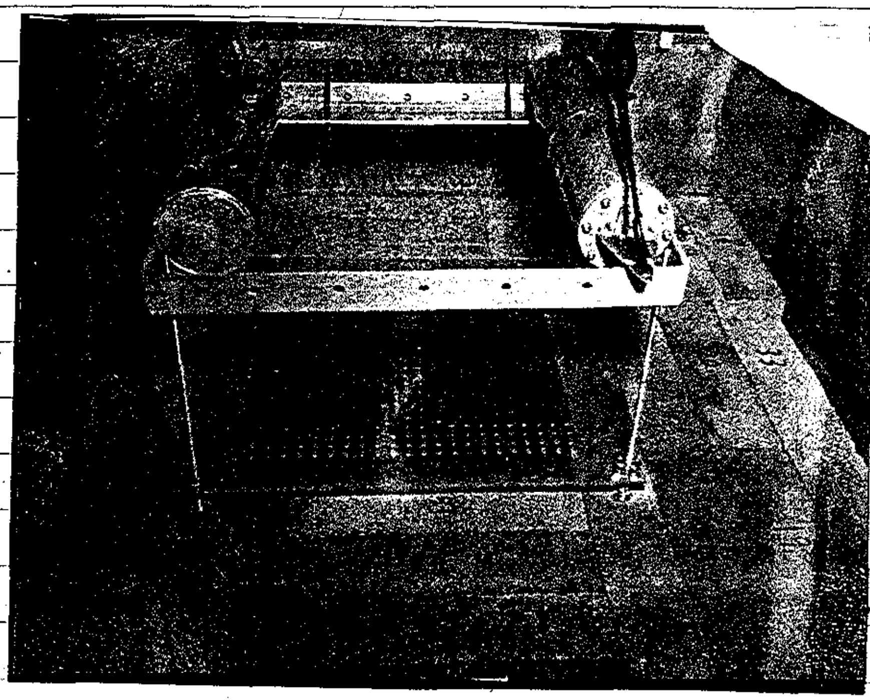
+Rer — #1 = 25.2°C

[= 349.85 sec = 3.4¢ — 2 = 25.2°C

1335 Water ht = 35.80 cm

System just critical

Drain



INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	$3X10^{-12}$	Meter ✓	4"	✓	$3X10^{-12}$
		Fast ✓	2"	✓	"
K-2	$3X10^{-12}$	Meter ✓	4"	✓	"
		Fast ✓	2"	✓	"
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-98

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKH

Source in checked by AKH Source No. M-93

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

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

Red light on by AKH Time 0900

Start-up OK'd by I.D.C. AKH Date 7-20-73

Same array as described on p-47.
Total of 382 rods: 20.0" of concrete. Instruments
as shown on p-54, 1st

Water ht = 42.50 cm
+Rx
C = 384.62 sec = 3.1¢
1005 Water ht = 35.80 cm
System just critical
Drain.

Temp °C
#1 = 25.2°C
2 = 25.2°C

Moved the 2 rods in ~~4th~~ 2nd row, 1 hole
pos. See diagram. 2nd

Water ht = 42.30 cm
2 +Rx
C = 1021.31 sec = 1.2¢
1340 Water ht = 37.90 cm
System just critical
Drain.

Temp °C
#1 = 25.2°C
2 = 25.2°C

Moved the 2 rods in the 21st row 1 more hole for
See diagram 3rd

Water ht = 42.20 cm
3 + Rx
E = 1608.00 mv = 0.80
1417 Water ht = 39.00 cm
System just critical
Drain.

Temp °C
#1 = 25.2°C
2 = 25.2°C

Moved the 2 rods in the 21st row 1 more hole for.
See diagram 4th

Water ht = 42.20 cm
4 + Rx
E = 1803.59 mv = 0.71 ¢
Water ht = 39.70 cm
System just critical
Drain.

Temp °C
#1 = 25.2°C
2 = 25.2°C

Moved the 2 rods in the 21st row 1 more hole for.
See diagram - 5th
Water ht = 42.50 cm
#5 Rx
E = -4346.00 mv = -0.31 ¢
1526 Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-12}	Meter ✓	9"	✓	3×10^{-12}
		Fast ✓	2"	✓	"
K-2	3×10^{-12}	Meter ✓	9"	✓	"
		Fast ✓	2"	✓	"
PM-1	700 V 5000	Alarm ✓	.5"	✓	5000 ✓ 700 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 R-80

START-UP CHECK LIST

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

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

Source in checked by R.K.C. Source No. M-93

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

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

Red light on by R.K.C. Time 0900

Start-up OK'd by F.A.C. R.K.C. Date 7-23-73

Moved the 2 rods in the 21st row 1 more hole for
see diagram. 6th

Water ht = 42.90 cm
1 - Per
τ = -1441.80 sec = -0.93¢

Temp °C
#1 = 25.2°C
2 = 25.2°C

1010 Drain

Moved the 2 rods in the 21st row 1 more hole for.
see diagram. 7th

Water ht = 42.30 cm
2 - Per
τ = -608.44 sec = -2.3¢

Temp °C
#1 = 25.2°C
2 = 25.2°C

1028 Drain

Moved the 2 rods in the 21st row 1 more hole for.
see diagram. 8th

Water ht = 42.00 cm
3 - Per
τ = -347.68 sec = -4.2¢

Temp °C
#1 = 25.2°C
2 = 25.2°C

1253 Drain

over.

Moved the 2 rods in the 21st row 1 more hole for
see digram. 9th

Water ht = 42.80 cm
9 - Per
C = -245.55 ns = - 6.3 ¢
1310 Drain

Temp °C
#1 = 25.5° C
2 = 25.5° C

Moved the 2 rods in the 21st row 1 more hole for.
see digram. 10th

Water ht = 42.20 cm
5 - Per
C = -228.16 ns = - 6.9 ¢
1320 Drain.

Temp °C
#1 = 25.5° C
2 = 25.5° C

Rods replaced in original posi. see p 47-54 &
56.

Water ht = 42.20 cm
6 + Per
C = 354.20 ns = 3.3 ¢
1500 Water ht = 35.80 cm
System just critical
Drain

Temp °C
#1 = 25.5° C
2 = 25.5° C
—

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-12}	Meter ✓	4"	✓	3×10^{-12}
		Fast ✓	2"	✓	"
K-2	3×10^{-12}	Meter ✓	4"	✓	"
		Fast ✓	2"	✓	"
PM-1	700 V	Alarm ✓	15"	✓	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 M-93

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RHL

Source in checked by RHL Source No. M-93

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

Instruments in trip circuit: K-1- 2 RM1-2

Red light on by RHL Time 0925

Start-up OK'd by F.D.C. RHL Date 7-25-73

Removed 1 rod in 21st row. Total of 361 rods. 20.0" concrete reflector. Same array as described on p-97.

Water ht = 42.20 cm
1-Per
τ = -341.16 sec = -4.3
1033 Drain.

Temp °C
#1 = 25.2°C
2 = 25.2°C

Added 1 rod. Total of 362 rods. Same array as above. Removed 4.0" of concrete. Total thickness now = 16.0".

Water ht = 42.20 cm
2 +Per
τ = 380.27 sec = 3.1¢
1118 Water ht = 35.85 cm
System just critical
Drain.

Temp °C
#1 = 25.2°C
2 = 25.2°C

13

Removed 1 rod: Total of 361 rods: 16.0" concrete refl.

Water ht = 42.30 cm
3-Per
τ = -310.74 sec = -4.8¢
Drain.

Temp °C
#1 = 25.2°C
2 = 25.2°C

added 1 rod. Total of 362 rods. Removed 4.0" of concrete. Total thickness now = 12.0"

Water ht = 42.50 cm
4-Per
τ = 367.23 sec = 3.2¢
1356 Water ht = 35.80 cm
System just critical
Drain:

Temp °C
#1 = 25.2°C
2 = 25.2°C

Removed 1 rod. Total of 361 rods: 12.0" concrete refl.

Water ht = 42.20 cm
5-Per
τ = -315.08 = -4.7¢
1432 Drain

Temp °C
#1 = 25.2°C
2 = 25.2°C

added 1 rod: Total of 362 rods. Removed 4.0" of concrete. Total thickness now = 8.0"

Water ht = 42.20 cm
6 + Rev
τ = 412.87 sec = 2.9 f
1519 Water ht = 36.00 cm
System just critical
Drain.

Temp °c
#1 = 25.5° c
2 = 25.5° c

Removed 1 rod. Total of 361 rods. 8.0" concrete refl.

Water ht = 42.20 cm
7 - Rev
τ = -349.85 sec = -4.2 f
1526 Drain

Temp °c
#1 = 25.5°
2 = 25.5°

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-12}	Meter ✓	4"	✓	3×10^{-12}
		Fast ✓	2"	✓	"
K-2	"	Meter ✓	4"	✓	"
		Fast ✓	2"	✓	"
PM-1	700 ✓	Alarm ✓	.5"	✓	500 ✓
PM-2	1200 ✓	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. RKK Personnel check by I.D.C.

Instruments and safeties checked and reset by RKK

Source in checked by RKK Source No. M-93

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

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

Red light on by RKK Time 0915

Start-up OK'd by I.D.C. RKK Date 7-26-73

added 1 rod. Total of 362 rods. Removed 4.0"
of concrete. Total thickness now = 4.0"

Water ht = 42.20 cm — Temp °C
'—Per — #1 = 25.2 °C
τ = −321.60 sec = −4.6 ¢ — 2 = 25.2 °C

added 1 rod. Total of 363 rods.

Water ht = 42.20 cm — Temp °C
²+Per — #1 = 25.2 °C
τ = 908.31 sec = 1.4 ¢ — 2 = 25.2 °C
1038 Water ht = 35.90 cm
System just critical
Drain.

Now have an 17x17 array, with the 9th row removed in 2 directions. Have 11 rods removed from 1 face. Have 4.0" concrete reflector. See diagram. Total of 295 rods

Water Ht = 42.20 cm
3-Pwr
N.G.
1500 Drain

Temp °C
#1 = 25.5°C
2 = 25.5°C

added 3 rods. Total of 298 rods. 4.0 concrete refl.

Water Ht = 42.20 cm
4-Pwr
Σ = 99.96 cm = 9.9 ¢
1532 Water Ht = 33.70 cm
System just critical
Drain.

Temp °C
#1 = 25.7°C
2 = 25.7°C

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	$3X10^{-12}$	Meter ✓	4"	✓	$3X10^{-12}$
		Fast ✓	2"	✓	4
K-2	$3X10^{-12}$	Meter ✓	4"	✓	4
		Fast ✓	2"	✓	4
PM-1	700 ✓	Alarm ✓	5"	✓	500 ✓
PM-2	1200 ✓	Low ✓	10"	✓	900 ✓
		Alarm ✓	1"	✓	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.V.C. RKA Personnel check by E.V.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.V.C

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

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

Start-up OK'd by E.V.C. RKA Date 7-27-73

Removed 1 rod: Total of 247 rods. 4.0" concrete refl.

Water ht = 42.20 cm — Temp °C
1 - Per — #1 = 25.2 °C
T = -999.58 sec = -1.3 ¢ — 2 = 25.2 °C
0851 Drain:

Same array as above: but have moved array so that 2 faces are now at the cell ~~boundary~~ boundary. See diagram. Total of 249 rods. 4.0" concrete refl.

Water ht = 42.20 cm — Temp °C
2 - Per — #1 = 25.2 °C
T = -212.95 sec = -7.5 ¢ — 2 = 25.2 °C
1054 Drain;

Added 1 rod. Total of 245 rods:
Water ht = 42.20 cm — Temp °C
3 + Per — #1 = 25.2 °C
T = 760.55 sec = 1.6 ¢ — 2 = 25.2 °C
Water ht = 37.70 cm
System just critical
1120 Drain.

avr.

Added 4.0" of concrete: Total thickness = 8.0"
Total of 245 rods.

Water ht = 42.20 cm — Temp °C
4 +Per — #1 = 25.8 °C
T = 121.69 sec = 8.5 ¢ — 2 = 25.3 °C
Water ht = 33.60 cm
System just critical
1318 Drain.

Removed 1 rod. Total of 244 rods. 8.0" concrete ref.

Water ht = 42.20 cm — Temp °C
5 -Per — #1 = 25.5 °C
T = -825.74 sec = -1.7 ¢ — 2 = 25.5 °C
1336 Drain

Added 4.0" of concrete: Total thickness = 12.0"
Total of 244 rods.

Water ht = 42.20 cm — Temp °C
6 -Per — #1 = 25.5 °C
T = -808.35 sec = -1.7 — 2 = 25.5 °C
1408 Drain.

added 1 rod. Total of 245 rods. 12.0" concrete refl.

Water ht = 42.20 cm
7 + Per
C = 113.0 cm = 9.0¢ 33.75 cm
Water ht = ~~33.75 cm~~
System just critical
1432 Drain

Temp °C
#1 = 25.6 °C
2 = 25.6 °C

added 4.0" of concrete. Total thickness = 16.0"
Total of 245 rods.

Water ht = 42.20 cm
8 + Per C = 108.65 cm = 9.3¢
Water ht = 33.80 cm
System just critical
1506 Drain.

Temp °C
#1 = 25.6 °C
2 = 25.6 °C

Removed 1 rod. Total of 244 rods. 16.0" concrete refl.

Water ht = 42.20 cm
9 Per
C = -2477.22 cm = -0.53¢
1525 Drain

Temp °C
#1 = 25.6 °C
2 = 25.6 °C

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-12}	Meter ✓	4"	✓	3×10^{-12}
		Fast ✓	2"	✓	"
K-2	3×10^{-12}	Meter ✓	4"	✓	"
		Fast ✓	2"	✓	"
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 F.D.C. AKH Personnel check by F.D.C.

Instruments and safeties checked and reset by AKH

Source in checked by AKH Source No. 19-43

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

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

Red light on by AKH Time 0830

Start-up OK'd by F.D.C. AKH Date 7-31-73

added 4.0" of concrete. Total thickness = 20.0"
Total of 244 rods.

Water ht = 42.20 cm
System just critical
Drain.

Temp °c
#1 = 25.2°c
2 = 25.2°c

Removed 1 rod. Total of 243 rods: 20.0" concrete refl.

Water ht = 42.20 cm
1-Pcm
ρ = -167.32 mm = -10.4¢
Drain:

Temp °c
#1 = 25.2°c
2 = 25.2°c

added 2 rods: Total of 245 rods: 20.0" concrete refl.

Water ht = 42.20 cm
2+Pcm
ρ = 108.65 mm = 9.3¢
Water ht = 33.40 cm
System just critical
Drain.

Temp °c
#1 = 25.2°c
2 = 25.2°c

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-12}	Meter ✓	4"	✓	3×10^{-12}
		Fast ✓	2"	✓	"
K-2	3×10^{-12}	Meter ✓	4"	✓	"
		Fast ✓	1"	✓	"
PM-1	700 V	Alarm ✓	15"	✓	500 V
PM-2	1200 V	Low ✓	19"	✓	900 V
		Alarm ✓	2"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ___

RADIATION ALARM: A ✓ B ✓ C ✓ SOURCE NUMBER B-13

START-UP CHECK LIST

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

Instruments and safeties checked and reset by BRK

Source in checked by BRK Source No. 19-93

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

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

Red light on by BRK Time 10:10

Start-up OK'd by F.D.C. BRK Date 8-8-73

Have on 14 X 14 + 7 array. Total of 203 rods.
H_2O reflector only.

Water ht = 47.20 cm — Temp °C
+ Per — #1 = 25.5 °C
τ = 78.23 sec = 11.9¢ — 2 = 25.5 °C
Water ht = 33.30 cm
System just critical
1100 Drain.

Removed 1 rod. Total of 202 rods.

Water ht = 47.20 cm — Temp °C
− Per — #1 = 25.5 °C
τ = −332.46 sec = −4.4¢ — 2 = 25.5 °C
1326 Drain

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	$3 X 10^{-12}$	Meter ✓	9"	✓	$3 X 10^{-12}$
		Fast ✓	2"	✓	"
K-2	$3 X 10^{-12}$	Meter ✓	9"	✓	"
		Fast ✓	1"	✓	"
PM-1	700 V	Alarm ✓	.5"	✓	500 V
PM-2	1200 V	Low ✓	14"	✓	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. AKN Personnel check by I.D.C

Instruments and safeties checked and reset by AKN

Source in checked by AKN 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 A.K.R.V. Time 1405

Start-up O.K'd by I.D.C. AKN Date 8-9-73

Have an 19 X 19 - 2 array. Total of 198 rods.
4.0" concrete block reflector. (Concrete blocks
encased in plexiglas. avg thickness = .116")
Blocks spaced .100" + thickness of plexiglas.
Lu p - 9

Water ht = 42.20 cm
1 + Per
C = 45.19 cm = 13.6 ¢
Water ht = 33.05 cm
System just critical
1455 Drain.

Temp °C
#1 = 25.5° C
2 = 25.5° C

Removed 1 rod. Total of 193 rods.

Water ht = 42.20 cm.
2 + Per
C = 749.68 cm = 1.7 ¢
Water ht = 36.60 cm
System just critical
1533 Drain.

Temp °C
#1 = 25.5° C
2 = 25.5° C

Removed 1 rod. Total of 192 rods.

Water ht = 42.20 cm
3 - Per
C = -165.15 cm = -10.6 ¢
1546 Drain.

Temp °C
#1 = 25.5° C
2 = 25.5° C

78

INSTRUMENT CHECK

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

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ___

RADIATION ALARM: A ✓ B ✓ C ✓ SOURCE NUMBER 13-80

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. 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 BKH. Time 0930

Start-up OK'd by I.D.C. BKH Date 11-1-73

H_2O Fuel rate = 5.4 cm/min
3" drain rate = 23.0 cm/min
3" dump rate = 27.0 cm/min

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

Have an 14 x 14 - 3 array. Total of 193 rods.
4.0" concrete block reflector on 2 opposite faces. (concrete blocks encased in plexiglas. avg thickness = .116".) Blocks one in contact.

1047 Water lvl = 42.3 cm
System sub critical
Drain.

Temp °C
#1 = 25.0°
2 = 25.0°

added 3 rods. Now have an full 14 x 14 array.
Total of 196 rods.

1307 Water lvl = 42.6 cm
System sub critical
Drain.

Temp °C
#1 = 25.0°C
2 = 25.0°C

over.

added 3 rods. Now have an 18x18+3 array. Total of 199 rods.

Water ht = ~~[illegible]~~ 42.3 cm

1-Per

C = -226.0 cm = -7.0 ϕ

1941 Drain

Temp C

~~[illegible]~~ = ~~[illegible]~~

~~[illegible]~~ =

#1 = 25.3°C

2 = 25.3°C

INSTRUMENT CHECK

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

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ___

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

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKL

Source in checked by RKL Source No. M-93

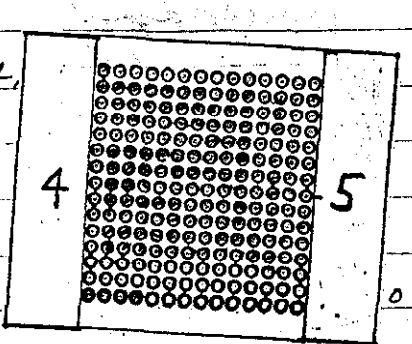
Emergency equipment in control room checked by I.D.C

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

Red light on by RKL Time 0805

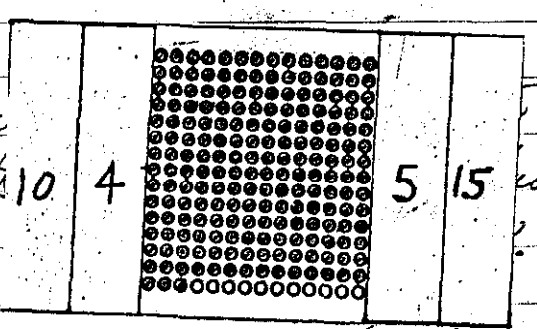
Start-up OK'd by I.D.C. RKL Date 11-2-73

added 1 rod. Now have an 14.
Total of 200 rods.



Water Lvl = 42.20 cm
1 + Per
C = 78.2 cm = 11.9 ¢
0900 Water Lvl = 33.30 cm
System just critical
Drain.

added 4.0" of concrete
thickness = 8.0".
on 14 x 14 + 3 array



Water Lvl = 42.40 cm
2 + Per
C = 378.1 cm = 3.2 ¢
0943 Water Lvl = 36.0 cm
System just critical
Drain.

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKK

Source in checked by RKK Source No. M-40

Emergency equipment in control room checked

Instruments in trip circuit: K-1-2-6

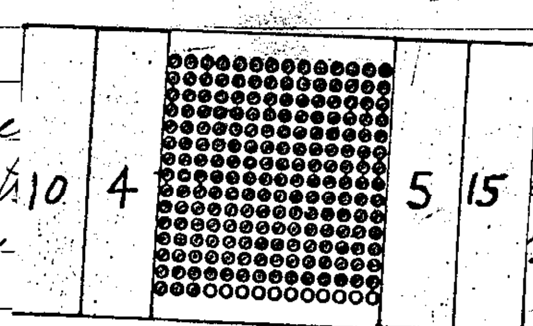
Red light on by RKK Time

Start-up OK'd by I.D.C. RKK Date

18-d-97 [illegible]
Total of 200 rods
14x14+4 array
Same as a-19
Blocks in contact

added 1 rod. Now have an 14X14+4 array.
Total of 200 rods.

Water ht = 42.20 cm — Temp °C
1 +Per — #1 = 25.0°C
T = 78.2 sec = 11.9 ¢ — 2 = 25.0°C
0900 Water ht = 33.30 cm
System just critical
Drain.



added 4.0" of concre[te] ... thickness = 8.0". ... [ha]ve an 14X14+3 array

Water ht = 42.40 cm — Temp °C
2 +Per — #1 = 25.0°C
T = 378.1 sec = 3.2 ¢ — 2 = 25.0°C
0943 Water ht = 36.0 cm
System just critical
Drain. — [illegible]

START-UP CHECK LIST

Equipment checked by I.D.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~~

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

Red light on by RKM Time

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

18-6-97 RP
Total of 200 rods
14X14+4 array
Same pos as p-19
Block in contact

added 1 rod. Now have an 14X14+4 array. Total of 200 rods.

Water ht = 42.20 cm
1 +Per
τ = 78.2 sec = 11.9¢
0900 Water ht = 33.30 cm
System just critical
Drain.

Temp °C
Block in contact. Same pos as p-19
14X14+3 array. Total of 199 rods.
Log #6 - p.81

5.0°C
5.0°C

added 4.0" of concrete to 2 faces: Total thickness = 8.0". Removed 1 rod. Have an 14X14+3 array. Total of 199 rods.

Water ht = 42.40 cm
2 +Per
τ = 378.1 sec = 3.2¢
0943 Water ht = 36.0 cm
System just critical
Drain.

Temp °C
#1 = 25.0°C
2 = 25.0°C

RKM

Removed 1 rod. Now have an 19 X 19 + 2 array
Total of 198 rods.

Water ht = 42.20 cm
3 - Per
C = -260.8 mr = -5.9 ¢
Drain.

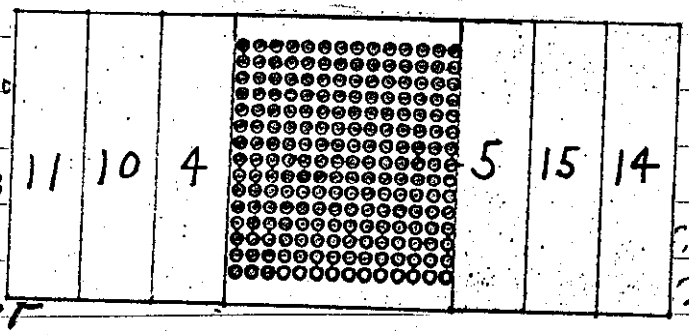
Temp °C
#1 = 25.0° C
2 = 25.0° C

added 4" of concrete to 2 faces. Total thickness
= 12.0". Total of 198 rods.

Water ht = 42.20 cm
4 - Per
C = -232.5 mr = -6.8 ¢
1300 Drain

Temp °C
#1 = 25.0° C
2 = 25.0° C

added 1 rod.



Water ht = 42.3
5 + Per
C = 328.1 mr = 3.6 ¢
1337 Water ht = 35.65 cm
6 System just critical
Drain.

.2° C
.2° C

Removed 1 rod. Now have an 19X19+2 array
Total of 198 rods.

Water ht = 42.20 cm
3 - Per
C = -260.8 mm = -5.9 ¢
Drain.

Temp °C
#1 = 25.0°C
2 = 25.0°C

added 4" of concrete to 2 faces. Total thickness
= 12.0". Total of 198 rods.

Water ht = 42.2c
4 - Per
C = -232.5 mm = -
1300 Drain

Block in contact. Same pos as p-19.
19X19+3 array. Total of 199 rods
Log # 6, p-82

0°C
0°C

added 1 rod. Total of 199 rods.

Water ht = 42.30 cm
5 + Per
C = 328.1 mm = 3.6 ¢
1337 Water ht = 35.65 cm
6 System just critical
Drain.

Temp °C
#1 = 25.2°C
2 = 25.2°C

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-12}	Meter ✓	4"	✓	3×10^{-12}
		Fast ✓	2"	✓	"
K-2	3×10^{-12}	Meter ✓	4"	✓	"
		Fast ✓	2"	✓	"
PM-1	7000 ✓	Alarm ✓	Out	✓	500 ✓
PM-2	12000 ✓	Low ✓	12"	✓	900 ✓
		Alarm ✓	1"	✓	"

LOG N CALIBRATE ___ ✓ OPERATE ___ ✓ DUMP WELL PROBE LIGHT ___

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

START-UP CHECK LIST

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

Instruments and safeties checked and reset by BHH

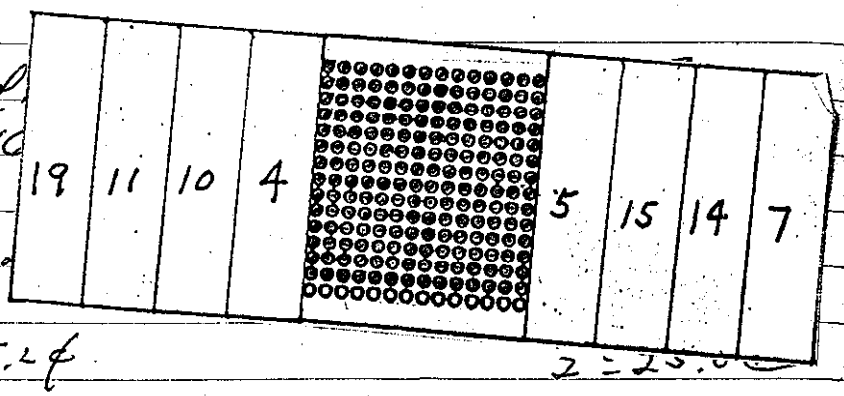
Source In checked by BHH Source No. M-43

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

~~Instruments in trip circuit~~ K-1-2 AM1-2

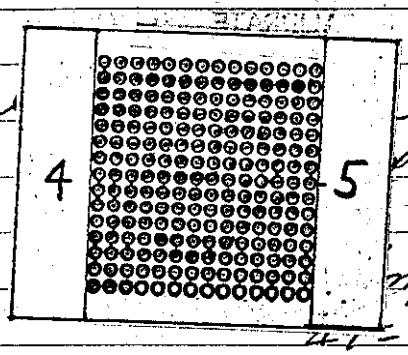
Red light on by BHH Time 0810

Start-up OK'd by I.D.C BHH Date 11-7-73



Added 4.0" of
thickness = "10

Water ht = 4.
1 + Per
C = 217.30 cm = 5.2 ¢
0956 Water ht = 35.45 Cm
System just critical
Drain.



Now have 4.0" of concrete thickness
of plexiglas encasement. ℓ 199 rods

Water ht = 42.30 cm
2 + Per
C = 608.4 cm = 2.0 ¢
1312 Water ht = 36.50 cm
System just critical
Drain.

mp°c
= 25.0°c
2 = 25.0°c

[redacted]

Blocks in contact. Same pos as on p-19.

14x14+3 array. Total of 199 rods

Log #6 - p-84

Added 4.0" of concrete to 2 faces. Total thickness = 16.0". Total of 199 rods.

Water ht = 42.0 Cm.

1 + Per

C = 217.30 sec = 5.2 ¢

0956 Water ht = 35.45 Cm

System just critical

Drain.

Temp °c

#1 = 25.0°c

2 = 25.0°c

Pos of rods for concrete block same as on p-19, 14x14+3 array, Total of 199 rods. Block spaced .10" from rods.

Log #6 - p-84

Now have 4.0" of concrete spaced .10" + thickness of plexiglas excavation. (.116" avg). Total of 199 rods

Water ht = 42.30 cm

2 + Per

C = 608.9 sec = 2.0 ¢

1312 Water ht = 36.50 cm

System just critical

Drain.

Temp °c

#1 = 25.0°c

2 = 25.0°c

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	$3X10^{-12}$	Meter ✓	~~4~~ 9.0"	✓	$3X10^{-12}$
		Fast ✓	2"	✓	"
K-2	$3X10^{-12}$	Meter ✓	9"	✓	"
		Fast ✓	2"	✓	"
PM-1	7000 ✓	Alarm ✓	.5"	✓	5002 ✓
PM-2	12002 ✓	Low ✓	12"	✓	9002 ✓
		Alarm ✓	1	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ___

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

START-UP CHECK LIST

Equipment checked by I, P, C AKM Personnel check by I, P, C

Instruments and safeties checked and reset by AKM

Source in checked by AKM Source No. M-43

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

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

Red light on by AKM Time 0800

Start-up OK'd by I, P, C, AKM Date 11-8-73

Removed 1 rod. Total of 198 rods.

Water ht = 42.40 Cm
1-Per
ε = -210.78 ¢ = -7.6 ¢

Temp °C
#1 = 25.0° C
2 = 25.0° C

0900 Drain.

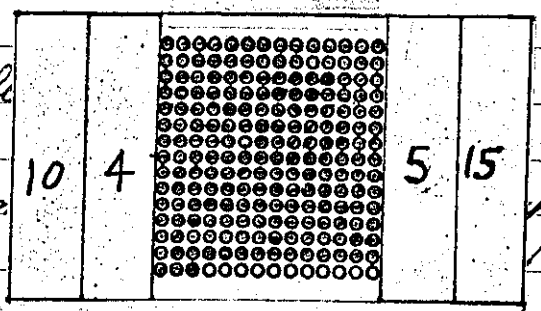
added 4.0" of concrete to 2 faces. Spaced .10". Total thickness now = 8.0". Total of 198 rods

Water ht = 42.20 cm
2-Per
ε = -467.19 ¢ = -3.0 ¢

Temp °C
#1 = 25.0° C
2 = 25.0° C

0937 Drain

added 1 rod. Tot



Water ht = 42.30 cm
3 +Per
ε = 147.76 ¢ = 7.2 ¢

Temp °C
1 = 25.0° C
2 = 25.0° C

1003 Water ht = 39.70 Cm
System just critical
Drain

Removed 1 rod: Total of 198 rods.

Water ht = 42.40 cm — Temp °C
1 -Per — #1 = 25.0 °C
τ = -210.78 sec = -7.6¢ — 2 = 25.0 °C
0900 Drain:

added 4.0" of concrete to 2 faces: Spaced .10": Total thickness now = 8.0". Total of 198 rods.

Pos of rods to concrete blocks, same as p-19.
14X14 73 array. Total of 199 rods. Blocks spaced .10" from rods. P-86
Log #6

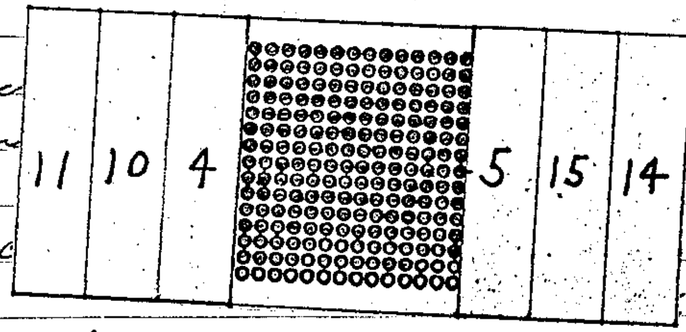
Water ht = 42.20 c[m] — [Te]mp °C
2 -Per — [#1] = 25.0 °C
τ = -467.19 sec = -3.0¢ — [2] = 25.0 °C
0937 Drain

added 1 rod: Total of 199 rods.

Water ht = 42.30 cm. — Temp °C
3 +Per — #1 = 25.0 °C
τ = 147.76 sec = 7.2¢ — 2 = 25.0 °C
01003 Water ht = 34.70 cm
System fuel critical
Drain

added 4.0" of conc

Total thickness n



Water ht = 42.30 c

^{4}+Per ... 0°C

τ = 158.62 sec = 6.8¢ 2 = 25.0°C

1329 Water ht = 34.80 cm

O System just critical

Drain.

Removed 1 rod: Total of 198 rods.

Water ht = 42.30 cm Temp °C

^{5}−Per #1 = 25.0°C

τ = −493.27 sec = −2.9¢ 2 = 25.0°C

1350 Drain:

14 x 14 + 3 array. Total of 199 rods.
Rods spaced .10" from rods.
P-37
Log # 6

added 4.0" of concrete to 2 faces. Spaced .10".
Total thickness now 12.0". Total of 199 rods.

Water ht = 42.30 cm
4 + Pos
C = 158.62 rem = 6.8 ¢
1329 Water ht = 34.80 cm
System just critical
Drain.

Temp °C
#1 = 25.0°C
2 = 25.0°C

Removed 1 rod. Total of 198 rods.

Water ht = 42.30 cm
5 - Pos
C = -493.27 rem = -2.9 ¢
1350 Drain.

Temp °C
#1 = 25.0°C
2 = 25.0°C

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	RESET	STARTUP RANGE
K-1	3×10^{-2}	Meter ✓	9"	✓	3×10^{-12}
		Fast ✓	2"	✓	"
K-2	3×10^{-12}	Meter ✓	9"	✓	"
		Fast ✓	2"	✓	"
PM-1	700V	Alarm ✓	.5"	✓	500V
PM-2	1200V	Low ✓	19"	✓	900V
		Alarm ✓	2"	✓	"

LOG N CALIBRATE ✓ OPERATE ✓ DUMP WELL PROBE LIGHT ___

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

START-UP CHECK LIST

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

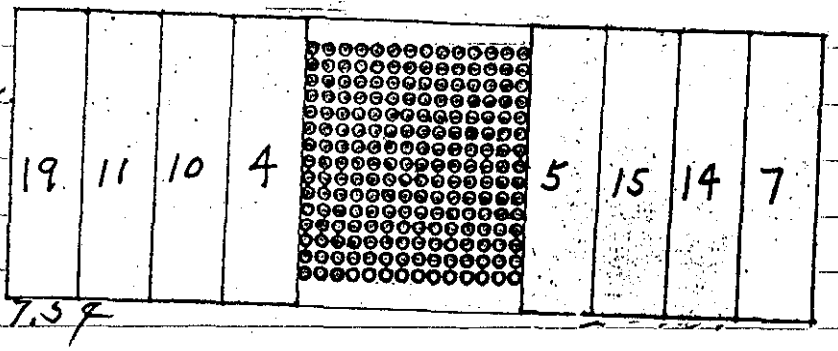
Instruments in trip circuit: K1-2 PM1-2

Red light on by RKH Time 0900

Start-up OK'd by I.D.C. RKH Date 11-9-73

added 4.0" of concrete to 2 faces. Spread. 10"
Total thickness now = 16.0". Total of 198 rods.

Water Ht = 42.50 cm. Temp °C
1-Per #1 = 25.0°C
C = -497.61 cm = -2.8 f 2 = 25.0°C
0955 Drain



added 1 rod.

Water Ht = 42.
2+Per
C = 141.24 cm = 7.5 f
1019 Water Ht = 34.30 cm.
System just critical
Drain.

Repeat of experiment on top of page 84. Concrete is concave on 2 faces. Total of 16.0" & 199 rods.

Water Ht = 42.10 cm Temp °C
3+Per #1 = 25.0°C
C = 451.98 cm = 2.5 f 2 = 25.0°C
1340 Water Ht = 36.90 cm,
System just critical
Drain.

over.

added 4.0" of concrete to 2 faces. Spaced .10"
Total thickness now = 16.0". Total of 198 rods.

Water ht = 42.5
1st Per
C = -497.61 cm =
0955 Drain

added 1 rod. Total of 199 rods.

Water ht = 42,40 cm
2nd Per
C = 141.24 cm = 7.5 f
1019 Water ht = 34.30 cm.
System just artificial
Drain.

Repeat of experiment on top of page 84. Concrete
in concave on 2 faces. Total of 16.0" & 199 rods.

Water ht = 42.10 cm
3rd Per
C = 451.98 cm = 2.5 f
1340 Water ht = 36.90 cm
System just artificial
Drain.

Temp °C
#1 = 25.0°C
2 = 25.0°C

Temp °C
#1 = 25.0°C
2 = 25.0°C

over.

Removed 1 rod: Total of 198 rods.

Water Alt = 92.9 cm

Temp °C

#1 = 25.0

2 = 25.0

+ - Per

G = -215.13 mm = -7.4 ft

1907 Drain.